PROCEEDINGS
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PROCEEDINGS

OF THE

MERCHANT MARINE COUNCIL

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LCDR N. B. Binns, *USCG, Editor*
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COAST GUARD CUTTER COOS BAY CITED

ASSISTANT SECRETARY of the Treasury James A. Reed is shown reading to Commander C. W. Bailey and members of his crew the Coast Guard Unit Citation awarded the Cutter Coos Bay and her men for their rescue of eleven men from the ill-fated MV *Ambassador* which sank recently.

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

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FRONT COVER

The Coast Guard Cutter *Coos Bay* is shown maneuvering close aboard to the sharply listing MV *Ambassador* preparatory to rescuing the 12 crewmembers still on the ill-fated vessel.

BACK COVER

The perils of going to sea are abruptly brought home to the average unsuspecting apartment dweller. Courtesy of the *SATEVEPOST*.

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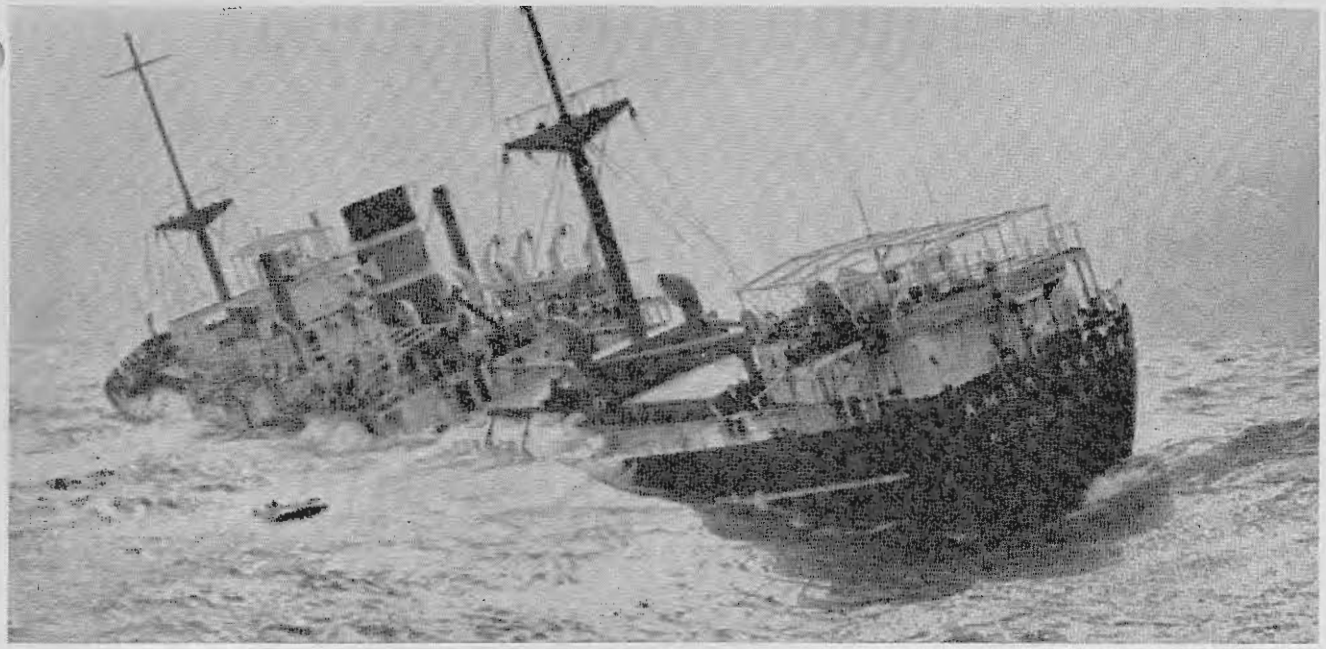

INFLATABLE LIFERAFT containing one of the survivors of the *Ambassador* is shown just as it slid off the deck of the stricken vessel.

THE AMBASSADOR STORY

On the morning of 18 February 1964 the U.S. Coast Guard Cutter *Coos Bay*, a 2,500-ton 311-foot diesel-powered ship, was steaming in snow squalls and fog off the outer tip of the Grand Banks on her return from a 3-week winter weather patrol on Ocean Station BRAVO, located in Davis Strait off Labrador. The crew of 134 officers, men and weather bureau observers had been alert for drifting icebergs, and now their thoughts were of homecoming 2 days hence. An emergency broadcast TTT was intercepted by the radio operator, advising that the British motorship *Ambassador*, 7,308 gross tons, with a crew of 35 aboard was broken down and listing heavily, in mountainous seas some 370 miles south of the *Coos Bay*. Shortly thereafter an SOS signal was received. Meanwhile, the Commander, Eastern Area, U.S. Coast Guard, in New York had directed the *Coos Bay* to proceed and assist. *Coos Bay's* maximum speed of 18 knots was soon cut down to 15 by the heavy seas as she plunged south along in the trough, rolling heavily.

Meanwhile the Italian passenger liner, SS *Leonardo da Vinci*, was reported standing by the stricken *Ambassador*. The *Ambassador* was transmitting on emergency batteries since the engineroom was flooded, and her signals grew progressively weaker. Finally the radio operator said that he, too, was abandoning. As the distress case progressed, ships of all nationalities and in various locations, some even several hundreds of miles away called and offered their help.

Coos Bay arrived the morning of 19 February to find several merchant ships standing by the stricken freighter. The wind was very strong and the seas were running high. Even the large ships were yawing wildly back and forth. On the scene were the Italian passenger liner *Vulcania*, and the French merchant ship *Caraibe*, the American ship *City of Alma*, and the Norwegian ship *Fruen*.

U.S. Air Force and Coast Guard and Canadian aircraft had been searching since the previous day for liferafts and survivors. Just before *Coos Bay* arrived on the scene she recovered a deflated liferaft sighted by one of the lookouts.

The *Fruen* was laying about 200 yards to leeward of the *Ambassador* and had fired a line-throwing gun to the stricken freighter just as *Coos Bay* arrived. Five men had already been taken off by *Fruen*, however there were still 16 men on board the *Ambassador*. The previous day most of the crew of 35 had taken to the liferafts. The port life boat of the *Ambassador* had been crushed by the seas and the heavy port list prevented the starboard boat from being launched. The operator had radioed the previous day that they didn't think the ship would last another 8 hours. The first crewmen to reach *Fruen* told of how 2 of the rafts had upset almost immediately near the ship and that 14 men had been lost. They said that 3 men had been seen drifting away in a small raft. Twenty-one of the men in the rafts made it back on board the *Ambassador* and spent the night huddled in the lee of the bulwarks on the bow of the steeply listing ship.

Since *Fruen* had a line fast on the *Ambassador*, *Coos Bay* stood by and directed the various merchant ships and aircraft to search the different areas of possible drift of the liferafts. The odds were heavily against finding anyone alive by this time because of the weather and the fact that two of the first liferafts had upset, nevertheless, the search went on. Over the space of the next 2 hours four more men made it across to *Fruen* on the long line. The waves were breaking over their heads and often they would disappear from sight.

The first line that *Fruen* put aboard the wreck snapped after a while, as did the second but a few men got off each time. When a total of nine men had been removed, the third line also parted and *Fruen* radioed that she had no more line to put out. The radio operator was a woman and the *Coos Bay* had considerable difficulty in understanding her accent until fortunately, the Master of the Dutch salvage tug *Elbe* cut in and offered to translate and relay messages. The *Elbe* was still a hundred miles away and was coming to attempt to tow the derelict into port should she remain afloat. Although *Fruen* was out of rescue equipment and was several days late on her voyage, she remained

on the scene while *Coos Bay* attempted to remove the crew. *Fruen* then stood off to windward to watch.

The Master of the *Fruen*, a ship of 10,000 tons (larger than the *Ambassador*) displayed admirable seamanship in maneuvering such a large vessel in the vicinity of a foundering wreck and successfully putting a line aboard three times. Fortunately the two ships drifted about the same rate, making the operation possible.

There were still 12 men on board *Ambassador*. The ship listed so steeply that men could not walk on the decks but had to climb from handhold to handhold. The lee deck was awash and seas broke heavily on the hatch covers. The question of how much longer the ship would stay afloat was a big one. Already she had lasted much longer than the crew had thought possible the previous day.

Coos Bay maneuvered her bow close to the bow of the *Ambassador* and fired a line-throwing gun. The first shot was true and the crewman of the *Ambassador* pulled the line aboard. *Coos Bay*, being a lighter draft ship with a lot of superstructure to resist the wind, drifted to leeward faster than the wreck. Thus it was readily apparent that the rescue operation was not going to be a snap. The men on the wreck hauled away as rapidly as they could and soon a 15-man rubber life raft was on the way. The seas were not as steep as on the previous day, yet they were still about 25 feet high with the tops breaking and blowing spume in the 40 knot wind. *Coos Bay* rolled heavily 20° to 30° almost constantly and once in a while rolled to 45° with all hands hanging on to whatever they could.

Launching of the ship's boats was out of the question. The rubber life raft seemed the men's best chance for getting off. *Coos Bay* drifted away as the men hesitated to board the bouncing craft. Finally five men jumped aboard but failed to crawl under the protective canopy and down into the bottom of the raft. Moments later three of the men were washed overboard by a large wave and two of them drifted towards the stern of the ship. Lookouts were immediately alerted to "keep those men in sight at all costs." Again a wave surged over the raft and the remaining two men went overboard. *Coos Bay* immediately got underway at best speed to get the first man who had drifted farthest from the ship upwind. It was hoped that the crewman still aboard the *Ambassador* would help the other men back aboard who were still floating near the ship.

Within minutes the *Coos Bay* was alongside the man who now was 500 feet to windward. A standard ship

TWO SURVIVORS of the *Ambassador* are shown as they are hauled through the water from the sinking vessel to the side of the Coos Bay. The men are wearing lifejackets with collars which were passed to them from the Cutter before they jumped overboard tied to the shot line.

pickup (as practiced in Man-Overboard Drill) was made and swimmers with lifelines went into the water to help the man up the embarkation net. The first man was exhausted but required no treatment. Then the lookouts spotted another man drifting under the stern of the *Ambassador*. *Coos Bay* ran over close aboard and threw a line to him which he had just strength enough to grasp until he had been pulled a hundred feet clear of the ship. Then he, too, was brought aboard by the swimmers. These six men who volunteered for swimmer duty risked their lives many times before the day was out and were all recommended for commendation. The second man to come aboard required the service of the ship's doctor who was ready on deck with a resuscitator. It was touch and go for a while but finally he was revived and by the following day was up and about.

Meanwhile *Coos Bay* steamed around to leeward of the wreck to see what had happened to the three other men in the water. They were not in sight, however the liferaft was seen drifting off to windward. In the chance that they had been able to climb back aboard, *Fruen* was asked to recover the raft.

Since darkness was approaching, it was decided better to take *Coos Bay* right in close aboard the wreck, pass a line for the men to secure around themselves, and pull them aboard through the warm Gulf Stream water, one at a time. Since the ships drifted at different rates, *Coos Bay* could not lay close aboard long enough for more than one man to be hauled aboard. *Coos Bay* waited until the man had jumped into the water, then took a light strain on the line to pull him clear of the derelict's bow while the man was being hauled alongside where the swimmers in their rubber "wet" suits could help him aboard.

As soon as one man was aboard, *Coos Bay* steamed around to make another approach, fire a line aboard, and repeat the operation. Since the life preservers worn by the first two men were observed not to keep the man's head above water, it was decided to send over *Coos Bay* jackets on the line. The jackets had a collar to protect the man's head.

