1039, another whistle signal was heard on the port bow; both engines were reduced to 60 RPM (11.1 knots). At this time, the bow of a vessel appeared out of the fog, about one-quarter mile just off the port bow and on a course crossing at right angles to that of *Ship A*. At 1039½, hard right rudder was ordered and the engine order telegraph was placed on full astern. At 1040, the bow of *Ship A*, going ahead and swinging to the right, struck *Ship B* on her starboard side, approximately 125 feet from the bow and at about right angles to her fore-and-aft line.

Ship A hit *Ship B* forward of her pilothouse, continued into the hull through the No. 2 starboard wing tank, crossing the centerline, and cutting the catwalk. The bow was left hanging onto the rest of the ship with only about a foot-wide strip. *Ship B*'s bow broke off at 1115, and was later towed to the Bethlehem Shipyard in Hoboken, N.J.

Ship A was damaged at the bow. Plating and frames were torn and pushed into the forward lounge and the forepeak, with a gash extending aft about 60 feet. Also, the chain pipes, port and starboard, the forepeak tank top, and the power cables leading to all the deck machinery forward were damaged.

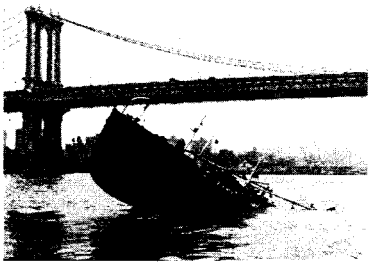
The masters of both vessels carried out emergency procedures. After ascertaining that no assistance was required, both vessels, escorted by tugs, proceeded into New York Harbor, each under its own power.

SHIP B

Ship B departed Brooklyn, N.Y., at 0800 EST, 1 March, on a voyage to Aruba, Dutch West Indies. The vessel was in ballast with a draft on departure of 12 feet 10 inches forward and 21 feet aft.

At 0955, *Ship B* disembarked the pilot about 2 miles off Ambrose Lightship. The master was in charge of the vessel's movements and the third officer was stationed on the starboard wing of the bridge. A lookout was on the bow.

At 1000, departure was taken from



Ambrose Lightship, bearing 033° true, 1½ miles distant. Course was set at 135°, with the speed full ahead at 12½ to 13 knots. This course and speed were maintained for approximately 5 minutes, at which time the visibility commenced to decrease. The third officer started sounding the fog whistle by hand and "Standby" was rung up on the telegraph. A few minutes later, speed was reduced to half ahead (7 to 8 knots) and the course was changed to 144°.

Two radar targets were then observed on the 8-mile range scale; one at about 4½ miles and the other about 2¼ miles, both to starboard. The target at 2¼ miles was moving in the opposite direction. Its fog signal was heard and *Ship B*'s speed was reduced to dead slow ahead (3.5 knots). The target was estimated to have passed about one-half to three-fourths mile off the starboard side. *Ship B* then increased speed to slow ahead (5.5 knots). Shortly thereafter, another radar target appeared about 2¼ miles on the port side as the bearing opened to the left. This target was lost in the sea return at about the 2-mile range. No fog signals were heard and it was estimated that the target passed about 1½ miles off to port.

At about 1038, with visibility down to one-fourth mile, a fog signal was heard on the starboard beam. Speed was reduced to dead slow ahead (3.5 knots). Shortly thereafter, another whistle signal was heard just forward of the starboard beam; immediately all engines were stopped. About one-fourth of a mile away, on the starboard beam, a vessel appeared out of the fog, bearing down on *Ship B* at about right angles. The engine order telegraph was rung full astern, followed immediately by emergency full astern. *Ship B* was about dead in the water at the time of impact.

ANALYSIS

Relative motion, and the direction and distance of the CPA (closest point of approach), cannot be estimated to any reliable degree without properly plotting at least several periodic range and bearing positions of the target. In addition, the solution is accurate only when the course and speed of the target are not altered after the last range and bearing. In this case, even if the visual methods were accepted as capable of producing accurate results, the loss of the target in the sea return at a distance of 2 miles would have rendered the predicted results extremely doubtful and to be treated with utmost caution.

A relative motion plot (based on the available information) indicates that *Ship B* had crossed ahead of *Ship A*, and bore about 017° true when *Ship A* ended its turn, from 000° to a new course of 035°. *Ship A*'s new course and speed (11.1 knots) placed the two ships on collision courses (based on *Ship B*'s course of 144° and an effective speed of about 4 knots). Thus the plot indicates a collision will occur about 3 minutes later.

The primary cause of this collision was the failure of *Ship A* to go at a moderate speed in a fog and failure to stop her engines and navigate with caution upon hearing forward of her beam the fog signal of a vessel, the position of which was not ascertained. These failures were aggravated by the fact that the radar provided timely notice of the proximity of the other vessel. Improper interpretation of the radar aboard *Ship A* was also a factor; in that, *Ship A's* course change (to 035°) actually placed the vessels on collision courses. This situation could have been avoided by the simple expedient of plotting ranges and bearings.

