PROCEEDINGS
OF THE MARINE SAFETY COUNCIL

DEPARTMENT OF TRANSPORTATION — UNITED STATES COAST GUARD

Vol. 28, No. 11 — CG–129 — November 1971

Collision Under the Golden Gate . . .

Four Hours Overboard . . .

Man Overboard . . .

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COVERS

FRONT COVER: The SS *Arizona Standard,* her lower bow areas severely damaged, is pictured the morning after her collision with the SS *Oregon Standard* near the Golden Gate Bridge in the San Francisco Bay. The collision happened in thick fog, and it resulted in extensive pollution of the Bay and of adjacent coastal areas. The causes and results of the collision are discussed in this month's lead article, "Collision Under the Golden Gate."

BACK COVER: Texaco's recently jumboized tanker *Baltimore Trader* returning from her successful Sea Trials passes her own old forebody which was being towed to Greece for scrapping. The Newport News Shipping and Dry Dock Company performed the largest jumbo job ever in an American yard, lengthening the vessel by 225 feet to 800 feet. *Courtesy Maritime Reporter/Engineering News.*

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PROCEEDINGS

OF THE

MARINE SAFETY COUNCIL

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COLLISION UNDER THE GOLDEN GATE

THE U.S. COAST GUARD operates the harbor advisory radar (HAR) system for the San Francisco Bay area as an experiment to investigate the desirability of harbor advisory systems in this and other busy U.S. ports. The system maintains surveillance over San Francisco Bay and the Bay channel approaches. Vessel movement information within the HAR area of responsibility is provided to affected vessels over the navigation radio channel (UHF channel 18A) from Coast Guard Harbor Advisory Radar Operations Center. When vessels report their departures or report to HAR at a designated reporting point, HAR responds, giving the positions of vessels and the directions of their movement in the reporting vessel's channel segment. Additional information is provided only upon request from a vessel or, if in the interest of safety, it is felt to be particularly meaningful for the vessel. Participation in the system is strictly voluntary, and as a result, no vessel is required to report its position or to monitor channel 18A. In the early morning of January 18, 1971, the HAR radar observer helplessly watched as two Standard Oil Co., of California tank vessels collided near the Golden Gate Bridge.

The SS Arizona Standard *pictured here sustained severe damage to its lower bow areas forward of the collision bulkhead.*

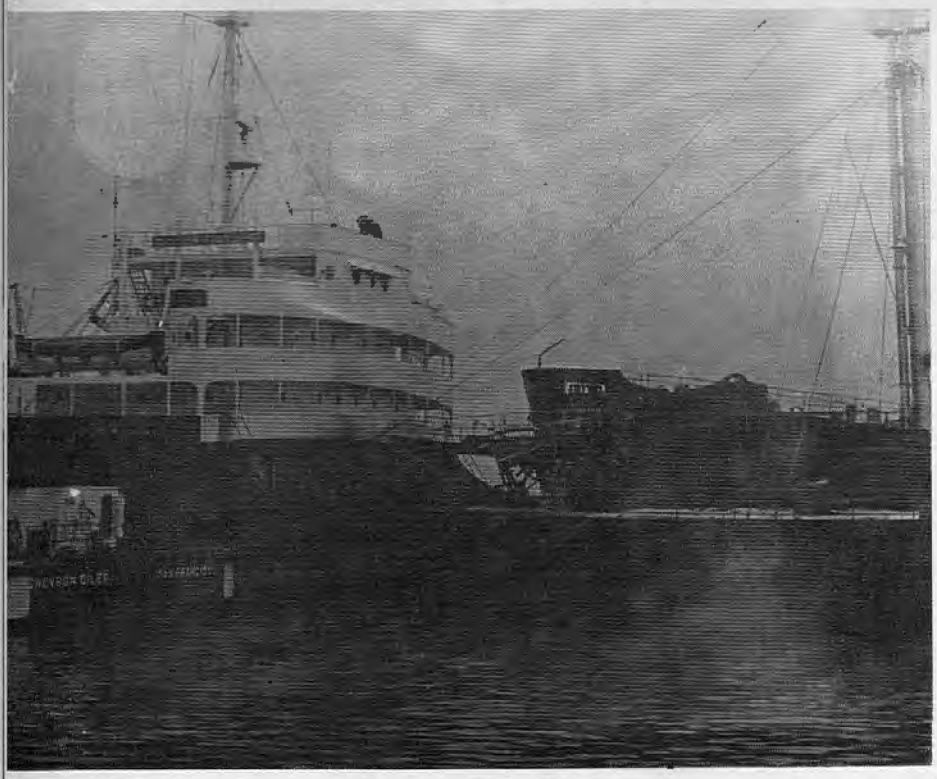
A thick fog fell on the San Francisco Bay area on the night of January 17 and the morning of January 18. The SS *Oregon Standard* continued on-loading and other preparations for her voyage from Richmond, Calif., bound for Bamberton, British Columbia. And the SS *Arizona Standard*, bound for Richmond from Estero Bay, Calif., made her way up the coast until 2221 when she encountered reduced visibility. Her master immediately ordered her engines to be placed on maneuvering speed status and began sounding fog signals. The masters of the two nearly identical 504-foot, 6,000 horsepower, steam and turbo-electric powered tankships elected to proceed through the fog on nearly opposite courses in the pilot waters of the San Francisco Bay entrance.

The *Oregon Standard* completed her loading operations of some 100,000 barrels of heavy bunker fuel before midnight on the 17th. The chief mate and the second mate tested all navigation gear and found it satisfactory. The two radars, one a Decca type RM with eight range scales from one half mile to 48 miles, the other a Raytheon Mariner's Pathfinder with four range scales from one half mile to 50 miles, were tuned and made ready for use.

At about 20 minutes after midnight, the *Oregon Standard* left the dock assisted by two tugs; her master, at the conn, was aware that the *Arizona Standard* was due at Point Orient at 0200 or 0230. She was underway, sounding fog signals at 1-minute intervals.

At 0049 the master of the *Oregon Standard* contacted HAR on 18A and advised that the tanker had departed Richmond Long Wharf bound for sea. He later switched to channel 10 because, as he testified, he had no traffic or pips on his radarscope. It is Standard Oil Co. policy that all of its vessels are to participate fully in HAR.

The fog had reduced visibility to about 200 to 300 yards, so that Southhampton Shoal Lighted Bell Buoy 1SS, which was abeam of the



The bow of the SS Arizona Standard *penetrated the port bow of the SS* Oregon Standard. *The vessels remained locked together as pictured above until 7 hours after the collision.*

Oregon Standard at 0053, was the only aid to navigation sighted visually on the passage outbound. Navigation from that point was by radar ranges and bearings and by dead reckoning. The *Oregon Standard* averaged 10.5 knots from the time she entered Southhampton Shoal Channel until Point Blunt on Angel Island was abeam to starboard. At that point her speed over ground was reduced by the flooding tide; and she rounded Angel Island on a southwesterly course making an average of 9.5 knots until abeam of Point Cavallo. There she reduced speed, averaging 7 knots until she passed under the Golden Gate Bridge.

When the *Oregon Standard's* master determined by the sound of its fog horn and by dead reckoning that Lime Point (at the northern end of the bridge) was abeam, he ordered right rudder to steer into the channel under the center span of the bridge. While making this turn, the master switched from the 1½-mile scale to the 5-mile scale and observed the blip that was the *Arizona Standard* on the Raytheon radarscope at about 1600 yards bearing 25° off the port bow. He tried to contact the *Arizona Standard* on the radio, but he erroneously set the switch on channel 6 rather than on the calling and distress channel—16. Unable to make contact on this frequency, he abandoned the effort and returned to navigating in an attempt to avoid a collision. At range 250 yards, the two white and the green navigation lights of the *Arizona Standard* were visually sighted on the same relative bearing. The master ordered full astern and sounded the general alarm.

The *Arizona Standard,* coming up the coast, encountered the reduced visibility which blanketed the Bay area, sailing with the tide flooding northeast at 1.5 to 2.0 knots. Bridge personnel aboard the *Arizona Standard* heard the *Oregon Standard's* 0049 report to HAR. Nine minutes later, the master of the *Arizona Standard* advised HAR that his vessel was entering the main ship channel bound for Point Orient. The master was at the conn, and the chief mate was manning the radar. Visibility was such that, although the white lights of the buoys on the port side of the channel were visible, the red lights to starboard could not be seen. The master sent the lookout from the wing of the bridge to the bow.