After two men had been recovered in the above manner, and since time was running out, it was decided to take them off, two at a time on the line. Two jackets were sent over the next time. This worked well until the next to the last trip when there were four men remaining on the ship. Suddenly all four men were seen to jump overboard tied on the line and it was too late to try to stop them. The *Coos Bay* was drifting onto the wreck and nothing could be done but get them on board as quickly as possible. The first man on the line was seen to lose consciousness about midway across and go face down in the water. The other men were too far away to help him and there was nothing to do but haul them aboard as fast as possible, hoping that quickly applied resuscitation would save him. The line was leading through a block just above the embarkation net and there was no delay in hauling the first man quickly aboard. The doctor applied emergency measures even before he was cut loose from the line but it was too late. The other three men came aboard in good condition.

Coos Bay then left the wreck under the observation of *Fruen* who would warn passing ships of the unlighted derelict, and proceed to search for a life raft that had just been located by an aircraft 26 miles away. The plane dropped float lights to mark the spot and circled the area until *Coos Bay* arrived. The fully inflated raft was located floating upright by searchlights but no survivors were found. *Coos Bay* then steamed west to look for a light that had been reported by another aircraft. Although the *Vulcania* had by this time been dismissed to proceed on her voyage, she remained to search for this light until *Coos Bay* arrived. *Coos Bay* and various aircrafts searched throughout the night and the following day without results. The weather was worsening and the search visibility was almost nil, therefore active search was discontinued late in the evening of the 20th pending further developments.

A FRESH LOOK AT THE RULES OF THE ROAD AND RADAR NAVIGATION

BY CAPTAIN ROBERT M. SLACK

THE FOLLOWING ARTICLE by Captain Slack on rules of the road and navigation by radar is presented because of the interest in the subject, and to provoke thought on this all important aspect of maritime safety. The thoughts expressed by Captain Slack are his own, and do not necessarily reflect the official views of the U.S. Coast Guard.

Despite the ever increasing efficiency and dependability of merchant marine radar sets and the requirement that every deck officer on a radar equipped oceangoing ship must be a qualified radar observer, vessels continue to become involved in collisions at sea.

Courtesy Captain Howard Peterson

ONE FORM of Bridge arrangement showing the radar scope, engine order telegraph, steering stand, magnetic compass, and radiotelephone.

USE RADAR PROPERLY

In almost every collision case investigated by the U.S. Coast Guard involving radar one conclusion appears time after time: improper use of the radar or improper interpretation of the information provided by the radar was a major contribution to the disaster.

The thought is frequently expressed by mariners that in poor visibility the safest procedure is to adhere strictly to the interpretation placed by the courts on the term "moderate speed" in cases where vessels have been *in collision* in poor visibility: "moderate speed is a speed such that the vessel can stop within half the range of visibility." This opinion appeared in *The Silver Palm* case, and has been one of the conclusions drawn in every case since then where collisions in fog occurred.

The fact is that this point of view overlooks three requirements of the Rules which may make a reduction of speed *under certain conditions* precisely the wrong thing to do.

INTERNATIONAL RULE 16

The first two points are the qualifying phrases in Rule 16 (a) and (b). (The Rule is quoted here in its entirety for reference, with the qualifying phrases underlined.)

"RULE 16 (a) Every vessel, or seaplane when taxiing, on the water, shall, in fog, mist, falling snow, heavy rainstorms or any other conditions similarly restricting visibility, go at a moderate speed, *having careful regard to the existing circumstances and conditions.*

"(b) A power-driven vessel hearing, apparently forward of her beam, the fog-signal of a vessel the position of which is not ascertained, shall, so far as the circumstances of the case admit, stop her engines, and then navigate with caution until danger of collision is over."

(Italics supplied by the author.)

In section (a) the key words are "the existing circumstances and conditions."

CIRCUMSTANCES AND CONDITIONS

What are these circumstances and conditions? Some positive factors may be listed as follows:

1. The vessel has *radar.*

2. The radar is in good and efficient *operating condition.*

3. The radar operator is *properly trained* and is qualified to:

a. *operate the set* by performing the elementary adjustments of the controls required and

b. *interpret the information* provided by the set by *plotting* the relative movements of targets in range, and from this information deriving the true course and speed of these targets and

c. based on the above, determine the course and speed of own ship which will *avoid* a close-quarters situation.

4. *Traffic density* is such that the radar operator can plot all targets affecting own ship and can resolve the plot into target course and speed and necessary action, if any, by own ship. This, in turn, is a function of the *plotting system* used; a system that permits only one target to be plotted at a time is obviously not as safe and effective as one that permits multiple targets to be plotted simultaneously so that their movements relative to each other as well as to own ship can be observed and resolved.

5. The *type of traffic* likely to be encountered is such that it will be picked up by the radar in time for adequate action to be taken to avoid a close quarters situation.

6. The *weather conditions* are such that the sea return (or atmospheric conditions) will not prevent the radar picking up targets at a safe distance.

7. There is adequate *sea room*; i.e., there are no limitations imposed on the free movement of the ship by narrow channels, shoals or similar hydrographic features.

The first reaction of the reader may well be to question the ability of anyone to effectively weigh all these factors and arrive at a logical conclusion. This is by no means true. A careful reading of the factors listed will reveal that most of them are as applicable to navigation in clear weather as in poor visibility.

MODERATE SPEED

Moderate speed is not a term that applies solely to conditions of poor visibility. It is a requirement *at all times* and *in all waters.*

A few examples will suffice to illustrate this frequently overlooked point.

A deeply laden tanker proceeding up a narrow channel with steep banks sights another ship at a distance. It slows down so that the volume of water pushed ahead of the ship will not adversely affect the other ship's navigation and so that the suction between the two ships when they pass will not cause them to be drawn into collision.

A vessel in the open sea approaches a fleet of fishing vessels in close company. If they are so close together and maneuvering in such a way that no clear path is seen through the formation the ship must either alter course to clear the formation or reduce speed to avoid colliding with them and pick her way through the fleet.

In heavy weather a vessel slows down to avoid pounding. Full speed would obviously be excessive, since it would result in damage to one's own ship.

There are cases where moderate speed is directly related to speed over the ground or speed through the water regardless of visibility. In certain canals a maximum speed is set to avoid damage to the banks. Ships passing close to vessels or barges moored along a channel must reduce speed. Ports have regulations as to the speed at which vessels may pass through congested areas. Many examples will occur to the experienced navigator.

Moderate speed is good seamanship in clear weather as well as in poor visibility. It depends upon "the existing circumstances and conditions"!

JUDGMENT AND RESPONSIBILITY

Since this is true, whose judgment is paramount? Obviously it must be that of the man who is responsible for making the decision—the Master. He, and *only* he, is charged with the ultimate responsibility, and hence is clothed with the *ultimate authority,* to decide what is a moderate speed in any given set of circumstances and conditions.

We cannot argue from the general to the particular, nor can we generalize from specific examples. Each case is unique and must be judged in its own environment. The Master draws on past experience, his observations of the immediate situation, his knowledge of the local waters, the experience and advice of his officers, and equates this with what he has learned by studying the results of similar situations experienced by others. After weighing all these and other factors he comes to a decision.

Since no set of conditions can be reproduced precisely at some later time and since the testimony of eyewitnesses will vary greatly in reporting significant details, *the decision of the Master will not be subsequently condemned provided it results in a safe resolution of the situation.*

THE WATCH OFFICER

The position of the watch officer is somewhat different. He is charged with immediate responsibility for the safe navigation of the vessel during the period he is on watch and at the conn, and no set of written or verbal orders can relieve him of this responsibility or absolve him of the consequences of any action he takes or omits to take during this period. Most ships have a set of written orders specifying situations in which the Master wishes to be called and setting forth specific action to take under certain conditions. These orders cannot possibly be so comprehensive as to cover the minutiae of every situation and so must be considered as being of the nature of general orders, to be interpreted in the light of particular circumstances and conditions.

The one thing that releases the officer of the deck is to call the Master when in doubt. If the nature of the standing orders or the written orders applying to the specific time are such as to leave the officer on watch no leeway for exercising his judgment in a given situation he *must call the Master in sufficient time to allow the Master to acquaint himself with the situation before the vessel is in danger.*

Regardless of the phrasing of written or verbal orders the watch officer must be prepared to take prompt and adequate action if the circumstances require it and then call the Master as soon as possible. An example of this type of situation might be a meeting situation in clear weather with good visibility, if the approaching vessel turns across his bow. Another example might be the sudden onset of fog.

To be fully relieved of responsibility for the maneuvering of the vessel there must be a specific and definite transfer of the conn. It is always advisable for this to be done in a formal way so as to leave no doubt as to who is directing the movement of the vessel. If the Master desires to take over the conn he should do so by some such expression as "I will take the conn now." The mere fact that the Master is on the bridge does not vest the Master with the conn—it merely gives the Master the opportunity of assuming control if he desires to do so. An obvious illustration of this is when the Master comes on the bridge on a dark night from a brightly lighted room. It will take some time for him to acquire night vision and meanwhile the watch officer will be much better informed and better able to evaluate the movements of vessels in the vicinity.

REDUCTION OF SPEED IN A FOG

It may well be said at this point that we are avoiding the main issue of whether or not to automatically reduce speed in fog to a speed such that we can stop within half the range of visibility. On the contrary, we have been laying the groundwork to demonstrate that no such automatic decision can *or should* be made.

Let us assume that we are in mid ocean, with a light sea, gentle breeze and visibility 500 yards. We are not in a known fishing area and there is little probability of encountering small craft. Our radar is operating normally, and ordinarily picks up targets the size of a rowboat at a distance of 2 or 3 miles, small cabin cruisers and buoys at a distance of 5 miles or more, and ships at distances in excess of 12 miles. Course is 000 true, speed 15.0 knots.

The radar is in operation on the 20-mile range. The officer on watch is observing the radar at frequent intervals, switching ranges to ensure better reception at all distances. The Master is on the bridge. There are no targets on the radar but the watch officer is checking it at frequent intervals, observing it for a full minute or more each time.

At 0848 a target is observed bearing 059° true, distant 11.8 miles. At 0900 the target bears 059½° true, distant 8.7 miles. At 0906 it bears 060° true, distant 7.0 miles.

A relative motion line plotted shows that the target will pass on our starboard quarter at a distance of approximately 0.3 miles.

The Master states he desires to keep three miles away from the tar-

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ABOUT THE AUTHOR

Captain Slack has had 22 years continuous service as a licensed officer in the Merchant Marine. This includes 4 years as Master and 7 as Chief Officer. He has served as Director of Safety and Training for States Marine Lines, and is presently General Manager of Electronics Navigation for Codan Marine, Inc. Captain Slack has prepared articles on speed in fog and radar photography that have appeared in various marine journals. He is a member of the Society of Naval Architects and Marine Engineers, the Institute of Navigation, the Institute of Photogrammetry, and the National Association of Corrosion Engineers.

get. A quick plot is made and at 0912 course is changed to 075° true, maintaining speed. The course is held for 9 minutes (until 0921) at which time the target bears 005° true, distant 3.0 miles.

For comparison, it may be noted that at 0900 the course change to keep 3 miles clear would have been to 045°; at 0906 it would have been to 057° true. The sooner course is changed, the less the distance lost along the track.

At 0921 course of 000 true is gradually resumed, bringing the ship left slowly so that the target does not come inside the 3 mile circle.

Suppose that instead of changing course the Master had elected to hold course and speed until he heard the fog signal of the other ship. Let us further suppose that he hears the fog signal when the target is bearing 070° and about a mile and a half or less away. At that point if he elects to stop his engines and take the way off his ship there is likely to be a collision. If his ship is a deeply loaded C–2 freighter it will take him about 6 minutes to stop and in that time he will travel about a mile. The results may be plotted for convenient reference. The *positive* action resulted in a safe passage. Negative action might well have lost both ships.

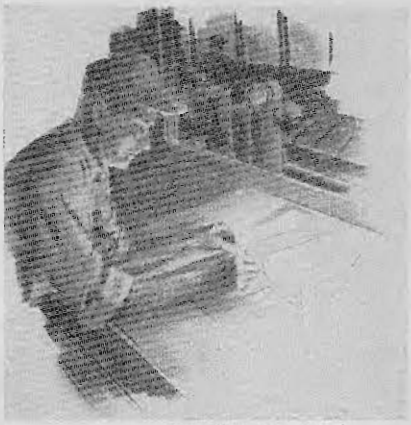
This case is not an exaggerated example. In more frequented waters stopping to avoid a ship ahead may well result in being run down by an overtaking vessel. If, in the case plotted, there had been ships astern on the same course and speed stopping might involve all ships in a collision.

INTERNATIONAL RULE 25

In the Rules as they now stand there is one clause which is frequently overlooked when discussing speed in fog. That is Rule 25, the General Prudential Rule, which states:

"In obeying and construing these Rules due regard shall be had to *all* dangers of navigation and collision, and to any *special circumstances*, including the limitations of the craft involved, which may render a departure from the above Rules necessary in order to avoid immediate danger." (Italics supplied by the author.)

What are the dangers in the situation referred to above? Examination of the original relative movement line shows that a dangerous close-quarters situation is in the making. Stopping the engine at any time after 0924 *may* result in a collision or at least in a closer passing than would take place if own ship simply maintained course and speed. Furthermore, stopping the ship would take away her ability to maneuver out of the way of the other



Courtesy Sun Oil Co.

ship if that ship performed some unexpected maneuver.

The special circumstances here, identical to the circumstances and conditions mentioned in Rule 16(a), are that our ship has radar and has ample searoom to perform any maneuvers desired to avoid the other ship.

POSITIVE ACTION IS STRESSED

It must be remembered that the Rules are entitled: "The Regulations for the Prevention of Collision at Sea." Throughout the Rules *positive* action is stressed. At every Convention where changes in the Rules have been discussed proposals for specific passing distances and speeds have been voted down, in favor of leaving the Master free to make his decision based on existing circumstances and conditions.

From the single example given above it may be seen that the present Rules provide ample justification for maintaining and even increasing speed under certain circumstances. When driving a car it is usually the safest thing to do to stop by a railroad track and let an approaching train pass before crossing the right-of-way. Unfortunately ships do not run on tracks. Frequently the prudent thing to do is maintain a safe distance, not reduce your mobility and thus increase your danger. In a certain cemetery there is a gravestone with the following inscription:

Here lies the body of Jonathan Day.
He died maintaining his right-of-the-way.
He was right, he was right! That was always his song
(He's just as dead as if he'd been wrong!)

TWO EXAMPLES

All the foregoing discussion has been based on the present Rules. Two excerpts from the January 1960 issue of the *Proceedings of the Merchant Marine Council* together with comments by the writer may accentuate some of the points made above. The first concerns a passenger ship-tanker collision:

"Unquestionably had a radar plot been maintained aboard the passenger ship the true course of the tanker would have been determined and the collision could thereby have been avoided, but only because the tanker maintained the same course throughout." (An additional comment pointed out the fact that on each vessel sea return had obscured the movement of the other vessel inside the 2 mile ring.)

The same case is discussed as case 2, pages 5 and 6 of the January 1964 edition of the same magazine.

To the comments in the "Proceedings" the author might add that a vessel relying on radar information must always plan to pass all targets picked up at such a distance that they will not be lost in the sea return. There is no mention of the passenger ship reporting loss of targets in the sea return prior to picking up the tanker on her radar but it is likely that it happened. This phenomena was certainly noted on the tanker.

In the case of the tanker there is some satisfaction to her crew that they were cleared of fault in the investigation. Had there been an explosion or fire, as happens in the majority of collisions where tankers are involved, this fact would hardly have consoled the next of kin for the loss of their loved ones. Perhaps all concerned might have been better pleased if her navigators had been plotting targets and had taken "early and substantial action" to avoid a close-quarters situation.

The second excerpt concerns a second passenger ship-tanker collision: "In other words, the plotting which could have aided the passenger ship did not and could not provide the information sought by the passenger ship simply because the tanker was not steadied on a course at the time the observations were made."

This plotting comment overlooks one very pertinent fact: the plotting referred to was begun at 4.9 miles and a second point was plotted at 3 miles. This is contrary to all precepts of good plotting procedure. Plotting should start on the long-range scale—in this case plotting should have been commenced at 12 miles or more. Furthermore, it is an elementary principle of mathematics that two points do not establish the shape of a line. It is necessary to plot three points at least to determine the shape.

Two points may be an arc of a curve, part of an ellipse, or almost anything. It *may* even be a straight line! Even so, if the officer plotting had done his work on the screen instead of on a maneuvering board he would have seen almost immediately after he plotted the second point that the tanker was not following a straight line drawn through the first two points. If he had plotted three or four successive positions of the echo on his screen the nature of the line would have been obvious. The time required to do this would have been much less than the time required to read off bearing and distance, note them down and transfer them to the maneuvering board, then work out the target course and speed. Therefore, quite the contrary to the statement made in the Proceedings, plotting *could* and *should* have provided the information sought by the passenger ship, and provided it in ample time to *maneuver away* from the threatening collision!

PLOTTING IS PROLOGUE

It might be well to diverge a little here to point out a fact not commonly considered. No matter what the type of plotting performed, it is only *history*—a reporting of past positions, and *prophecy*—a prediction that in the future the target will continue as he did in the past. Deductions drawn from history are at the best no better than the accuracy of the observations on which they are based, and as any one who reads the weather reports knows, prophecy is a very chancy thing. Once past performance has been evaluated and projected into the future, it must be followed up to see that it is not deviated from.

Until very recently the tendency has been to cast the major part of the blame in collisions where radar is involved on excessive speed and to mention in passing that proper use of radar might have caused the vessels to reduce speed. This has failed in its purpose of reducing collisions by enforcing reduction in speed. Indeed, the new ships are being constructed to run at faster speeds, many of them are being equipped with two radars, and they are running in fog at greater speeds than ever.

The answer, then, is to encourage the *positive* use of radar to keep away from other ships. On page 10 of the January 1964 issue of the Proceedings we find the following sentence at the top of the page: "Properly used radar is an effective aid." To use it properly in time of need, however, study and practice beforehand is most essential.

NOTICE

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1960

The Secretary-General of the Inter-Governmental Maritime Consultative Organization announced recently that the Instrument of Acceptance by the Government of Liberia of the International Convention for the Safety of Life at Sea, signed in London on 17 June 1960, was deposited with the Organization on 26 May 1964. This document is the seventh acceptance by a country with not less than one million gross tons of shipping. The Convention will come into force on 26 May 1965 as provided in paragraph (a) of Article XI, which is twelve months after the date of deposit of its acceptance by the Government of Liberia.

NEW RULES PROPOSED FOR ADOPTION BY THE FOURTH SOLAS CONVENTION

The proposed changes in the Rules are set forth on page 10 of the January 1964 issue of the Proceedings. These new Rules, while not yet adopted by the United States, represent a great stride forward in safety procedures. They should be read thoroughly and repeatedly, and discussed at length on board ship until they are fully understood.

It is the opinion of the writer that adoption of the new additions to the Rules will greatly reduce the number of collisions. The comments by the Merchant Marine Council are very interesting. In the second paragraph it is stated:

"These new additions to the Rules of the Road serve to clarify the use of marine radar and legalize many of the procedures now used by radar equipped vessels during fog and periods of low visibility. The new rule and the annexes have been adopted to take full advantage of the benefits to be gained by radar navigation, to the extent that such usage will not endanger other shipping."

The most important change contained in the additions is paragraph (c) which has been added to Rule 16:

"(c) A power-driven vessel which detects the presence of another vessel forward of her beam before hearing her fog signal or sighting her visually may take early and substantial action to avoid a close quarters situation but, if this cannot be avoided, she shall, so far as the circumstances of the case admit, stop her engines in proper time to avoid collision and then navigate with caution until danger of collision is over."

Here for the first time is an official suggestion that the proper procedure may even be to increase speed if necessary to do so to avoid danger. Note that section (c) does not remove the requirement of stopping the engine *if a fog signal is heard* forward of the beam. The conclusion that may be drawn is that the vessel should be maneuvered out of sound range of the fog signal.

Also, in the Annex to the Rules, in (3) it is stated:

"(3) When navigating in restricted visibility the radar range and bearing alone do not constitute ascertainment of the position of the other vessel under Rule 16(c) sufficiently to relieve a vessel of the duty to stop her engines and navigate with caution when a fog signal is heard forward of her beam."

Here again the important thing is *hearing* the fog signal; if the ship keeps out of sound range of the fog signal all is well.

Paragraph (4) of the Annex supports the statement made in the beginning of this paper, that the man on the spot is the best judge of the situation:

"(4) When action has been taken under Rule 16(c) to avoid a close quarters situation, it is essential to make sure that such action is having the desired effect. *Alterations of course* or speed or both are matters as to which the mariners must be guided by the circumstances of the case."

One final quotation.

Recently a noted attorney stated in print, "The Coast Guard position is that they are obligated to investigate any complaint, and if there has been excessive speed during a period of reduced visibility, they must press charges against the involved licensed deck officer."

EXCESSIVE SPEED

So here we are with the original question: what is excessive speed? What are the liabilities and responsibilities of the deck officer? The attorney is right, as far as he goes. All he omitted was the findings. We will investigate a hypothetical case and see if we can predict them.

Let us suppose that some person—crewmember, passenger, anyone at all—makes a formal complaint to the Coast Guard that on such-and-such a date and at a given time the SS *Hot Air* was navigated at an excessive speed during a period of low visibility. The investigating officer boards the ship and informs the Master that he has an official complaint.

Let us further suppose that the complaint refers specifically to the example given previously of the ship encountered in fog at sea.

The Master is asked for his reply to the complaint. In this instance it can be very simply stated. It might well be in the following form:

"At 0848 I was on the bridge in a period of poor visibility. The radar was in operation and giving good results. Engines were on standby, and the engineroom reported they were able to respond instantly to any speed changes rung up on the engine order telegraph. A lookout was posted and the whistle was being blown at two minute intervals. At 0848 a target was observed, bearing 059° true distant 11.8 miles. Two other targets were on the radar screen, behind our ship. These targets were over 3 miles behind us, on approximately the same course and speed as our ship.

The target on the starboard bow was plotted on the reflection plotter. Establishment of the relative motion showed that if the course and speed of each ship was continued a close quarters situation would result. The true course and speed of the target was derived from the relative plot and a course chosen which would cause us to pass 3 miles from the target. The proposed course change was checked against the ships astern and it was seen that it would not result in a dangerous situation with respect to these ships.

At 0912, while the target on the starboard bow was 5.4 miles distant, I changed course to 075°, maintaining speed. At 0921 hours the target bore 005°, distant 3 miles, having followed the predicted relative movement line. At that time I gradually resumed my former course, keeping the target on the 3-mile circle. There were no collisions and no close-quarters situations. If I had slowed down I might have collided, or have come into close quarters situations, with the two ships in my wake."

What charges would be pressed as a result of the above investigation and findings? None! The judgment of the Master was vindicated by the simple and obvious fact that *he kept his ship out of collision.* This is what the Rules are designed for and accomplishment of this objective is all that can be required of the Master.

The statement of the attorney might well be expanded to say that any person may complain at any time to the Coast Guard about almost anything an officer does in the course of his duties. This, also, is true. The Coast Guard is bound to investigate the complaints, but no charges can be preferred if the investigation reveals either that the actions complained of did not take place or that they did take place, but were properly done in the course of the officer's duties, and resulted in no harm to anyone.

ROLE OF THE COAST GUARD

The writer would like to say, at this point, that the role of the U.S. Coast Guard in enforcing marine safety is often misunderstood. Their function is to enforce the regulations concerning safety at sea, and to promulgate regulations which will advance the cause of Safety and at the same time not stunt the growth of the maritime industry. They function somewhat in the manner of the traffic cop, who of course does not pat you on the back when you obey the rules, but who gives you a ticket when you break them.