At 0120, HAR advised the *Arizona Standard* that the *Oregon Standard* was passing north of Alcatraz Island bound for sea. Seven minutes later the chief mate, with the radar on a range of 6 miles, observed the *Oregon Standard* south of Point Blunt. The mate plotted three positions of the contact on the face of the radarscope, noting no times, and making no further plots. He estimated the closest point of approach as 1 mile, and continued to observe the contact for about 6 minutes before it disappeared from the scope, reason unknown.

At 0130 HAR advised the *Arizona Standard* that the *Oregon Standard* was 1 mile east of the Golden Gate Bridge. The *Arizona Standard* made several unsuccessful attempts to contact the *Oregon Standard* on channels 18A, 16, and 10 (the company's working frequency).

The *Arizona Standard* approached the bridge on course 056° true, following the natural range observed on radar, formed by Harding Rock Buoy and the offshore rocks just south of Point Blunt. She was making 11.4 knots at this time.

At about 1036 the *Arizona Standard's* master heard the mid-channel signal from the center span of the bridge, and ordered the helmsman to come right slightly, to 058° true. Two minutes later HAR advised the *Arizona Standard* that HAR had been unable to contact the *Oregon Standard* on channel 18A. The *Arizona Standard* advised that she was about to pass under the Golden

Gate Bridge. Another attempt to raise the *Oregon Standard* on the radio failed. At 0139 the master observed the red navigation light of the *Oregon Standard* off his starboard bow. He ordered hard left rudder and the engine stopped.

At approximately 0140 the two tank ships collided with a soft grinding crunch. Crewmembers of neither vessel lost their footing, and no one was hurt. The *Arizona Standard*'s bow struck and penetrated the *Oregon Standard*'s port side, rupturing three of the *Oregon Standard*'s cargo tanks. The bunker oil from the tanks poured into the Bay. The *Arizona Standard* sustained severe damage to her lower bow areas forward of the collision bulkhead. The overhang of her bow slid aft on the *Oregon Standard*'s deck, shearing ullage trunks and external fittings as it moved aft.

After examining the damage, the masters attempted without success to back the vessels free of each other.

The two remained locked together and drifted under the bridge into the inner Bay. The starboard anchor of the *Oregon Standard* was let go with nine shots of chain out, but the vessels continued to drift toward Angel Island. Several tugs arrived after HAR and the company office were notified of the collision, and they held the tankers clear of shallow water. Shortly thereafter barges and oil removal equipment arrived, and an oil retention boom was rigged around the ships. The wheel wash from the maneuvering tugs caused oil to be washed from the boom enclosure. Skimmers and vacuum barges began to remove oil from the surface of the water immediately after their arrival on scene.

About 7 hours after the collision the vessels were separated and proceeded to the Standard Oil dock.

An estimated 20,000 barrels of oil spilled from the *Oregon Standard*. None was lost from the other vessel. The tide carried the oil into portions of the Bay. Later tidal action dispersed the oil and caused contamination of adjacent coastal areas. Extensive cleanup operations took place, but pollution damage was severe. Hundreds of waterfowl died, as efforts to save them were able to succeed for only about 3.5 percent of the birds coated with oil. Damage to marine life has not been determined.

Extensive cleanup efforts both ashore and in the water were required to minimize the harm from pollution. Scenes such as the above were familiar in many portions of the Bay and along adjacent coastal areas. The total damage to the environment as a result of the collision may never be determined.

The collision can surely be called a catastrophe in terms of ecological harm, property damage, economic loss, harm to the small boater and to the public's stake in the environment. Its tragedy is felt even more deeply since, according to the National Transportation Safety Board, the accident could have been averted had any one of four systems designed to prevent such collisions functioned properly.

The U.S. Coast Guard Marine Board of Investigation concluded:

> The casualty was caused by faulty navigation of the SS *Arizona Standard* and the SS *Oregon Standard*. Both vessels proceeded at an immoderate speed in dense fog and failed to keep to the starboard side of the channel prior to the collision. There were other factors that may have contributed to the casualty.
>
> a. Failure to establish radiotelephone communication. . . .
> b. Navigating narrow channel in dense fog. . . .
> c. Failure of the *Oregon Standard* to make timely radar contact. . . .
> d. Loss of radar contact by the *Arizona Standard*. . . .

In making its determination of the probable cause of this collision, the National Transportation Safety Board concluded that "the cause of this collision was the failure or inadequacy of four different systems or subsystems, any one of which could have prevented the collision had it

When the vessels were separated, the damage to the Oregon Standard *looked like this. Ullage trunks and external fittings on the deck area were sheared when the overhang of the* Arizona Standard*'s bow slid aft on the* Oregon Standard. *Heavy bunker oil from the three ruptured cargo tanks spilled into the San Francisco Bay, causing extensive pollution damage.*

functioned adequately." The four systems are the regulatory system of the Inland Rules of the Road, the radar systems of the vessels, the whistle signal system, and the experimental harbor advisory radar system.

Two major violations of the rules of the road by each vessel contributed to the collision. Obviously, neither master was anxious, under the prevailing conditions, to pilot his ship close to the bridge abutments. Perhaps they tended to overcompensate toward the center of the channel under the bridge. Illustrations 2, 3, and 4 are photographs of the HAR radarscope taken at 3-minute intervals near the time of the casualty. Their evidence shows that the collision occurred in approximately midchannel, 300 to 450 yards to the seaward side of the Golden Gate Bridge (illustration 4). Each vessel failed to stay to its starboard side of the channel, in violation of the rules of the road. This violation was a major cause of the collision. The absence of a direct or readily available indication of the center of the channel in the vicinity of the bridge, and the failure of the masters to accurately plot their positions contributed to this violation.

Another contributing factor was the reliance of the master of the *Oregon Standard* solely on his sense of hearing and on dead reckoning to determine when Lime Point was abeam and so to time his turn to starboard to pass under the bridge. Illustration 2 shows that Lime Point was actually somewhat abaft the *Oregon Standard's* beam before the master ordered the turn. Hence he came south of his intended track, steering close to the center of the channel. The set of the current and the advance and transfer during the turn were other factors which may have caused this deviation from the intended track. Had he relied on a radar bearing off Lime Point, the master's determination of the time to turn might have been more accurate.

Failure of both vessels to maintain a moderate speed in the reduced visibility was another contributory violation of the rules of the road. Moderate speed is defined as a speed at which a vessel is capable of stopping within one-half the distance of its visibility. The speeds of the vessels were documented. The *Arizona Standard*, from 0130 to the time of the collision averaged 11.4 knots. Such speed, according to the NTSB was not necessary to maintain steerageway, and was immoderate in light of a visibility of less than 500 yards. The *Oregon Standard* made the 1-mile from Point Cavallo to the point of collision in 10 minutes—an average speed of 6 knots.

Adherence to the rules of the road regarding speed in fog and keeping to starboard in a channel would have averted the collision.

The *Oregon Standard's* master used the Raytheon radar to pilot his vessel through the Bay. He kept it on the 5-mile range scale from departure until the vessel drew near Harding Rock Buoy. The *Arizona Standard*, being more than 5 miles from his ship, would not have appeared on the scope. The master then switched the radar to the 1½-mile scale and kept it on that scale until the vessel was about to pass under the bridge. On this scale the *Arizona Standard* would not have appeared on the scope until the *Oregon Standard* was off Lime Point. At that time the master was trying to determine when Lime Point was abeam, to line up the bridge piers on his scope, and to make his course change to pass under the bridge. He may simply have failed to notice the blip of the *Arizona Standard* at the edge of his scope even if it appeared there.

The Decca radarscope was being observed by the second mate. He kept the scope on the 3-mile or the 1½-mile scales until the tankship was off Harding Rock. Then he switched it to the 6-mile scale for 2 or 3 minutes. At this time, the *Arizona Standard* should have been close enough to be observed on this scale. Yet the mate did not observe her, perhaps because he was absorbed in logging bearings and distances off navigational points, supervising the helmsman, tending the engine order telegraph, listening for fog signals, acting as a lookout, and performing other duties of a deck watch officer. He then switched to the 3-mile scale. When the vessel was off Point Cavallo, he switched to the 1½-mile scale until just prior to passing under the bridge. The contact was finally observed by the master when it was just 0.8 mile distant. Most probably the failure of the *Oregon Standard* to observe the *Arizona Standard* was the result of neither radar being checked on a range-scale greater than 6-miles, and the preoccupation of the master and of the second mate with their other duties.