The enforcer of the rules is never popular. Each person feels that his infraction is unique, and should be overlooked. The Coast Guard, in construing the Rules, must give heed not only to the letter of the law, but also to the court interpretations; and court interpretations are based on the written law and on the *legislative intent*—in other words, what they feel the lawmakers had in mind when they enacted the statute. To determine this, they refer back to the debates and discussions of the rulemaking bodies at the time the laws were enacted.

Where the Rules of the Road are concerned, the substance of the debates has inevitably been that the enthusiasm of the navigator must be restrained—he must be prevented from ignoring weather conditions in the interest of making the fastest possible passage from departure to arrival—and at the same time he must be permitted to exercise to the fullest possible extent his good judgment in relating weather conditions to safety. Never has this been shown more clearly than in the debates that took place in London at the 1960 SOLAS Convention. Every attempt to enact Rules referring to specific speeds and distances was beaten down in favor of the tradition of making the Master the best judge of what is safe for his ship in any given situation.

The Coast Guard investigating officer, then, is bound not only by the text of the law but by court interpretations, and legislative intent. Always, too, he must consider what is best for the health of the industry. In considering complaints he must weigh dangers to life and property against the fact that the complaint may originate in the desire of one individual to harass another. In the absence of a positive showing of injury he will normally dismiss the complaint.

RELUCTANCE TO MAKE DECISIONS

Many complaints concerning speed in fog arise from the reluctance of the individual to make a positive decision. It is very simple to decide to stop the ship and let the other fellow be responsible for the safety of his ship and yours. It is more difficult to choose a positive course of action which will be safe for both ships. There is a well-known story which illustrates very well the case of the man who shrinks from making decisions.

A tramp stopped at a farmhouse and asked if he could do some work in return for a meal.

The farmer handed him an ax and took him to the woodlot. He showed the tramp a large quantity of wood to be split, then left him to do the job.

At suppertime the tramp had not only split all the wood, but he had stacked it and had carried to the house enough for several days use.

The farmer was delighted. In addition to supper he gave the tramp a few dollars, told him he could sleep in the barn at night, and in the morning he would find more work if the tramp wished to stay.

The next morning was very cold and the farmer thought he would find an easier job for the tramp. He took him to the root cellar which was sheltered from the cold wind and showed him a large pile of potatoes. He told him to separate the bad from the good, and then left him.

At lunch time the farmer went to the root cellar and to his surprise he found the tramp fast asleep, with one or two bad potatoes on one side of him, several good potatoes in another pile, and a mixed pile in front of him.

The farmer woke the tramp and asked him why, when he did so well at the hard job the day before, he was not able to perform a simple task such as separating potatoes.

The tramp replied, "I don't mind working. I like the exercise. It is making all these decisions that is killing me."

CONCLUSION

That, friends, is what it is all about. Positive decisions are the lifeblood of any industry, and especially of the maritime industry. A structure is built by constantly adding to the foundation. If we only take away, and never add, we are left with a hole in the ground—and that is suitable only for a grave. Let us not dig the grave of the merchant marine; let us build a strong, viable industry, which is strongly competitive and based on positive principles which lead to a higher and stronger life for those who depend on it for their livelihood.

733-635—64——2

TREASURY DEPARTMENT
UNITED STATES COAST GUARD

ADDRESS REPLY TO:
COMMANDANT
U.S. COAST GUARD
HEADQUARTERS
WASHINGTON 25, D.C.

MVI–3
17 March 1964

Commandant's Action
on
Marine Board of Investigation; disappearance of the SS *Marine Sulphur Queen* at sea on or about 4 February 1963 with the presumed loss of all persons on board.

The record of the Marine Board of Investigation convened to investigate subject casualty together with the findings of fact, conclusions and recommendations has been reviewed.

The SS *Marine Sulphur Queen*, a T2–SE–A1-type tank vessel of U.S. registry, converted to carry molten sulfur, departed Beaumont, Tex., with a full cargo of 15,260 tons on the afternoon of 2 February 1963 en route Norfolk, Va. The ship and crew of 39 men disappeared. The vessel was last heard from at 0125 EST on 4 February 1963.

The ship's conversion in 1960 to a molten sulfur carrier necessitated the removal of all transverse bulkheads in way of the original centerline tanks and modification of the internal structure to accommodate one continuous independent tank 306 ft. long, 30 ft. 6 in. wide, and 33 ft. high, which was internally divided by transverse bulkheads into four cargo tanks of about equal size. The external surfaces of this long independent tank were insulated with a fibrous glass material 6 in. thick on the top of the tank and 4 in. thick on other surfaces. A void surrounded the tank which allowed a space about 3 ft. 6 in. between the bottom of the tank and the bottom plating of the ship, 2 ft. between the sides of the tank and the original wing tank longitudinal bulkheads, and 3 ft. between the top of the tank and the weather deck. A watertight bulkhead was installed at frame 59 which divided the void into two spaces. The forward space contained cargo tanks one and two and the after space contained cargo tanks three and four. A partial or diaphragm bulkhead which did not extend to the top or bottom of the void was installed where the first and second cargo tanks were divided at frame 65 and where the third and fourth cargo tanks were divided at frame 53. Near its midpoint the tank was welded to its supporting structures at frame 59, and provision was made to permit

expansion and contraction of the tank from the midpoint toward the ends. Each void was provided with power ventilation. Steam heating coils were installed in the cargo tanks to maintain the temperature of the cargo. Each cargo tank was fitted at its after end with a port and a starboard trunk which extended through the weather deck into a common watertight pumphouse. There was a horizontal clearance of 4 in. between the trunk and the weather deck to allow for expansion. An asbestos apron was fitted to cover this clearance. An electric motor was mounted on the top of each trunk and connected by a vertical shaft to a deep well pump located in a sump in the bottom of the tank. A 4-in. ventilator was installed in the top of each trunk and extended through the top of the pumphouse. An access scuttle was also installed in each trunk. At the forward end of each cargo tank, a 6-in. vent pipe was installed which terminated about 4 ft. above the weather deck. As a portion of this vent pipe, a section of flexible stainless-steel piping was installed between the tank top connection and the weather deck to provide for the expansion and contraction of the cargo tank. The forward bulkhead of the original after pumproom was removed when the ship was converted. The cowl ventilators of the after pumproom were retained but the ducts were removed so that they did not extend below the weather deck. The original wing cargo tanks were retained as ballast tanks and utilized to keep the ship on an even keel while loading and discharging. A fixed steam-smothering fire-extinguishing system was provided in the cargo tanks and the void spaces.

The *Marine Sulphur Queen* commenced operation as a bulk molten sulfur carrier in January 1961. On 8 April 1961, a major sulfur spill oc-

curred in the No. 1 pumphouse while discharging cargo. The molten sulfur flowed down through the clearance between the trunk and weather deck onto the insulation of No. 1 tank and into the void space below the tank. In June of 1961, the solidified sulfur and the sulfur-impregnated insulation were removed, and new insulation was installed. While discharging cargo on 28 December 1961, a spill occurred in the No. 3 pumphouse. Again, the sulfur flowed down onto the insulation of the tanks in the after void space and into the lower void. In January 1962, the solidified sulfur and the sulfur-impregnated insulation were again removed, and the new insulation installed.

During the latter part of 1961, a crack was found in the steel plate which formed the starboard sump at the after end of No. 4 tank. This crack was described as being about 12 in. long and about 1½ in. below the bottom of the No. 4 tank. The amount of molten snlfur which leaked through this crack prior to its repair in January of 1962 cannot be determined because of the sulfur spill in the pumphouse of No. 3 tank on 28 December 1961. However, a very small leak, described as a pinhole weep, was fonnd in way of the repair shortly after the ship left the shipyard. Several methods were used to repair this minor leak, but none was entirely satisfactory. In any event, the molten sulfur which did emit from the leak was confined in a bay approximately 3 ft. by 8 ft. formed by the tank foundation.

Commencing in the late summer of 1962 and continuing until the vessel sailed on its last voyage, molten sulfur leaked from the insulation at the after end of No. 4 tank on each loaded voyage. The amount of sulfur was so great that it was necessary for the crew to remove the solidified sulfur on each return voyage to keep it from plugging the bilge suctions. When the vessel sailed on its last voyage, an estimated 20 to 70 tons of solidified sulfur remained in the bilges at the after end of No. 4 tank. A witness stated that this sulfur was either coming out of insulation which was not removed during the repairs made in January of 1962 or coming from a leaking flange.

The repair list prepared by the Master in October of 1962 contained an item for the renewal of the 6 in. stainless-steel flexible vent line on the No. 1 cargo tank, the removal of approximately 6 tons of sulfur in the void at the forward end of the tank and the renewal of approximately 750 square feet of sulfur-saturated insulation at the forward end of No. 1 tank.

Numerous fires had occurred in the sulfur-impregnated insulation in the void spaces. These fires were of a local nature seldom covering an area of more than a few square feet, and caused little or no apprehension on the part of the crew. They were extinguished with the steam smothering system and fresh water. Commencing in October of 1962, these fires occurred with increasing frequency. Witnesses stated that during a voyage in the latter part of December 1962, fires burned almost continuously in the insulation at the after end of No. 4 tank, and at least one fire occurred in the void space of No. 1 tank. Before the last voyage, the cowl-type ventilators from the after pumproom had been removed and canvas covers installed to reduce the loss of steam from the fixed fire extinguishing system. The power ventilation for the voids was used only in port.

During its operation as a molten sulfur carrier, the *Marine Sulphur Queen* sustained heavy weather damage on two occasions, encountered two hurricanes and suffered one minor grounding.

The ship was drydocked and inspected by the Coast Guard in January 1962. It was inspected for certification by the Coast Guard in January 1963. However, the cargo tanks, void spaces surrounding the cargo tanks, and wing tanks were not inspected at this latter time in view of the vessel's scheduled March 1963 yard period for drydocking and repairs.

On 2 February 1963, the *Marine Sulphur Queen* completed loading a full cargo of 15,260 tons of molten sulfur at Beaumont, Tex. Cargo Tanks 1 and 2 contained dark sulfur with a carbon content of 0.14%, and Tanks 3 and 4 contained bright sulfur with a carbon content of 0.04%.

The ship departed Sabine Bar Seabuoy at 1900, CST, 2 February 1963, for Norfolk, Va., expecting to arrive at noon, on 7 February 1963. The Master had been instructed to give both a 48-hour and 24-hour advance notice of arrival to the Norfolk agent. At 0125, EST, 4 February 1963, a personal message from a crew member was transmitted by the vessel and received by RCA radio. This is the last known radio contact with the vessel. At this time the estimated position of the ship was 25°45′ N, 86° W. At 1123, EST, 4 February, RCA radio made the first of two unsuccessful attempts to contact the ship. The estimated position of the ship at this time was 24°40′ N, 83°19′ W. Weather conditions prevailing along the track of the *Marine Sulphur Queen* are known to have been rough. The wind was northerly 25–46 knots; northerly seas with a height of about 16 ft. and slightly abaft the vessel's port beam, and the period of encounter of the waves was within about 10 percent of the ship's period of roll.

At 2100, EST, 7 February 1963, the SS *Marine Sulphur Queen* was reported overdue to the Commander, 5th Coast Guard District, Portsmouth, Va. An intense air and surface search was mounted along the trackline of the ship from Beaumont, Tex., through the Straits of Florida to Norfolk, Va. During the period 8–13 February 1963, Coast Guard, Navy, Marine Corps, and Air Force aircraft participated in 83 flights, flying 500 hours and searching a total of 348,400 square miles. In addition, other Federal agencies determined that the vessel was not in Cuban waters. All efforts were without success and the search was discontinued on 13 February 1963.

On 20 February 1963, a life preserver and fog horn stenciled with the *Marine Sulphur Queen's* name were retrieved by a U.S. Navy vessel 12 miles southwest of Key West, Fla. A second search was commenced concentrating on the eastern part of the Gulf of Mexico, the Straits of Florida, and the Bahamas. The U.S. Navy conducted an underwater search for the vessel's hulk during the period 20 February through 13 March 1963. During the search additional debris was retrieved and identified as coming from the SS *Marine Sulphur Queen*. On 14 March 1963, after all efforts to locate the ship had failed, the search was again discontinued.