Aboard the *Arizona Standard* the chief mate was concentrating on the natural range of Harding Rock Buoy and the rocks off Point Blunt. He did observe the *Oregon Standard* on the scope at a range of about 6 miles, but he noted no times, and he made no determination of the contact's course and speed. The radar image was lost when the *Oregon Standard* was approximately 1 mile northeast of the center of the bridge. The only theory advanced for this disappearance of the blip is that it may have blended into the image of the Golden Gate Bridge. Yet neither the testimony nor the exhibits presented to the Marine Board of Investigation supports this assumption with the contact at such a great distance from the bridge. The loss of the image at this point remains unexplained.

Proper use of radar includes switching to larger range scales periodically to make timely observation of a contact, tracking the contact to determine its course, speed, and closest point of approach, and continuing to observe the contact for any changes of course or hazards which may arise. Such use can be a valuable aid to a pilot in avoiding collision. In conditions such as those present during this collision, every available aid to navigation should have been used to its best advantage. If radar had been used to its best advantage in this case, the collision might have been avoided.

Despite the fact that both vessels were sounding the proper fog signals, personnel on neither vessel heard the other's signals. Had they heard them it is possible that the vessels would have complied with the section of the Inland Rules of the Road which requires a vessel hearing, apparently forward of her beam, the fog signal of a vessel whose position is not ascertained to stop her engines and to navigate with caution until danger of collision no longer exists. The value of this regulation obviously depends on fog signals being heard. In this case a powerful diaphone and two fog signals on the Golden Gate Bridge, which the personnel aboard each vessel were intently listening to, may have contributed to the failure of the vessel's fog signals to be heard. The whistle signal system failed as a result; had it worked, the accident might not have happened.

The Harbor Advisory Radar system, a research and development project for the Coast Guard, has worked well, and a great deal of useful information has been obtained from this experiment. Operational units for San Francisco and for other busy ports are being considered by the Coast Guard. In this casualty, however, the HAR personnel sat helplessly watching as these two tankers collided. There are two reasons for the "failure" of the HAR system in this case: lack of communication and lack of authority.

As the HAR system currently operates there is no requirement that vessels either guard the designated frequency or report to the system. As soon as the *Oregon Standard* switched from channel 18A to channel 10, a breakdown in the system occurred. Communication was lost.

The HAR operator is currently allowed to provide only a word picture of the positions and general direction of movement of vessels which he observes on his radar. He may not provide interpretive information nor may he direct or regulate traffic movements in any manner. The Coast Guard lacks statutory authority to operate such traffic regulation systems.

Had the communication or the authority been present, it is likely that HAR would have prevented the collision.

Two underlying defects aggravated the failures of the four major collision prevention systems outlined above. First, there is the initial decision made under adverse conditions of visibility and tide whether to initiate or to continue the voyage or to delay departure or to heave to and await more favorable conditions. This has traditionally been the master's decision, with the safety of his vessel being the paramount factor for his consideration. But his decision is also affected by economic factors. The NTSB concluded: "The master alone should no longer be required or allowed to bear the burden of such decisions. He should receive assistance and, when necessary, authoritative direction in making the decision. Traffic regulation systems with mandatory participation, shipboard collision avoidance systems, and mandatory bridge-to-bridge radiotelephone communications are some methods which are available to provide the desired assistance."

The second underlying factor is pilothouse organization and workload. Several examples of deficiencies in this area appear. The master of the *Oregon Standard* was attempting to determine the timing of his turn by

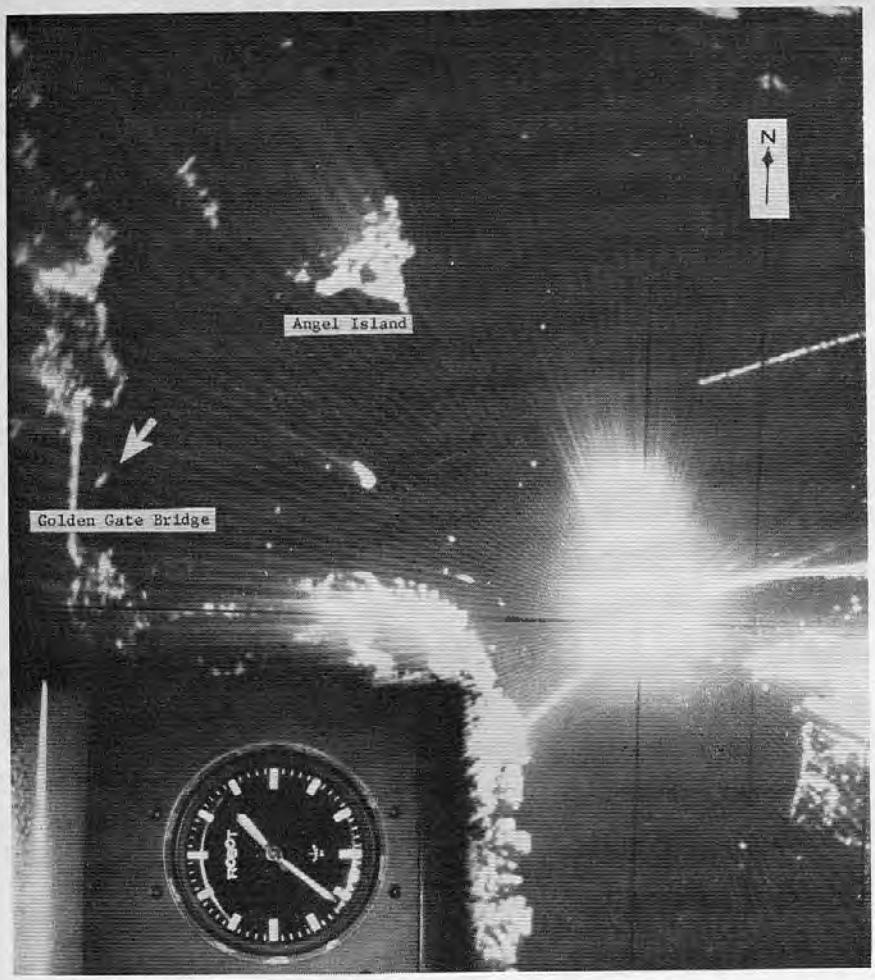


ILLUSTRATION 2

The 0136:08 photograph of the HAR radarscope shows the blip of the SS Oregon Standard *(indicated by arrow). This illustration indicates that Lime Point, at the north end of the bridge, was abaft the beam of the vessel before the vessel changed course to starboard to pass under the span.*

the sound of the fog horn at Lime Point. Obviously he could not be on the wing of the bridge listening to the fog horn and in the wheelhouse observing the range and bearing of Lime Point on the radar at the same time. Yet he failed to assign either task to a mate.

With the Decca radarscope on the 6-mile range scale, there should have been ample opportunity for the *Oregon Standard's* second mate to observe that the *Arizona Standard* was ahead in the channel. However, the second mate was busy with conflicting tasks, some of which could not be accomplished while within view of the radarscope. When the *Oregon Standard* finally detected the contact at 0.8 mile, the master attempted to raise the *Arizona Standard* on the radiotelephone, but he mistakenly set the radio on channel 6. Rather than take time to switch channels and try again, he returned to more direct efforts to avoid the collision. His bridge layout prevented him from talking on the radio and making a visual search at the same time, and he did not assign either task to someone else. Aboard the *Arizona Standard*, three officers at work on the bridge, knowing of the presence of the *Oregon Standard* in the vicinity, could not or did not plot either vessel's track. These examples led the NTSB to recommend that: "Vessel operators, the American Institute of Merchant Shipping, and the Society of Naval Architects and Marine Engineers give due consideration to the development of coordinated bridge workspace arrangements and task assignments in the formulation of vessel specifications and designs as highlighted in the recent General Dynamics study ('Human Factors in Ship Control' 1969)." The four volume study was made for the Maritime Administration, and is available for a fee from the National Technical Information Service, Springfield, Va. 22151.

The National Transportation Safety Board summarized its analysis of this collision and concluded as follows:

> Ecological losses which affect the general population, in addition to the economic losses incurred by the vessels' operators, resulted from this casualty. The results might have been even more catastrophic if two supertankers of more than 100,000 GT had been involved, or if the cargo of the *Oregon Standard* had been gasoline in lieu of bunker fuel.
>
> The current theory of control of vessel movements in harbors relies strongly upon the presumption that individual masters are competent and that by employing their skills in their own best interests, they will succeed in avoiding collision. However, the fact that economics also enters master's decisions is inescapable. Both vessels were moving at immoderate speeds, determined necessary by the masters for their own reasons, and the individual efforts of each master were insufficient to

prevent an enormous loss to the general public. The fact that this type of accident is repeatable, and on a far larger scale, makes valid the question of what degree of public control is necessary. Does service to the public welfare still properly permit such decisions, fraught with great public risk, to be made only by the two privately motivated individuals, or is a firmer degree of control, responsible to the general interest, necessary?

Under the control system prescribed by the Inland Rules of the Road, the vessels could have avoided each other by keeping to their starboard side of the channel, establishing their positions by their own radar. They could have avoided each other by seeing each other on radar, and maneuvering accordingly. They could have avoided each other by voluntarily employing the services of the harbor advisory radar. None of these systems operated to achieve the function needed for individual reasons already described.

The most significant of these systems, the Board believes, is the potentially controlling harbor advisory radar. The HAR is a publicly funded facility which lacks the corresponding public authority needed to insure that the weaknesses of privately operated systems or private motivations would not produce great public loss. This potentially protecting public radar system should no longer be placed in the position of recording the minute stages of a public disaster while powerless to prevent it. The Safety Board believes that, responsive to the public interest, the authority to control this traffic should be provided.

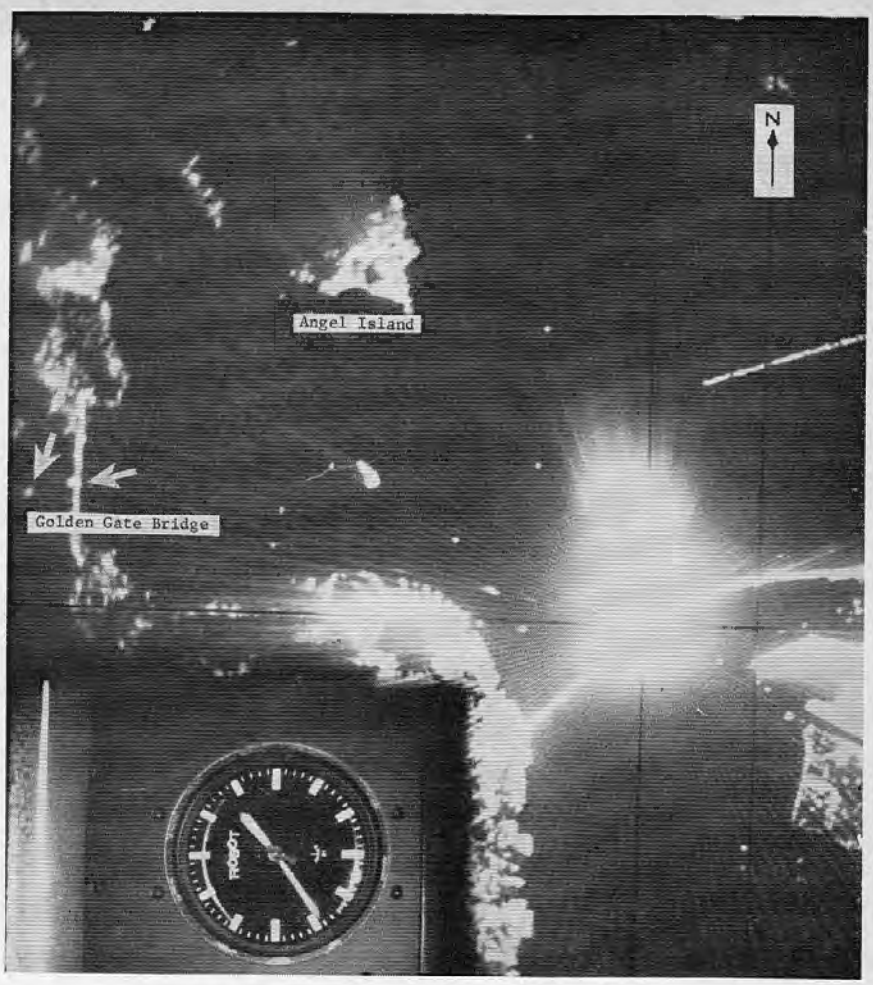


ILLUSTRATION 3

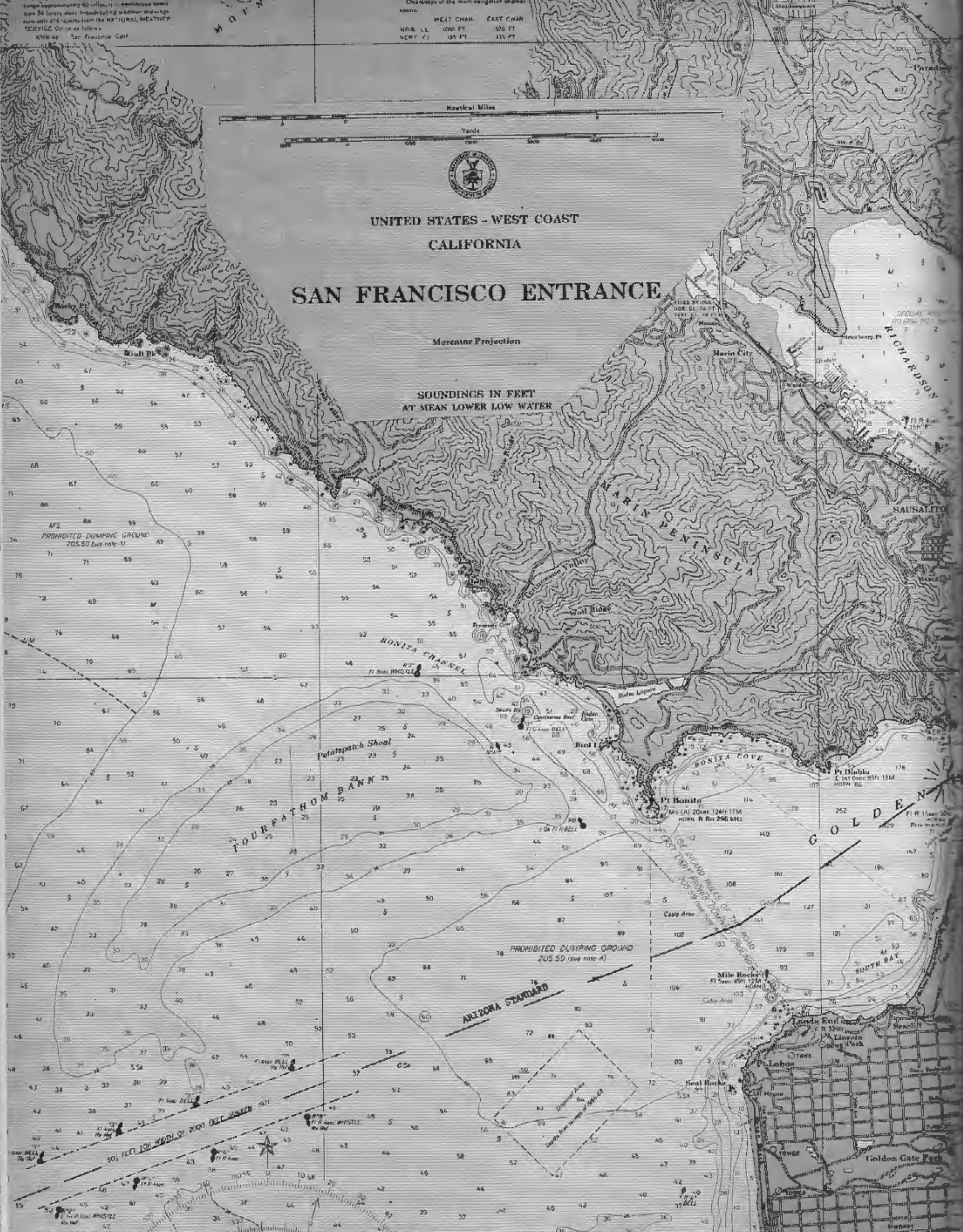
The 0139:02 photograph of the HAR radarscope shows both the Oregon Standard *and the* Arizona Standard *(arrows). It indicates the* Oregon Standard *just passing under the bridge, a little south of the center of the channel. The* Arizona Standard *is approximately 900 yards west southwest of the center of the bridge.*

In addition to its conclusion that faulty navigation caused the collision, the Coast Guard Marine Board of Investigation concluded that the failure to proceed at moderate speed in fog, a violation of Article 16 of the Inland Rules of the Road, and the failure to keep to the starboard side of the channel, a violation of Article 25 of the Inland Rules of the Road by the masters of both vessels was evidence of negligence. "The casualty might have been prevented," they went on:

> a. If the master of the *Oregon Standard* had started his right turn to line up with the channel under the bridge in sufficient time, or had otherwise directed his course to assure that his vessel would remain on the starboard side of the channel instead of in the middle of the channel.