REMARKS

In view of the vast search operations conducted and the debris found and identified as coming from the *Marine Sulphur Queen,* the ship and her entire crew of 39 men are presumed to be lost.

Concurring with the Board, the vessel apparently was lost on 4 February 1963 on its approach to, or in the vicinity of, the Straits of Florida.

Further concurring with the Board, in the absence of survivors or physical remains of the ship, the exact cause of the loss of the *Marine Sulphur Queen* cannot be determined.

The Board considered many possibilities which may have caused the loss of the ship and rightly declined to assign any order of probability to these causes. In its conclusions the Board commented on the following possible causes:

a. An explosion may have occurred in the cargo tanks.

b. A complete failure of the vessel's hull girder may have caused it to break in two.

c. The vessel may have capsized in synchronous rolling.

d. A steam explosion may have occurred as the result of a rapid filling of the void space with water.

The record contains ample evidence to support the Board's suppositions.

Another possible cause for the loss of the vessel and one which the Board did not comment upon concerns the possibility of an explosion in the void space surrounding the cargo tanks. Hydrogen sulphide and carbon disulphide gases released by agitated molten sulfur as well as sulfur vapor could have entered the void spaces in sufficient quantities to have formed an explosive mixture. The recent history of fires in the insulation of No. 4 tank indicates that a source of ignition existed. A continuing study of this possibility is being made.

The Board's findings include a detailed description of the structural arrangement and scantlings of the vessel. This description has been reviewed for general correctness. The structural arrangement and the scantlings of the vessel can also be dealt with by reference to the pertinent plans. The following plans are considered to be in this category and will be filed with the original record of the investigation:

Bethlehem Steel Co., Baltimore Yard Plan No.

a. 43933 Alt. 1—General Arrangement.

b. 44302 Alt. 2—Midship Section Modifications.

c. 44303 Alt. 2—Mod. to Existing Bhds. and Webs.

d. 44304 Alt. 0—New W.T. Longitudinal Bhds.—Frs. 71 to 73.

e. 44305 Alt. 0—Mod. to Cent. Vert. Keel and Deck Girder.

f. 44307 Alt. 2—Swash Bhds. for Sulfur Tanks.

g. 44308 Alt. 2—Sulfur Tank No. 1 Structural Details.

h. 44309 Alt. 2—Sulfur Tanks No. 2, 3, and 4 Structural Details.

i. 44310 Alt. 0—Foundations for Sulfur Tanks.

j. 44311 Alt. 0—Expansion Connections for Sulfur Tanks.

k. 44323 Alt. 0—Sumps for Sulfur Tanks Arrgt. and Dets.

l. 44324 Alt. 0—Sump Arrgt.

m. 44331 Alt. 5—Arrangement of Sulfur Cargo Piping.

The Board's recommendation that the same conversion of another T2-type tanker should not be approved is concurred in. However, its further recommendation that no other conversion of this type vessel should be approved which deviates from the originally designed features for the carriage of normal petroleum products requires considerable qualification. First, the acceptability of any conversion must be considered on its individual merits, having regard for the existing condition of the vessel and the proposed cargo, route, and service. Secondly, the objection to the conversion of an existing T2 or another tanker of comparable age is associated with the probable condition of the vessel, particularly the cargo portion, due to age, as much as it is due to design considerations. Thus, there might be no objection to conversion of such an existing vessel if it were, in fact, found to be fully in satisfactory condition, and if the conversion design requirements were compatible with the existing structure. In accordance with the foregoing principle, the use of an existing T2 tanker bow and stern, if in satisfactory condition and properly joined to a suitable new cargo middlebody, is considered acceptable.

The Board's recommendation which would require molten sulfur carriers to install a device to automatically record the temperature of steam entering the heating coils is not fully concurred in. If the source of supply of the steam is such as to provide inherent temperature control, no temperature measuring or recording device or alarm is considered necessary. If this is not the case a temperature gage and an alarm should be required. If the temperature of these coils is unnecessarily high, the explosive risk may be increased and, additionally, heat transfer may be reduced due to the increase in viscosity of sulfur adjacent to the coils. In any event, there is need to separately monitor the cargo temperature since the temperature of the heating coils must be higher than the desired cargo temperature.

Due to the high corrosion rate which may result from the use of water or steam in fighting sulfur fires and the impracticability of effectively manning fire stations in the restricted void spaces, the Board's recommendation that fire hose stations be required in the void spaces surrounding the cargo tanks is not concurred in.

The Board's recommendation that instrument manufacturers be advised of the need for the development of a suitable explosimeter that will accurately measure the explosive gases emanating from molten sulfur in order that frequent checks of the gas content in the tank can be made by the ship's personnel is concurred in only insofar as it applies to improving existing equipment and the development of suitable gas monitoring systems. Such a system is also needed to check for explosive gases in the void spaces. Reasonably accurate instruments are now in use. Proposed regulations would require such instruments on all tank vessels. Consideration is being given to extending this requirement to freight and passenger vessels which carry limited quantities of inflammable or combustible bulk cargoes.

Concurring in another of the Board's recommendations, regulations are being developed for submission to the Merchant Marine Council which would require operators of molten sulfur carriers to provide appropriate instructions and indoctrination for vessel personnel concerning hazards of molten sulfur cargoes.

It was further recommended that the results of studies being made by the U.S. Bureau of Mines concerning the chemical and physical properties of molten sulfur be reviewed for their impact on U.S. vessels approved for the carriage of such cargo. Concurring in the Board's recommendation, the report is being carefully considered.

The Board's recommendation that the Commandant establish procedures to insure that Coast Guard Marine Inspection Offices are furnished timely information regarding significant areas requiring inspection and special cargo features of vessels uniquely designed to transport exotic cargoes is concurred in. Action has already been taken to insure that molten sulfur carriers are frequently inspected, and special instructions have been given to Marine Inspection Officers in ports where these vessels call. Additional inspection procedures are being developed for the inspection of all vessels carrying exotic cargoes.

The recommendation that a company seeking the approval of a vessel designed to carry exotic cargoes be required to submit reasonable studies concerning all of the chemical and physical properties of the cargoes and that, when necessary, such properties be given full consideration in the design of the vessel is concurred in and will be referred to the Merchant Marine Council for consideration.

The Board recommended that problem areas concerning the construction of cargo tanks and the chemical properties of molten sulfur be resolved prior to the construction or conversion of another vessel to a molten sulfur carrier. Since the loss of the *Marine Sulphur Queen*, a continuing study has been made of all of the problems involved in the carriage of molten sulfur. During the recent conversion of a T2 tankship for the carriage of molten sulfur, a completely new midbody was installed, individual independent cargo tanks were designed to reduce the problems associated with thermal expansion,

and the cargo tank vent pipes were designed so that the flexible section was eliminated. On an existing vessel the flexible vent lines have been removed, and a continuing inspection program conducted to insure that dry sulfur or any other combustible material is not permitted in the void spaces surrounding the cargo tanks. The Department of Health, Education, and Welfare will be requested to determine if there is a health hazard to personnel employed on vessels carrying molten sulfur.

With regard to the Board's recommendation that procedures be established which would provide the owners, agents, or operating companies with daily positions of their vessels, it is considered that the final responsibility in this regard rests with each vessel's management.

The Board was of the opinion that Recommendation 48 of the International Convention for the Safety of Life at Sea, 1960, concerning the carriage of an emergency Position Indicating Radio Beacon should be implemented at the earliest practicable date. The recommendation is being actively considered on an international basis.

The Board recommended that a portable emergency radio transmitter be kept in the vicinity of the after lifeboats and that an inflatable liferaft be carried in the vicinity of the forward and after deck houses. Proposed regulations to implement both of these recommendations are being considered by the Merchant Marine Council.

Subject to the foregoing remarks the record of the Marine Board of Investigation is approved.

E. J. ROLAND,
Admiral, U.S. Coast Guard,
Commandant.

STRUCTURAL FAILURE ECONOMICS

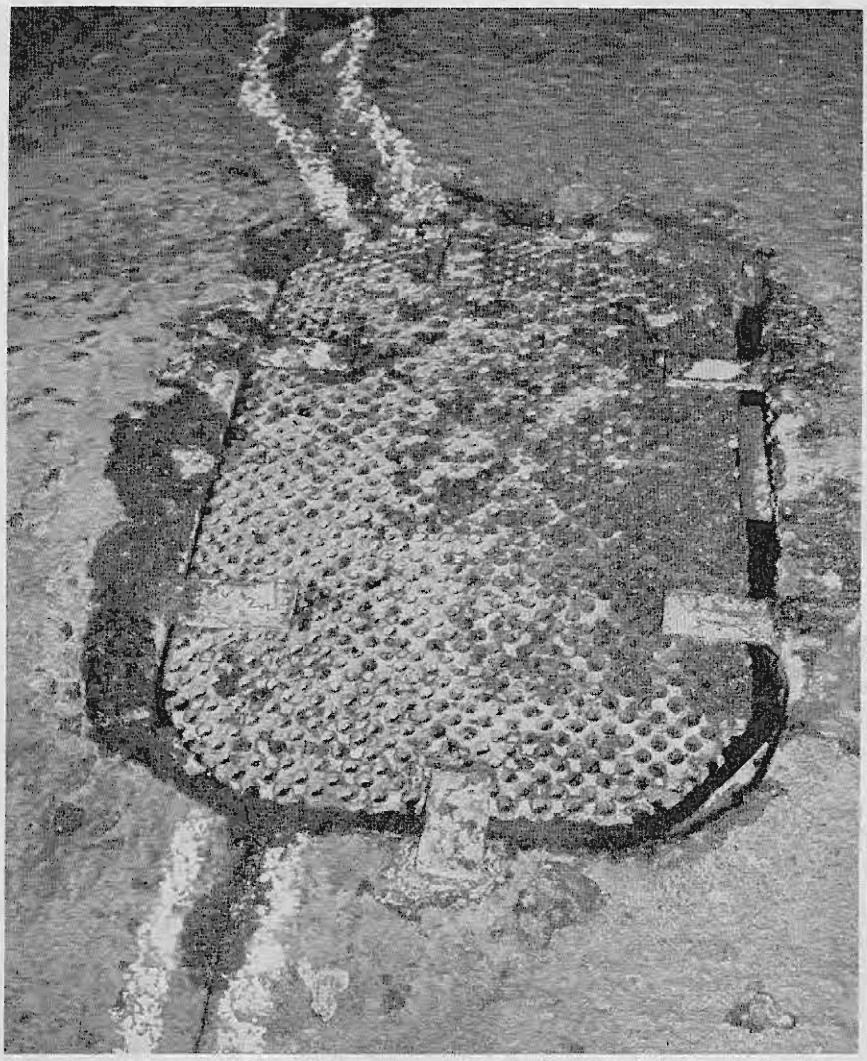
A large proportion of ship structural failures continue to be found in association with notch effects resulting either from poor design or sloppy fabrication practices. In the long run, these things are not only detrimental to safety but are also costly.

The appended illustration shows a sea chest opening with fractures emanating from adjacent corners. It will be noted that the edges of this opening are very ragged. Quite a little of this raggedness is evidently due to wastage, but it appears that it may also be attributed to uneven cutting of the original opening. In fact, irregular cutting of that opening would have contributed to unevenness in wastage.

The mechanical guidance of burning torches or the use of automatic electronic control to predetermined fair contours are well established and economically produce cuts of substantially smoother contour than are possible by free manual burning. Yet one continues to see much ragged, sloppy work where manual on-the-spot burning could have been replaced by fair guided burning if a little forethought had been exercised.

In areas of stress concentration such as exist near the corners of openings, it is doubly important that the edges be fair and smooth. Where fair guided burning is not possible, this may be achieved by grinding after burning. However, use of a fair burn in the first place is, in all but the most critical areas, sufficient, and is more economical.