ILLUSTRATION 1

On the following pages is a chart of the San Francisco Bay entrance, the scene of the collision of the SS Oregon Standard *and the SS* Arizona Standard. *The approximate tracklines of the vessels are drawn in, and the approximate point of impact is shown. It must be emphasized that the tracklines and the point of collision are estimated and are not intended to show exact positions.*



UNITED STATES - WEST COAST
CALIFORNIA
SAN FRANCISCO ENTRANCE
Mercator Projection
SOUNDINGS IN FEET
AT MEAN LOWER LOW WATER
Nautical Miles
Yards
WEST CHAN
EAST CHAN
MARIN PENINSULA
RICHARDSON
SAUSALITO
Marin City
Rocky Pt
Gull Rk
Wolf Ridge
Tennessee Valley
BONITA CHANNEL
Potatopatch Shoal
FOURFATHOM BANK
Bird I
BONITA COVE
Pt Bonita
Pt Diablo
GOLDEN
PROHIBITED DUMPING GROUND
205.50 (see note A)
ARIZONA STANDARD
Mile Rocks
SOUTH BAY
Lands End
Lincoln Park
Pt Lobos
Seal Rocks
Golden Gate Park
Cable Area


SAN FRANCISCO BAY
Richmond Inner Harbor
Point Richmond
Brooks I
Fleming Pt
Pt Cheney
Tiburon
RACCOON STRAIT
ANGEL ISLAND
Pt Stuart
Pt Knox
SOUTHAMPTON SHOAL
SUBMARINE OPERATING AREA 207.540
RESTRICTED AREA 207.540
Alcatraz I
Treasure Island
Yerba Buena I
North Pt
Telegraph Hill
Rincon Pt
GOLDEN GATE BRIDGE
SAN FRANCISCO
MIDDLE HARBOR
Berkeley Pier (submerged)

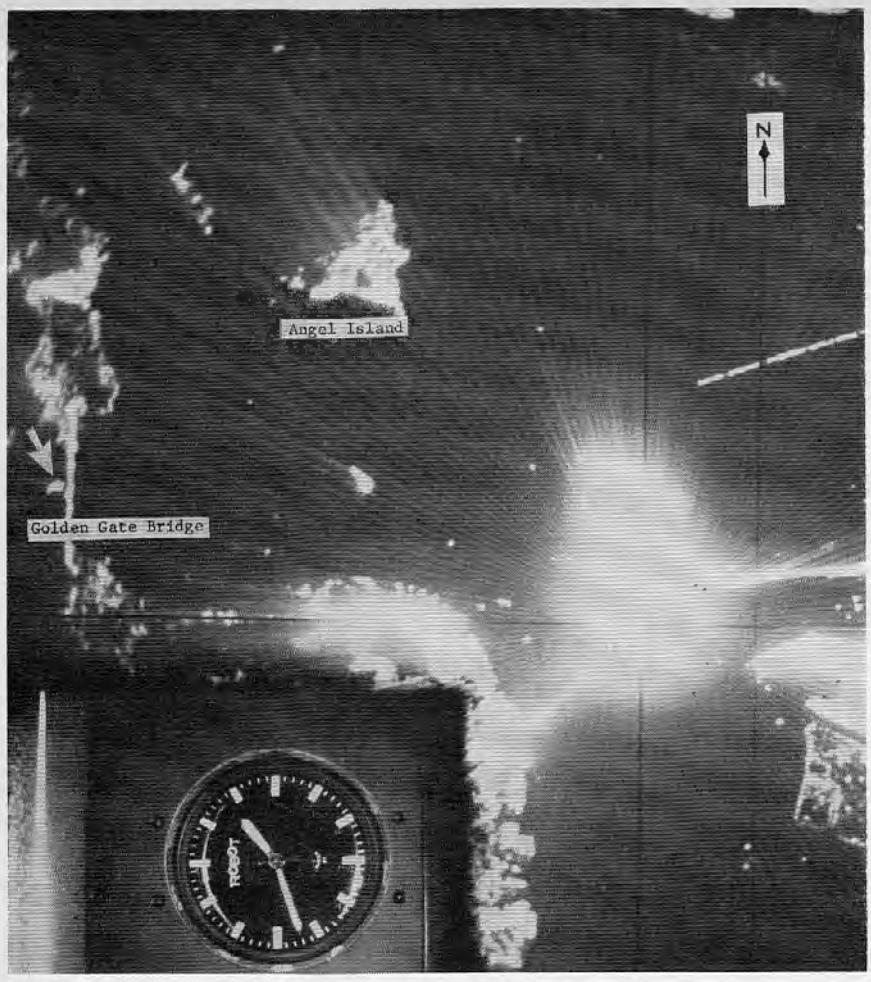


ILLUSTRATION 4

The 0141:58 photograph of the HAR radarscope shows the two radar pips representing the Arizona Standard *and* Oregon Standard *merged in a position approximately 150 yards west southwest of the center of the bridge (arrow).*

b. If the master of the *Arizona Standard* had set his course to take his vessel closer to the south pier of the Golden Gate Bridge, instead of making good a course down the middle of the channel.

c. If communications on the radiotelephone had been established in order that the vessels could have ascertained the course and intentions of the other. This would have allowed the vessels to take evasive action to prevent both vessels from passing under the Golden Gate Bridge in the center of the channel at the same time.

d. If the *Arizona Standard* had been picked up on radar at a distance greater than eight-tenths of a mile in sufficient time for the *Oregon Standard* to take evasive action. Closer attention to the PPI scope, better adjustment of the radar, operation of the radar at intervals on a greater range scale, and an additional radar observer may have facilitated earlier radar contact.

The Marine Board of Investigation recommended continued efforts to get the Vessel Bridge-to-Bridge Radiotelephone Act passed and continuance of the harbor advisory radar.

The NTSB concurred in the Marine Board of Investigation's recommendation regarding HAR and commended Congress for its passage of the "Vessel Bridge-to-Bridge Radiotelephone Act." The President signed the act (Public Law 92–63) on August 4, 1971. It now awaits implementing regulations from the Coast Guard. Such regulations are expected to become effective on or about July 1, 1972. The Safety Board further urged passage of legislation such as the proposed "Ports and Waterways Safety Act of 1971" (H.R. 8140) which would provide statutory authority for the Coast Guard to establish and operate traffic regulation systems in congested port waters of the United States.

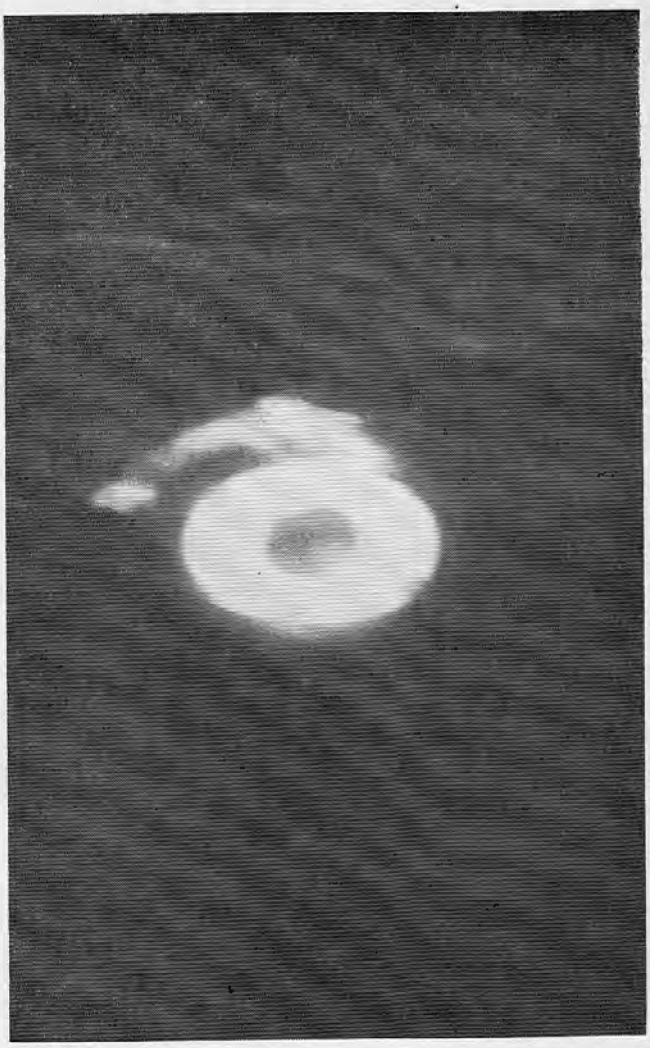
The Safety Board also recommended that:

> The Coast Guard continue to develop the Marine Traffic System in San Francisco Bay . . .
>
> The Coast Guard Study the feasibility of developing a method of traffic separation for inboard and outboard traffic in the Golden Gate Channel.
>
> The Radio Technical Commission for Marine Services actively support and encourage the Maritime and electronic industries' efforts to develop and utilize collision avoidance systems . . .

Legislation and regulations to correct the errors which caused the catastrophe which befell San Francisco Bay on January 18, 1971, are pending. Perhaps the lessons learned from this casualty will help to avert such casualties—or worse ones—in the meantime.

NOTE.—The above article is based upon the Marine Casualty Report of the incident, comprised of the U.S. Coast Guard Marine Board of Investigation Report and Commandant's Action, and the action by the National Transportation Safety Board released August 11, 1971. Copies of the Marine Casualty Report may be obtained by writing U.S. Coast Guard (MVI–3/83), 400 Seventh Street SW., Washington, D.C. 20590. ⚓

FOUR HOURS OVERBOARD



The photographs on this page were taken during a recovery of a man overboard in 1965. The victim fell over the side for unknown reasons, and it was 4 hours before he was rescued by a lifeboat from his own vessel. He was fortunate, indeed. The waters he was in—south of Bermuda—were warm enough so that he could last that long. He was spotted by personnel on his ship, and the photo below demonstrates how difficult it is to spot a man's head even in calm seas. The life ring was thrown to the man after he was sighted, so the crew of his vessel did not even have that to look for in their search.

The incident emphasizes the importance of physical fitness as explained in the article on the following pages. This victim was swimming strongly even after 4 hours in the water. He was able to survive only because he was physically fit.

The picture at the right evokes some idea of the smallness of a man alone in the vast ocean. This man was lucky; many, many others have not been. Don't be the man overboard! ⚓

Don't be the MAN OVERBOARD

Cdr. R. V. Hirstein, USN
Naval Safety Center

The sea is a stern taskmaster, sometimes quiet, never yielding, always waiting.

This article is based on a review of the 26 most recent man-overboard reports received by the Surface Ship Directorate of the Naval Safety Center. The conclusions are not encouraging: 12 of the 26 men were drowned, nine at night; 20 of the instances involved non-rated men; only four of the 14 survivors were wearing flotation gear. By ship type, carriers experienced nine of the men overboard, destroyer types seven, fleet oilers three, tank landing ships two, with one each being experienced by a CLG, ASR, AG, AS, and PBR. In eight of the cases the ship involved was at anchor, and five of the 12 deaths were from anchored or moored ships.

The following article is reprinted from the fall, 1970 issue of Fathom magazine, a Naval Safety Center Publication. Although the author intended it for a Naval readership, we feel it applies as well to the Merchant Marine and others who sail the seas.—Editor

THE DRAWING (on *page 213*) is the way your ship might appear to you just after you have fallen overboard during daylight hours. Hopefully you were seen either falling or in the water. If you were seen, prepare to keep yourself afloat for 8 to 14 minutes (an average spread based on our cases and Fleet Training Group requirements). Hopefully you have a lifejacket on. If you are not wearing flotation gear, then hopefully you are a strong swimmer and in good enough condition to enable you to last until your rescuers arrive. If it is dark, your chances for survival are reduced considerably. But perhaps most important, if all other factors are in your favor, you hopefully are familiar with rescue procedures—how you can help when that helo, boat or ship reaches you.

UNDERSTANDING THE DANGERS

Perhaps the most striking fact to be garnered from these statistics is that 20 of the men who fell overboard were non-rated; an actuality which points out a vital responsibility of division officers and petty officers. New men in particular must be indoctrinated in the dangers of living and working in a ship. Those new to sea life unfortunately tend to underestimate the dangers of being at sea. What is worse than an FA swept over the side while trying to dump trash from the destroyer fantail on the midwatch? . . . or the SA who at 0100 finishes a turn as helmsman and proceeds on his way to relieve as after lookout and is never seen again? . . . or the SN working outside of lifelines with no lifejacket on? . . . or the airman blown from a carrier's flight deck after being hit by the wash of a jet aircraft? All these are documented cases in the list of 26.

Lack of attention or carelessness on the part of the individual was determined to be a major factor in 14 instances. Such an excuse, however, does not allow a supervisor to evade the responsibility of ensuring that his men understand the dangers of being aboard a ship at sea. Unfortunately, all the indoctrination in the world sometimes has little value in saving a life. Four of the men overboard were apparently intentional actions. In each, mental depression was indicated. Drunkenness accounts for two of these possible suicides and drug use is inferred in another.

DARKNESS

As previously mentioned, darkness seriously complicates the man-overboard problem. Available information indicates that none of the nine who were lost at night were either seen or heard. (It is interesting to note that all nine of the drowned men were in an off-duty status when they fell or jumped into the water.) Only those with experience at sea can appreciate and respect the noisy combination of wind, sea and ship on a dark night. The following accident narrative bears witness to this. "The clouds were scattered and there was no moon. There were stars visible. The position from which the man probably fell would have carried him under the overhang so that it is unlikely that anyone could have seen him until he passed by the fantail. The fantail watch did not spot him probably because of the darkness of the night and the possibility that he was stunned by the fall and unable to take action to attract attention."

PHYSICAL FITNESS

The ability to swim, tread water or otherwise keep afloat is greatly dependent upon the physical condition of the man involved. Flotation gear, of course, makes the stay in the water considerably less exhausting, but we need only recall that four of 14 survivors in the study were wearing lifejackets or similar gear to point out the need for conserving energy and strength. It doesn't take long to become exhausted in choppy waters. Here is a quote from a report submitted by a rescue helo pilot. "The man was about 300 yards upwind of the smoke (float). I established the helo into a hover and the swimmer went into the water. The man was assisted into the sling and brought into the helo. He appeared to be totally exhausted but otherwise in good condition. We returned to the ship . . ." In another accident report a rescue helo pilot said. "The horse collar was lowered for the man as he appeared to be in good condition even though he was without any flotation gear. He had trouble swimming to the sling so a swimmer was lowered to assist. After the man had been helped into a mae west he appeared to lose consciousness and had to be manually positioned in the horse collar by the swimmer." The physical condition of these men was not reported, but both were obviously in good enough shape to last the minimum time for survival (both were

LIFESAVING HINTS

Here are several basic rules to help you avoid falling overboard, or if you should be so unfortunate, to help you stay alive until rescue:

- **Do not sit or lean on lifelines.**
- **Do not go out on weather decks at night or during heavy weather unless required to do so. If you must go out, wear a lifejacket and perhaps a lifeline, and be alert for course and speed changes which might increase the ship's roll and cause the sea to sweep the deck.**
- **Do not sleep topside.**
- **Know how to swim, tread water and float on your back expending the least amount of effort possible.**
- **Keep yourself physically fit.**
- **Do not dump trash at unauthorized times and places. Not only are you taking the chance of falling overboard with no witnesses, but you are increasing the possibility of a false man-overboard situation. Garbage and trash can look surprisingly like a man when floating down the side of a ship on a dark night.**
- **Obey the basic rules of seamanship:**

1. **Never stand in the bight of a line.**
2. **Never stand outboard of a line to another ship during an unrep.**
3. **Temporary lifelines must always be rigged where permanent lines are lowered.**
4. **Men working over the side or outside of lifelines must wear lifejackets, lifelines and be tended.**

in the water at least 8 minutes). In the second case the sea state was reported as "very rough," and the man was recovered over 2 miles from his ship.