In the case illustrated, the total length of the resulting cracks was 15 feet. Repairs involved replacing of plate from three strakes as well as the sea chest insert plate. The sea chest opening on the other side of the vessel had cracked similarly a little more than a year before. Both fractures and the resulting costly repairs might have been avoided if a little more care, and possibly a few more dollars, had been spent on the original fabrication.



MARITIME SIDELIGHTS

Do you ever look on the back of Pilot Charts? The U.S. Navy Oceanographic Office Pilot Chart of the North Pacific for May 1964 has, on the reverse side, a rather interesting article on the Incidence of Collisions. The use of radar to avoid collisions and strandings is discussed, areas of the world where ship collisions are prevalent are pointed up, and statistics concerning what Rules of the Road are most often violated in collisions are listed.

⚓ ⚓ ⚓

The largest oceangoing self-unloading freighter ever built on the Great Lakes, the 680-foot Upper Lake's Shipping Ltd.'s *Cape Breton Miner*, was recently launched at St. Catharines, Ont. The *Cape Breton Miner*, will sail between Toronto and Sydney, N.S., every 10 days, and is capable of operating as a worldwide carrier of coal, iron ore pellet, grain, stone, and phosphate.

⚓ ⚓ ⚓

St. Louis, one of the greatest ports on the river in the Golden Days of the Mississippi Steamboat, and now once again a flourishing river port as well as a big rail center, is celebrating its centennial anniversary this year. Among other things it is building a stainless steel arch 630 feet high to symbolize its position and tradition as a gateway between East and West and North and South. Located on national park property it will be known as the Gateway Arch.

⚓ ⚓ ⚓

Passengers crossing the Atlantic by sea totaled 795,000 during 1963, a decrease of 24,000 compared with 1962. . . . The Netherlands has accepted the 1962 amendments to the International Convention for Prevention of Pollution of the Sea by Oil. . . . Algeria has joined the Intergovernmental Maritime Consultative Organization. . . . Los Angeles handled some 24,351,976 tons of cargo during 1963, the highest for the west coast ports. . . .

ATLANTIC MERCHANT VESSEL REPORT (AMVER) SYSTEM

THE FRENCH Consul General in New York, Mr. Michel Legendre, learns the operation of the Atlantic Merchant Vessel Report (AMVER) System from the Commander, Eastern Area U.S. Coast Guard, Rear Admiral Richard M. Ross, USCG (center), and the AMVER Officer, Commander, Mark F. Mitchell, USCG, with Radarman First Class Richard Wilkens, USCG, at the console. Also with the group is the Third Coast Guard District Public Information Officer, Lieutenant Jack C. Goldthorpe.

AMVER is a voluntary merchant vessel position report system using movement reports from vessels of all nationalities plying the Atlantic Maritime Region. This computer-operated system is used to provide the Coast Guard's east coast rescue coordination center in New York with positions of merchant vessels near a vessel in need of assistance.

More than 8,000 vessels representing 61 flags have participated in the AMVER program. This represents approximately 65 percent of foreign flag and 90 percent of American Flag merchant ships operating in the international waters of the Atlantic.

Details of AMVER System operations may be obtained from Commander, Eastern Area, USCG, Custom House, New York 4, N.Y. AMVER instructions are available there, and at Coast Guard Captain-of-the-Port and Marine Inspection Offices in Major Atlantic and Gulf Ports of the U.S. The 1963 instructions are published in the following languages:

Danish, Dutch, English, French, German, Greek, Italian, Japanese, Norwegian, Portuguese, Russian, Spanish, and Swedish. Requests for instructions should state the language desired if other than English.

nautical queries

DECK

Q. Steel plating used for ship construction and repair is commonly referred to by its weight.

(a) What thickness would 40.8-pound plate be?

(b) What thickness would 30.6-pound plate be?

A. (a) 1 inch.

(b) ¾ inch.

Q. What is a stepped bulkhead and what precautions are necessary where one is installed?

A. A stepped bulkhead is one in which the upper part does not come vertically over the lower part. In such case, in order to maintain watertight integrity it is important that the portion of the deck which forms the step be maintained watertight without openings.

Q. What is the reduction in metacentric height due to free surface on a vessel with a displacement of 12,500 tons when a hold 35 feet long and 50 feet wide has free water on the tank tops (neglecting effect of additional weight)?*

NOTE: The reduction in metacentric height due to free surface may be determined by the formula $\frac{rlb^3}{12V}$ where:

r is the ratio of the specific gravity of the liquid in the tank to the specific gravity of the liquid in which the vessel is floating (r is equal to one (1) in this problem)

$\frac{lb^3}{12}$ is the moment of inertia of the tank

V is the volume of displacement of the vessel, assuming the vessel is in sea water.

A. $\frac{35 \times 50 \times 50 \times 50}{12 \times 12500 \times 35} = \frac{5}{6} = .83$ foot

Reduction in metacentric height due to free surface is 0.83 foot.

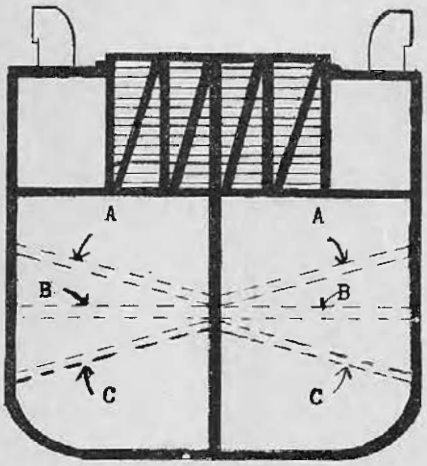
Q. Why is the use of doubler plating for repairs or alterations to be avoided on plating of compartments designed to carry fuel oil or other inflammable or combustible liquids?

A. The use of doubler plating should be avoided when making repairs or alterations to compartments for carrying fuel oil or other inflammable or combustible liquid cargoes because of the impossibility or great difficulty in cleaning and gas freeing the space between the doubler and the original plating. After a tank has been cleaned and gas freed such a doubler area might serve as a source of vapor emission which might create a hazard, and should hot work be performed on the doubled area, any trapped liquids might be ignited.

*The specific gravity of the water on the tank tops is assumed to be the same as that in which the vessel is floating.

Q. (a) Where shifting boards are rigged for a grain cargo, would you regard wooden shores A, B, or C as most efficient? Why?

(b) What compensation is made for inefficient positioning of shores?



A. (a) Shores "B" are most efficient as shores will support the greatest weight when in direct compression.

(b) Inefficient positioning of shores as at A and C, where the angle is greater than 10° from the horizontal, must be compensated for by increasing the size of the shore.

ENGINE

Q. Describe a sectional-header type water-tube boiler.

A. The boiler consists of an arrangement of inclined tubes forming the bulk of the heating surface, sinuous boxes or headers to which the tubes are attached, a horizontal steam and water drum, a mud drum, and a furnace immediately beneath the inclined tubes.

The inclined tubes are divided into vertical sections and to ensure the continuous circulation of water in one direction they are placed at an inclination of 15° to 20° from the horizontal. The tubes are so arranged in order to break up and ensure efficient contact with the products of combustion.

Each section is made up of a series of straight tubes, expanded at their ends into sinuous steel boxes known as "headers." The tubes are thus staggered.

Extending across the front of the boiler and connected to the upper ends of the front headers by short tubes is a horizontal steam and water drum. As the upper ends of the rear headers are also connected to this drum by horizontal tubes, each section is provided with inlet and outlet for steam and water.

Across the bottom of the front headers, and connected thereto by short tubes or nipples, is a forged steel box of square section. This box being situated at the lower corner of the bank of tubes, forms a mud drum through which the boiler can be completely drained or blown down as necessary.

Q. What would you do if the water level was falling due to tube failure in a water tube boiler?

A. All fires must be secured immediately.

The feed should be maintained or increased if possible.

Close the boiler steam stops of the damaged boiler and relieve the steam pressure with the hand lifting gear on the safety valves. If necessary increase the blower speed to force the escaping steam up the stack.

After the pressure has decreased, stop the blower and secure the feed to the damaged boiler, thereby permitting the boiler to cool off slowly.

Q. Upon what should the frequency of tube blower operation depend? How does the operating engineer know when the tubes are in such condition as to make blowing advisable?

A. The frequency of tube blowing should depend first of all on the amount of dirt and soot in the products of combustion. A direct indication is obtained from the stack temperatures. As the stack temperature on any one or all boilers increases excessively, it may be assumed that the heating surfaces of the boiler have been "sooted up," which condition retards the transfer of heat to the water side of the boiler, thereby allowing the heat to pass through the stack and be lost to the atmosphere.