As mentioned earlier, eight of the 26 cases studied were men overboard from moored or anchored ships. Five of the eight men drowned. The problem seems to be different in port. Two of the five men drowned while intoxicated and after returning from liberty. Another was suspected of using drugs, one man's fall over the side could not be explained and one man was lost in a swift river current. The incidence of men returning aboard ship drunk and falling or jumping overboard (or falling off the pier near the ship) occurs frequently enough to warrant consideration. Probably the best way to combat this problem is to encourage the buddy system while on liberty. The fact that a man is accompanied by a shipmate can usually prevent serious accidents. A buddy should see that his ship mate gets aboard and to his bunk safely. An efficient duty section will also see that once a man is in sight he is "monitored" to his bunk. This includes coming aboard, crossing over, and arrival in his berthing compartment.

WHAT THE SHIP WILL DO

Once it has been brought to the attention of the officer of the deck on the bridge that a man has been sighted overboard, the ship will be maneuvered with rudder and perhaps engines to, first, avoid hitting the man, and then to recover him or return close by to await the return of the rescue helo or boat. Anyone sighting a man in the water *must* immediately shout in his loudest voice, "Man Overboard—Port/Starboard Side," and then either repeat the call as many times as is necessary or take other measures until it is obvious that the conning officer is taking the necessary actioo or indicates in some manoer that he has received the word. A lifering will be thrown over by the fantail watch and at least six short blasts will be sounded on the ship's whistle to indicate the emergency.

By day, the Oscar Flag will be hoisted; at night two pulsating red lights arranged vertically will be shown.

WHAT THE MAN IN THE WATER SHOULD DO

The first concern of the man-overboard should be to rapidly swim clear of the ship until there is no longer any danger of being sucked under or struck by the ship's screws. If uninjured and not wearing flotation gear, he should immediately begin looking for a lifering thrown from the ship. If flotation gear is not in sight, trouser inflation will provide effective water wing support. *Strength and energy must be conserved!* If it is questionable whether or not a lifering being blown away can be retrieved, it should be remembered that an exhausting chase may consume more strength and energy than can afford to be lost.

If the man-overboard is wearing a lifejacket and finds that his swimming ability is impaired, he should forget about his mobility. Flotation gear is the biggest single factor in favor of survival at sea.

Attempting to keep his ship in sight is another way for the man in the water to waste valuable strength. By and large, a ship maneuvering to return to a victim may well disappear several times in the process. Staying in the immediate area of water entry will usually enhance chances for recovery, particularly if smoke floats or dye markers were thrown nearby.

Falling overboard has always been one of the worst perils of the sea. Fortunately, the chances of a successful recovery in a man-overboard situation are probably better than ever. It is far too frequent that an act of skylarking or lack of attention sets the stage for having a man in the water. Don't let that man be *you*. ⚓

PRESIDENT SIGNS BOAT SAFETY ACT

On August 10, President Richard M. Nixon signed into law the Federal Boat Safety Act of 1971, a major tool in further promoting recreational boating safety and reducing the growing number of casualties. Specifically, the act provides authority for the Coast Guard to establish minimum safety construction standards for boats and associated equipment; encourages uniformity for individual State boating safety programs; authorizes financial assistance to the States; directs that a Boating Safety Advisory Council be established; and provides for the numbering of all undocumented vessels equipped with propulsion machinery.

Secretary of Transportation John A. Volpe said, "The Federal Boat Safety Act of 1971 does not take the fun nut of boating; it puts security into it. It is a life preserver for the experienced boatman and novice alike. It is a law to be welcomed by all who enjoy the marine resources of our land."

Adm. Chester R. Bender, Commandant of the Coast Guard and Rear Adm. Austin C. Wagner, Chief, Office of Boating Safety at Coast Guard Headquarters also commented on the importance of the new Act to the Coast Guard and to the boating public. The Commandant said, "The Coast Guard is, indeed, happy to see the passage of this Federal Boat Safety Act. It will provide the recreational boatman with safeguards he has undoubtedly heretofore thought were not attainable." Rear Admiral Wagner, whose office will implement the act added, "The U.S. Coast Guard has always received cooperation from the States, interested public service organizations, and the marine industry. Now, with a formal policymaking body in the form of the Boating Safety Advisory Council and the authority which the act represents, I see this cooperation reaching top efficiency and maximum cost effectiveness in minimizing future losses of life and property."

The Boating Safety Advisory Council, to be composed of representatives of industry, state and local government, and the general public, will advise the Secretary of Transportation and the Commandant on matters relating to recreational boating safety.

The Coast Guard will prescribe minimum construction standards to the extent necessary to insure the safest possible boat and equipment reaches the boatman. The burden of complying with these standards will fall jointly on the manufacturer, the dealer, and the individual boatman. Enforcement of boating safety regulations will increasingly fall to the State and local governments, while the Coast Guard will continue to carry out enforcement on waters of sole Federal and joint jurisdictions.

Industry and the public are protected from arbitrary standards and regulations by the safeguards of the Boating Safety Advisory Council, the Marine Safety Council, and the public rulemaking procedures already in effect. The reasonableness of any proposed regulation and the extent to which it will contribute to boating safety will be considered and balanced against the extra cost or burden which it may impose.

Questions regarding the new act may be referred to: U.S. Coast Guard (BBE/62), 400 7th Street SW, Washington, D.C. 20590.

Copies of the law may be obtained by writing to: House Document Room, U.S. Capitol Building, Washington, D.C. 20515. Ask for Public Law 92–75. ⚓

PUBLIC HEARING SET FOR 15 NOVEMBER

The Coast Guard will hold an informal public hearing on Monday, November 15, at 9:30 a.m. The proposed regulations implementing the Vessel Bridge-to-Bridge Radiotelephone Act (Public Law 92–63) will be discussed. The hearing, in Conference Room 2230, Department of Transportation, Nassif Building, 400 Seventh Street SW, Washington D.C., was announced in the Federal Register of October 20, 1971. Interested persons are invited to attend.

In addition, the Coast Guard will consider written comments submitted before December 1, 1971.

The Vessel Bridge-to-Bridge Radiotelephone Act will become effective six months after the promulgation of regulations.

Title 46 Changes

Chapter I—Coast Guard, Department of Transportation

SUBCHAPTER I—CARGO AND MISCELLANEOUS VESSELS

PART 98—SPECIAL CONSTRUCTION, ARRANGEMENT, AND PROVISIONS FOR CERTAIN DANGEROUS CARGOES IN BULK

Portable Tanks for Combustible Liquids

The purpose of these amendments to the cargo and miscellaneous vessels regulations is to allow combustible liquids having a flash point exceeding 150° F. and paraffinic hydrocarbons to be carried on board a vessel in portable tanks which conform to the requirements of 46 CFR Subpart 98.35. These amendments also provide for safeguards for the additional hazard created by exposure of a portable tank to fire or other unexpected sources of external heat. These amendments were proposed in a notice of proposed rule making published in the FEDERAL REGISTER of February 24, 1971 (36 F.R. 3425) and in the Merchant Marine Council Public Hearing Agenda dated March 29, 1971 (CG–249). The proposed amendments in this document were identified as Item PH 4–71.

A public hearing was held on March 29, 1971, in Washington, D.C. Interested persons were given the opportunity to submit written comments both before and at the public hearing and to make oral comments concerning all the proposed amendments at the public hearing.

Item PH 4–71 proposed amendments to §§ 98.35–3 and 98.35–13 of Title 46, Code of Federal Regulations. Two comments were received regarding Item PH 4–71. One comment suggested that the term "paraffinic hydrocarbons" should be defined or deleted. The Coast Guard determined that "paraffinic hydrocarbon" is an unambiguous term which defines itself. The suggestion was not accepted by the Coast Guard.

The second comment suggested that in addition to the supplemental pressure-relieving device required by the proposed § 98.35–13(e), there should be a visual indication that venting has occurred. The Coast Guard determined that requiring such a device would necessitate additional public rule making procedures. The Coast Guard determined that the suggested device could not be added to the present proposal at this time.

The Coast Guard adopted the proposal with one change to the proposed revision of § 98.35–3. The proposed paragraph (c) has been made a part of the proposed paragraph (a)(1) since it clarifies that requirement and appropriately belongs there.

In consideration of the foregoing, Part 98 of Title 46, Code of Federal Regulations, is amended as follows:

1. By revising § 98.35–3 to read as follows:

§ 98.35–3 Authorization for commodities.

(a) General authorization is hereby given for the carriage of the following combustible liquids on board a vessel in portable tanks which conform to the requirements of this subpart:

(1) Combustible liquids having a flash point exceeding 150° F. by an open cup test. Combustible liquids defined as hazardous articles in § 146.27–1 of this chapter are not included.

(2) Paraffinic hydrocarbons.

(b) The shipper or the carrier shall obtain authorization from the Commandant (MHM) for all other combustible liquids before they may be transported in portable tanks.

2. By amending § 98.35–13 by adding paragraph (e) to read as follows:

§ 98.35–13 Venting.

* * * * *

(e) Pressure vessel type portable tanks must have supplemental pressure-relieving devices to protect against excessive pressure due to unexpected sources of external heat such as fire. Such supplemental pressure-relieving devices must be capable of preventing the pressure from rising more than 20 percent above the maximum allowable working pressure of the vessel. The minimum required relief capacity is determined by the formula prescribed in § 54.15–25(c) of this chapter. Pressure vessel type portable tanks approved under the authority of this subpart before January 1, 1972, need not comply with the venting requirements specified in this paragraph.

Effective date. These amendments shall become effective on October 30, 1971.

Dated: September 22, 1971.

C. R. BENDER,
Admiral, U.S. Coast Guard,
Commandant.

(Federal Register of September 30, 1971.)

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 will be furnished by mail to subscribers, free of postage, for $2.50 per month or $25 per year, payable in advance. The charge for individual copies is 20 cents for each issue, or 20 cents for each group of pages as actually bound. Remit check or money order, made payable to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Regulations for Dangerous Cargoes, 46 CFR 146 and 147 (Subchapter N), dated January 1, 1971 are now available from the Superintendent of Documents price: $3.75.

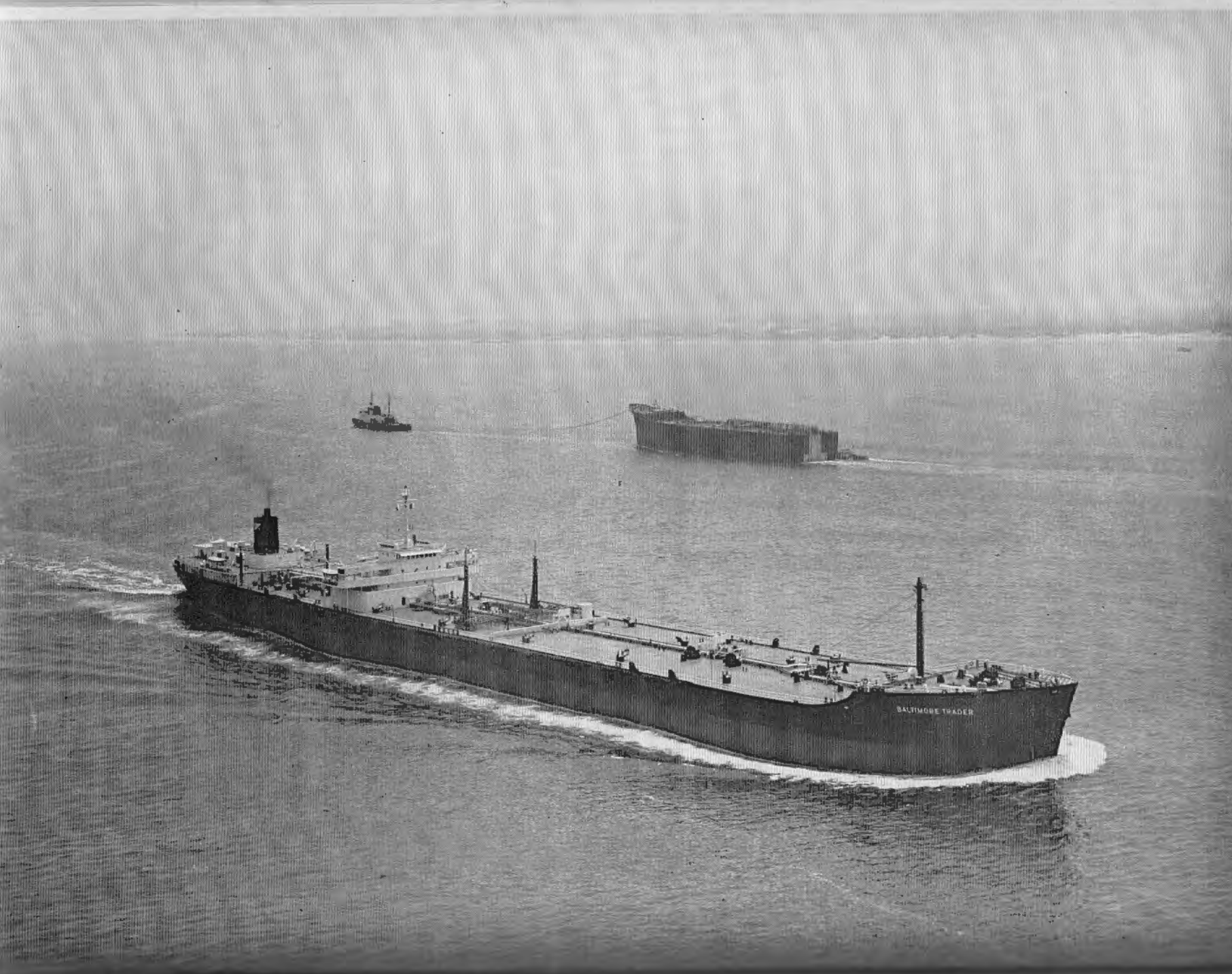
CG No.	TITLE OF PUBLICATION
101	Specimen Examination for Merchant Marine Deck Officers (7–1–63).
108	Rules and Regulations for Military Explosives and Hazardous Munitions (5–1–68). F.R. 6–7–68, 2–12–69, 10–29–69.
115	Marine Engineering Regulations (7–1–70). F.R. 12–30–70.
123	Rules and Regulations for Tank Vessels (5–1–69). F.R. 10–29–69, 2–25–70, 6–17–70, 10–31–70, 12–30–70.
129	Proceedings of the Marine Safety 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, 5–11–67, 12–23–67, 6–4–68, 10–29–69, 11–29–69, 4–3–71.
172	Rules of the Road—Great Lakes (9–1–66). F.R. 2–18–67, 7–4–69, 8–4–70.
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 (2–1–71).
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, 2–18–67, 5–11–67, 12–23–67, 6–4–68, 11–29–69, 4–3–71.
190	Equipment Lists (8–1–70). F.R. 8–15–70, 9–29–70, 9–24–71, 9–30–71.
191	Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel (5–1–68). F.R. 11–28–68, 4–30–70, 6–17–70, 12–30–70, 6–17–71.
200	Marine Investigation Regulations and Suspension and Revocation Proceedings (5–1–67). F.R. 3–30–68, 4–30–70, 10–20–70.
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 (5–1–68). F.R. 10–29–69, 5–15–70, 9–11–70, 1–20–71, 4–1–71, 8–24–71.
249	Marine Safety Council Public Hearing Agenda (Annually).
256	Rules and Regulations for Passenger Vessels (5–1–69). F.R. 10–29–69, 2–25–70, 4–30–70, 6–17–70, 10–31–70, 12–30–70.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (8–1–69). F.R. 10–29–69, 2–25–70, 4–22–70, 4–30–70, 6–17–70, 10–31–70, 12–30–70, 9–30–71.
258	Rules and Regulations for Uninspected Vessels (5–1–70).
259	Electrical Engineering Regulations (3–1–67). F.R. 12–20–67, 12–27–67, 1–27–68, 4–12–68, 12–18–68, 12–28–68, 10–29–69, 2–25–70, 4–30–70, 12–30–70.
266	Rules and Regulations for Bulk Grain Cargoes (5–1–68). F.R. 12–4–69.
268	Rules and Regulations for Manning of Vessels (5–1–67). F.R. 4–12–68, 4–30–70, 12–30–70.
293	Miscellaneous Electrical Equipment List (9–3–68).
320	Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf (11–1–68). F.R. 12–17–68, 10–29–69, 1–20–71, 8–24–71.
323	Rules and Regulations for Small Passenger Vessels (Under 100 Gross Tons) (7–1–69). F.R. 10–29–69, 2–25–70, 4–30–70, 10–31–70, 12–30–70.
329	Fire Fighting Manual for Tank Vessels (7–1–68).

CHANGES PUBLISHED DURING SEPTEMBER 1971

The following have been modified by Federal Registers:

CG–190, Federal Register September 24, 1971.

CG–190 and CG–257, Federal Register September 30, 1971.


BALTIMORE TRADER