TABULATION OF UNSAFE PRACTICES
July Through December 1963

	Atlantic	Great Lakes and Rivers	Gulf	Pacific	Total
A. Access to Vessel					
Gangways, accommodation ladders, etc.—					
1. Length, width, strength, etc., inadequate	9	10	4	3	26
2. Rigged or secured improperly	9	9	8	7	33
3. Angle too steep	15	7	14	----	36
4. Not clear at either end	5	7	5	2	19
5. Water discharging onto	----	9	1	----	10
6. Hand ropes or rails not provided or inadequate	19	3	7	9	38
7. Insufficient number	----	----	1	1	2
8. Lifeboat or other object suspended over access	----	2	----	----	2
9. Ring life buoy with lanyard not provided or inadequate	30	15	22	16	83
10. Other	11	6	9	9	35
B. Access to Spaces on Board Vessel					
Ladders—					
11. Rigged improperly	7	3	4	2	16
12. Rungs, steps, or treads missing or loose	13	2	24	26	65
13. Deteriorated or weakened	16	3	24	9	52
14. Hand rails missing or inadequate	15	7	10	10	42
15. Doors or passages cluttered	11	4	8	9	32
16. Escape means blocked or locked	7	5	1	1	14
17. Other	6	4	1	5	16
C. Deck and Hull Openings					
18. Hatch covers, dangerously piled or placed	3	----	2	----	5
19. Hatch covers, missing or defective	6	4	5	7	22
20. Hatch covers, securing means defective	9	10	12	3	34
21. Hatch beam locking lugs missing or defective	5	5	1	1	12
22. Lifelines, chains, rails or guards missing or inadequate	24	5	21	15	65
23. Other	8	4	5	4	21
D. Decks and Platforms					
24. Slippery due to oil, grease, etc	30	32	34	20	116
25. Cluttered	29	11	16	6	62
26. Floor plates or gratings loose or not in place	15	7	5	11	38
27. Rails and guards missing or inadequate	25	8	15	17	65
28. Other	2	4	3	3	12
E. Cargo Handling					
29. Safe load not marked on booms	5	1	11	2	19
30. Guys, falls, booms, etc., improperly rigged	1	----	1	----	2
31. Overloading gear	1	----	----	----	1
32. Jury rig winch controls	1	----	----	1	2
33. Failure to use guards and gates of cargo elevators and escalators	----	----	----	----	----
34. Using defective cargo gear	1	1	1	----	3
35. Smoking prohibition disregarded	----	----	2	1	3
36. Stowage or handling of cargo gear	1	----	1	----	2
37. Other	1	3	5	7	16
F. Lifesaving Equipment					
38. Not ready for use	27	1	10	10	48
Lifeboats—					
39. Hoisting fully loaded	----	----	----	----	----
40. Personnel riding to fully stowed position	2	----	----	----	2
41. Preventive lashings not used when working in boat	2	1	----	----	3
42. Winch power not shut off when using hand crank or performing maintenance	1	----	----	----	1
43. Starting engine without ventilating	1	----	1	----	2
44. Bypassed safety devices	----	----	2	3	5
45. Tricing and frapping lines improperly used	6	1	2	3	12
46. Davit span lifelines not ready for use	4	1	5	2	12
47. Other	39	7	32	10	88
G. Firefighting Equipment					
48. Not ready for use	79	26	32	53	190
49. Fire screen doors blocked	1	----	1	2	4
50. Other	27	7	23	14	71
H. Ventilation					
51. Neglect to observe safety precautions prior to entering	----	----	----	----	----
52. Use of toxic solvent in confined spaces	----	----	----	----	----
53. Grease, dust, litter in ventilation system	12	5	1	9	27
H. Ventilation—Continued					
54. Cowls, mushrooms, etc., frozen	13	7	12	9	41
55. Insufficient ventilation	9	2	3	----	14
56. Other	7	8	16	5	36
I. Electrical					
57. Extension cords defective	30	7	17	28	82
58. Portable equipment not grounded	25	19	15	25	84
59. Overfused circuits	26	12	5	26	69
60. Jury rigged circuits	61	14	38	40	153
61. Caps for receptacle outlets not in place	95	18	62	63	238
62. Switch and fuse box panels in passenger spaces left unlocked	7	1	3	10	21
63. General alarm bells muffled or dampened	19	6	22	30	77
64. Vapor globes and guards not in place	111	48	48	60	267
65. Use of defective equipment in hazardous spaces	3	4	6	6	19
66. Other	38	20	16	21	95
J. Machinery					
67. Failure to take safety precautions in lighting-off boilers	2	5	8	2	17
68. Spring loaded valves on sounding pipes secured in open position or not in place	30	----	14	27	71
69. Machinery guards not in place or defective	21	20	24	17	82
70. Failure to block or safeguard steam valves when working on steam lines or inside a boiler, evaporator, etc	1	----	----	----	1
71. Other	30	8	24	20	82
K. Welding, Burning, Heating, or Riveting					
72. No gas-free certificates for "hot work" where required	2	----	6	2	10
73. Inadequate fire watch	3	----	3	1	7
74. Ventilation insufficient	1	----	2	----	3
75. Personnel protective equipment inadequate	----	----	----	----	----
76. Other	1	----	----	1	2
L. Tank Vessels					
77. Ullage holes or expansion trunk openings open without flame screens	2	26	29	8	65
78. Vent header drains left open	----	3	1	----	4
79. Deck battens or wooden gratings not provided where needed	----	1	1	----	2
80. Failure to comply with "Declaration of Inspection Prior to Bulk Cargo Transfer"	----	----	----	----	----
81. Other	7	34	20	8	69
M. Ferry and Excursion Vessels					
82. Vehicles not properly secured during navigation	4	1	----	----	5
83. Vehicle motors not turned off during navigation	1	----	----	----	1
84. Insufficient clearance between vehicles for egress of passengers in emergency	4	----	----	----	4
85. Barricades and gates opened prior to docking	3	----	----	----	3
86. Passenger supervision inadequate	1	----	----	----	1
87. Other	1	1	2	1	5
N. Miscellaneous					
88. Job supervision inadequate	8	2	2	2	14
89. Lack of supervision in maintenance of equipment	18	4	12	5	39
90. Lack of supervision in conducting drills	5	3	1	----	9
91. Lack of sufficient personnel	4	1	3	4	12
92. Oil, fuel and/or debris in bilges	71	6	20	40	137
93. Stoves, ranges, heaters, hot plates, lanterns, etc., not secured against vessel's movement	2	2	4	1	9
94. Inadequate deck, gangway, passageway, lighting	3	1	----	5	9
95. Unsanitary conditions	6	5	5	2	18
96. Chain falls improperly used	----	2	----	2	4
97. Lack of precautions while effecting repairs (including warning notices, etc.)	3	----	4	----	7
98. First aid equipment not ready for use (medicine chest, litter)	2	1	1	1	5
99. Stowage of ship's stores improper	18	3	5	1	27
100. Access over deckloads	----	----	----	2	2
101. Other	30	16	21	8	75
Grand total	1,269	551	867	796	3,483

[EDITOR'S NOTE.—The following regulations have been promulgated or amended since the last issue of the PROCEEDINGS. A complete text of the regulations may be found in the Federal Register indicated at the end of each article. Copies of the Federal Register containing the material referred to may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402.]

TITLE 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

SUBCHAPTER D—TANK VESSELS

[CGFR 64-28]

PART 35—OPERATIONS

Subchapter 35.01—Special Operating Requirements

ALUMINUM OR MAGNESIUM SACRIFICIAL ANODE INSTALLATIONS PROHIBITED IN CARGO TANKS

The present Tank Vessel Regulations are silent concerning corrosion control and the use of sacrificial anode installations in cargo tanks utilized for the carriage of inflammable or combustible liquids in bulk. The acceptance of such installations has been under consideration for some time because of the possible potential hazards created if such installations break loose within the cargo tanks. When the potential hazards were first recognized the Coast Guard on February 4, 1963, issued a Navigation and Vessel Inspection Circular No. 3–63, which described some of the suspected potential hazards involving aluminum and/or magnesium sacrificial anode installations and certain inspections and recommended precautions were outlined to prevent the anode from becoming a source of ignition through accidental incendive sparking.

Recent inspections of tank vessels equipped with aluminum and/or magnesium sacrificial anode installations and preliminary investigations of certain casualties involving tank vessels, together with results of discussions with representatives of the tank vessel industry, have convinced the Coast Guard that these anode installations can be a very serious and potential source of danger on board tank vessels. The recommended installation, maintenance, and inspection requirements in Navigation and Vessel Inspection Circular No. 3–63 have apparently not accomplished the desired degree of safety wanted, and it has been difficult to properly control and supervise the installation and maintenance of such sacrificial anodes. The present conditions existing in most tank vessels justify immediate actions seeking the removal of aluminum and/or magnesium sacrificial anode installations in cargo tanks in order to remove and eliminate possible causes of spark generation through such installations breaking loose and falling or sliding around inside the cargo oil tanks.

In view of the seriousness of casualties which may occur if incendive sparks are introduced into the cargo tanks utilized for the carriage of inflammable or combustible liquids in bulk, when such tanks contain an explosive atmosphere, it is hereby found necessary in the interest of safety to prohibit the future installation of aluminum and/or magnesium sacrificial anodes in cargo tanks and to require the removal of such anode installations from all tank vessels, and such removal shall be accomplished at the first available opportunity but not later than October 1, 1964. This removal of anode installations should be performed only when such tanks are gas freed.

Because of the conditions described generally above, it is also hereby found necessary to invoke the special emergency provisions concerning rule making in section 391a in Title 46, U.S. Code, and section 1003 in Title 5, U.S. Code, and declare that compliance (with those provisions respecting notice of proposed rule making, public hearings, public rule making procedures thereon, and effective date requirements) is impracticable and contrary to the public interest.

By virtue of the authority vested in me as Commandant, United States Coast Guard, by section 632 of Title 14, U.S. Code, and Treasury Department Order 120, dated July 31, 1950 (15 F.R. 6521), to promulgate regulations implementing section 391a in Title 46, U.S. Code, the following § 35.01–25 is prescribed and inserted in Subpart 35.01 after § 35.01–20, which shall become effective upon publication of this document in the Federal Register.

§ 35.01–25 Aluminum and/or magnesium sacrificial anode installations—TB/ALL.

(a) The installation of aluminum and/or magnesium sacrificial anodes in cargo tanks utilized for the carriage of inflammable or combustible liquids in bulk is prohibited.

(b) All existing installations of aluminum and/or magnesium sacrificial anodes in cargo tanks utilized for the carriage of inflammable or combustible liquids in bulk shall be removed at the first available opportunity but not later than October 1, 1964.

(R.S. 4405, as amended, 4417a, as amended 4462, as amended; 46 U.S.C. 375, 391a, 416, Treasury Department Order 120, July 31, 1950, 15 F.R. 6521)

Dated: May 13, 1964.

[SEAL] E. J. ROLAND,
Admiral, U.S. Coast Guard,
Commandant.

[F.R. Doc. 64–4906; Filed, May 15, 1964; 8:47 a.m.]

TITLE 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

SUBCHAPTER N—DANGEROUS CARGOES

[CGFR 64-20]

PART 146—TRANSPORTATION OR STORAGE OF EXPLOSIVES OR OTHER DANGEROUS ARTICLES OR SUBSTANCES, AND COMBUSTIBLE LIQUIDS ON BOARD VESSELS

Miscellaneous Amendments

Pursuant to the notice of proposed rule making published in the Federal Register of January 30, 1964 (29 F.R. 1572–1586), and the Merchant Marine Council Public Hearing Agenda, dated March 23, 1964 (CG–249), the Merchant Marine Council held a public hearing on March 23, 1964 for the purpose of receiving comments, views and data. The proposals considered were identified as Items I to XVI, inclusive. Item VIII contained proposals regarding dangerous cargo (CG–249, VIII, pages 100 to 137, inclusive). This document is the fourth of a series regarding proposals considered by the Merchant Marine Council. The proposals in Item VIII, as revised, are adopted and set forth in this document.

On the basis of comments received, changes were made in the proposals designated §§ 146.20–16, 146.20–23(g), and 146.20–100 in VIIIf, explosives; in §§ 146.22–15(b) and 146.22–100 in VIIIg, inflammable solids and oxidizing materials; and in § 146.29–55(b) in VIIIj, military explosives. The proposal in VIIIa, hatch covers, was withdrawn in order that the subject may be studied further. The proposal designated § 146.20–31 (CG–249, page 113) in Item VIIIf, regarding simultaneous handling of explosives and other cargo, was withdrawn for further study because of the objections raised in comments received.

The other proposals in Items VIIIb, list of explosives and other dangerous articles and dangerous liquids; VIIIc, special stowage plan for recording dangerous cargo aboard; VIIId, compatibility of dangerous cargoes within vehicles, vans, or portable containers; VIIIe, portable magazines for stowage of explosives; and VIIIh, corrosive liquids, are approved as described in the Agenda.

The provisions of R.S. 4472, as amended (46 U.S.C. 170), require that the land and water regulations governing the transportation of dangerous articles or substances shall be as nearly parallel as practical. The provisions in 46 CFR 146.02–18 and 146.-02–19 make the Dangerous Cargo Regulations applicable to all shipments of dangerous cargoes by vessels. The Interstate Commerce Commission in Order Nos. 60 and 62 has made changes in the ICC regulations with respect to definitions, descriptive names, classifications, specifications of containers, packing, marking, labeling, and certification for certain dangerous cargoes, which are now in effect for land transportation. Various amendments to the Dangerous Cargo Regulations in 46 CFR Part 146 have been included in this document in order that these regulations governing water transportation of certain dangerous cargoes will be as nearly parallel as practicable with the regulations of the Interstate Commerce Commission which governs the land transportation of the same commodities. For those changes in 46 CFR Part 146, which involved changes other than shippers' requirements, the proposed amendments were considered at the Merchant Marine Council Public Hearing held on March 23, 1964.

The amendments to 46 CFR Part 146, which were not described in the Federal Register of January 30, 1964 (29 F.R. 1580), are considered to be interpretations of law, or revised requirements to agree with existing ICC regulations, or relaxations of previous requirements, or changes which are editorial in nature, and it is hereby found that compliance with the Administrative Procedure Act (respecting notice of proposed rule making, public rule making procedure thereon, and effective date requirements thereof) is unnecessary with respect to such changes.

By virtue of the authority vested in me as Commandant, United States Coast Guard, by Section 632 in Title 14, U.S. Code, and Treasury Department Orders 120, dated July 31, 1950 (15 F.R. 6521), and 167–14, dated November 26, 1954 (19 F.R. 8026), to promulgate regulations in accordance with the laws cited with the regulations below, the following amendments are prescribed and shall be effective on July 1, 1964; however, the regulations in this document may be complied with in lieu of existing requirements prior to that date.

(Federal Register of May 23, 1964.)

EQUIPMENT APPROVED BY THE COMMANDANT

[EDITOR'S NOTE.—Due to space limitations, it is not possible to publish the documents regarding approvals and terminations of approvals of equipment published in the Federal Registers dated May 6, 1964 (CGFR 64–24), May 19, 1964 (CGFR 64–27), May 26, 1964 (CGFR 64–29). Copies of these documents may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402.]

ARTICLES OF SHIPS' STORES AND SUPPLIES

Articles of ships' stores and supplies certificated from May 1 to May 31, 1964, inclusive, for use on board vessels in accordance with the provisions of Part 147 of the regulations governing "Explosives or Other Dangerous Articles on Board Vessels" are as follows:

CERTIFIED

Armour Industrial Chemical Co., 110 North Wacker Drive, Chicago, Ill., 60606, Certificate No. 514, dated May 20, 1964, MARINE ARMOHIB

Apollo Chemical Corp., P.O. Box 210, West Orange, N.J., 07052:

Certificate No. 594, dated May 12, 1964, Marine Combustion Catalyst MCC–2

Certificate No. 595, dated May 12, 1964, Marine Slag Inhibitor MSI–5

AFFIDAVITS

The following affidavits were accepted during the period from April 15, 1964, to May 15, 1964.

Center Line, Inc., Box 1647, Tulsa, Okla., VALVES

Bailey Meter Co., 29801 Euclid Ave., Wickliffe, Ohio, 44092, VALVES & FITTINGS

National Supply Division, Armco Steel Corp., 1524 Border Ave., Torrance, Calif., FORGINGS & CASTINGS

Swepco Fittings, Inc., 1 Clifton Blvd., Clifton, N.J., FITTINGS [1]

Brown Engineering, 812 South Adams St., Seattle, Wash., 98108, FITTINGS [2]

The Bonney-Floyd Co., Division Shenango Furnace Co., 611 Marion Rd., Columbus 7, Ohio, CASTINGS

Orbit Valve Co., 7500 Interstate Dr., P.O. Box 5180, Little Rock, Ark., VALVES

Weco Division of FMC Corp., P.O. Box 19465, Houston 24, Tex., VALVES

Wells Equipment Mfg. Corp., P.O. Box 19465, Houston 24, Tex.[3]

[1] Acceptance applies to stainless steel welding fittings fabricated by fusion welding in accordance with ASTM Spec. A-403–61T, for use in Class II piping systems only.

[2] Acceptance covers water eductors only.

[3] Delete in the currently approved affidavit section and add to the formerly approved affidavit section in the revised edition of CG 190.

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 2–64

April 30, 1964.

Subject: Testing Materials for Low Temperature Service

1. *Purpose.* To publish the requirements for testing of materials for use in low temperature service.

2. *Discussion.*

a. Ferritic materials used for low temperature service must be tested to ascertain that at the design temperature they possess ductile and not brittle characteristics. Charpy V-notch impact testing, supplemented by the drop weight test for plates, is used for that purpose. These tests are conducted at 10° F below the design temperature to account for the inaccuracies inherent in such tests and to provide a margin in case of error. The prescribed tests are used to adjudge both the base material and fabrication techniques, and also as a quality control procedure.

b. The field of brittle fracture prevention and impact testing is constantly undergoing development. The requirements contained in the enclosures to this circular are based on current knowledge of the subject, and will be updated as new information is developed. The use of impact testing does not absolve designers and fabricators of their responsibilities to design and construct with brittle fracture prevention in mind.

3. *Action.*

a. The procedures specified by the enclosures (not reprinted here—Editor) to this circular shall be used for all designs below —20° F.

b. A proposed impact testing schedule, covering base material testing, welding procedure qualifications, and production quality control testing shall be submitted for approval.

c. Impact testing and the results thereof shall be handled by the cognizant Officer in Charge, Marine Inspection in the same manner as welding test plates.

MERCHANT MARINE SAFETY PUBLICATIONS

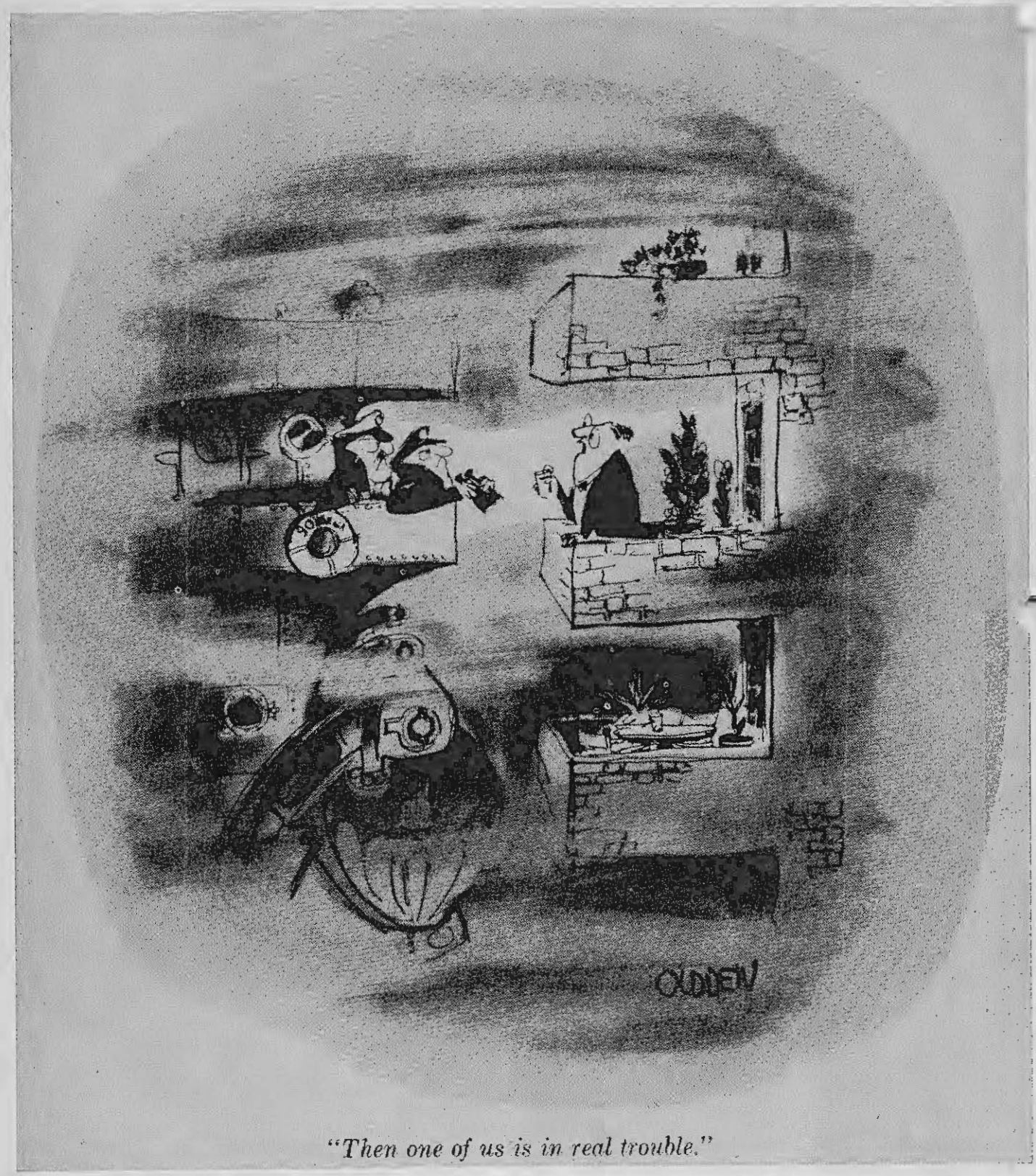
The following publications that are directly applicable to the Merchant Marine are available and may be obtained upon request from the nearest Marine Inspection Office of the United States Coast Guard. The date of each publication is indicated in parentheses following its title. The dates of the Federal Registers affecting each publication are noted after the date of each edition.

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 (3–1–63), F.R. 8–20–63, 10–26–63.
123	Rules and Regulations for Tank Vessels (1–2–62). F.R. 5–2–62, 9–11–62, 2–6–63, 4–4–63, 5–30–63, 8–20–63, 9–6–63, 10–8–63, 10–26–63, 12–13–63, 5–16–64.
129	Proceedings of the Merchant Marine Council (Monthly).
169	Rules of the Road—International—Inland (6–1–62), F.R. 1–18–63, 5–23–63, 5–29–63, 7–6–63, 10–2–63, 12–13–63, 4–30–64.
172	Rules of the Road—Great Lakes (6–1–62). F.R. 8–31–62, 5–11–63, 5–23–63, 5–29–63, 10–2–63, 10–15–63, 4–30–64.
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 (9–1–60).
176	Load Line Regulation (7–1–63). F.R. 4–14–64.
182	Specimen Examinations for Merchant Marine Engineer Licenses (7–1–63).
184	Rules of the Road—Western Rivers (6–1–62). F.R. 1–18–63, 5–23–63, 5–29–63, 9–25–63, 10–2–63, 10–15–63.
190	Equipment Lists (4–2–62). F.R. 5–17–62, 5–25–62, 7–24–62, 8–4–62, 8–11–62, 9–11–62, 10–4–62, 10–30–62, 11–22–62, 11–24–62, 12–29–62, 1–4–63, 1–8–63, 2–7–63, 2–27–63, 3–20–63, 4–24–63, 6–11–63, 6–15–63, 6–22–63, 6–28–63, 8–10–63, 10–16–63, 11–23–63, 12–3–63, 2–5–64, 2–11–64, 3–12–64, 3–21–64, 3–27–64, 4–29–64, 5–6–64, 5–19–64, 5–26–64.
191	Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel (7–1–63). F.R. 9–18–63, 12–13–63.
200	Marine Investigation Regulations and Suspension and Revocation Proceedings (10–1–63).
220	Specimen Examination Questions for Licenses as Master, Mate, and Pilot of Central Western Rivers Vessels (4–1–57).
227	Laws Governing Marine Inspection (6–1–62).
239	Security of Vessels and Waterfront Facilities (8–1–61). F.R. 11–3–61, 12–12–61, 8–8–62, 8–31–62, 11–15–62, 1–30–63, 3–27–63, 5–29–63, 6–4–63, 10–9–63, 1–30–64, 4–17–64.
249	Merchant Marine Council Public Hearing Agenda (Annually).
256	Rules and Regulations for Passenger Vessels (1–2–62). F.R. 5–2–62, 9–11–62, 12–28–62, 4–4–63, 5–30–63, 8–20–63, 9–6–63, 10–26–63.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (11–1–62). F.R. 2–1–63, 2–6–63, 3–13–63, 4–4–63, 5–30–63, 8–20–63, 9–6–63, 10–2–63, 10–26–63.
258	Rules and Regulations for Uninspected Vessels (1–2–64)
259	Electrical Engineering Regulations (12–1–60). F.R. 9–23–61, 9–30–61, 5–2–62, 9–11–62, 8–20–63, 9–6–63.
266	Rules and Regulations for Bulk Grain Cargoes (5–1–62). F.R. 9–11–62, 12–24–63.
268	Rules and Regulations for Manning of Vessels (2–1–63).
269	Rules and Regulations for Nautical Schools (5–1–63). F.R. 10–2–63.
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.
293	Miscellaneous Electrical Equipment List (6–1–62).
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.
323	Rules and Regulations for Small Passenger Vessels (Under 100 Gross Tons) (2–3–64).
329	Fire Fighting Manual for Tank Vessels (4–1–58).

Official changes in rules and regulations are published in the Federal Register, which is printed daily except Sunday, Monday, and days following holidays. The Federal Register is a sales publication and may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402. It is furnished by mail to subscribers for $1.50 per month or $15 per year, payable in advance. Individual copies desired may be purchased as long as they are available. The charge for individual copies of the Federal Register varies in proportion to the size of the issue and 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, 1964, are now available from the Superintendent of Documents, price: $2.50.

CHANGES PUBLISHED DURING MAY 1964

The following have been modified by Federal Registers:
CG–190, Federal Registers, May 6, 19 and 26, 1964.
CG–123, Federal Register, May 16, 1964.



"Then one of us is in real trouble."

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