As a result of this casualty, *Ship A* received damage in the amount of $380,000, and *Ship B* damage in the amount of $900,000. There were no personnel injuries.

CASE 3

The principals in this case were a U.S. destroyer escort (*Ship A*) and a Swedish merchant vessel (*Ship B*), of 16,266 gross tons. Both ships were equipped with good operating radar. The collision occurred at about 1945 EST, 19 March, about 1.9 miles 048° true from Cape Henry Light, Va. At the time of the collision, the wind was easterly, force about 2; a light, easterly sea; the weather was clear with good visibility; and the tide was ebbing, with an east-southeasterly set.

SHIP A

At about 1650 e.s.t. 19 March, *Ship A* completed exercises at sea off the Virginia Capes and began her return voyage toward the entrance to Chesapeake Bay. She was under instructions to rendezvous with an admiral's barge near Little Creek Approach Lighted Buoy "2A" for the purpose of disembarking passengers. The commanding officer and OOD (officer of the deck), a lieutenant, were on the open bridge, with the OOD in charge of the vessel's movements. A forward lookout was stationed on the signal bridge. The radar was manned in CIC (Combat Information Center).

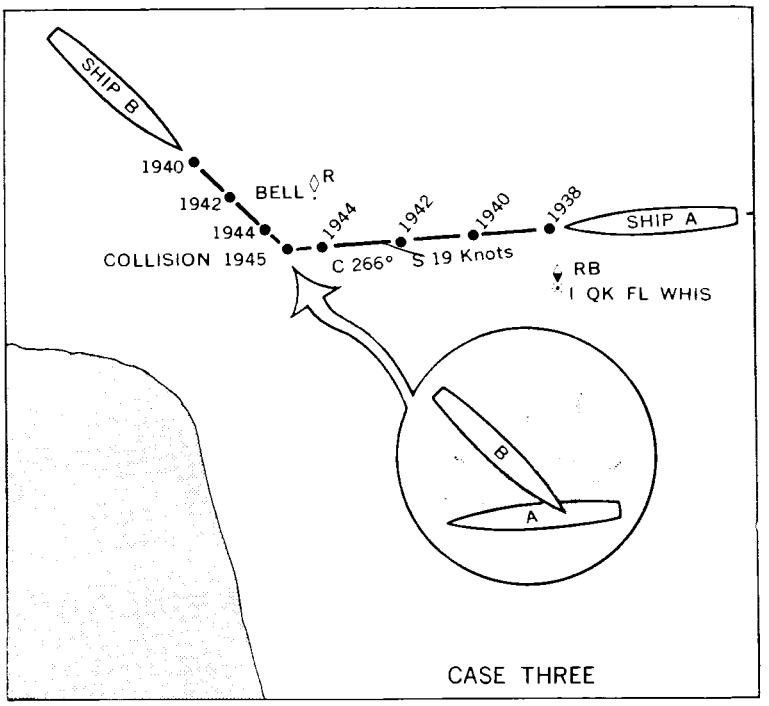
Ship A proceeded westward, passed Chesapeake Lightship to starboard, about 1,900 yards distant; then Buoy "2" was passed to starboard, about 150 yards distant. Cape Henry Junction Lighted Whistle Buoy was passed

to port, about one-half mile distant, at about 1938. At the time of passing this buoy, the ship's speed was 19 knots and the course was 266°.

When in the immediate vicinity of the junction buoy, the commanding officer and OOD noticed, about 15° off the starboard bow, several lights in the area of the Tail of the Horseshoe Channel. The commanding officer requested the OOD to check with CIC to find out if a moving target was among the lights. CIC returned a negative answer. Moving lights, which the commanding officer and the OOD accepted as coming from a ferry, were seen in this same area. However, the commanding officer, observing that CIC had not reported a moving target, assumed that the ferry was beyond the radar range which was set on the 7-mile scale.

Approximately 2½ minutes before the collision, the commanding officer observed the masthead lights and red side light of a vessel, which bore about 40° off the starboard bow. The OOD attempted to take a bearing, but the assistant navigator was using the starboard pelorus. He then viewed the lights by binoculars, and estimated the distance to be about 2,000 yards. The commanding officer, about this time, stopped the engines. A few seconds later, after hearing a four-short-blast whistle signal from the other vessel, he ordered "left full rudder—all engines back full," sounded four short blasts on his whistle, then sounded the collision alarm. The commanding officer then heard what he thought was another four-blast signal from the other vessel. *Ship A* began to turn left and the bow of *Ship B* passed down the starboard side of *Ship A*. When about 100 feet away, the commanding officer ordered "rudder amidships—all ahead full." But, a few seconds later, *Ship B* struck *Ship A* on the starboard side, abaft of amidships.

Ship A was able to prevent progressive flooding and remained afloat. The injured and deceased personnel were cared for, and the vessel was later towed into the port of Norfolk, Virginia. *Ship B* remained in the area, and later proceeded into Norfolk.



SHIP B

Ship B departed Baltimore, Md., bound down Chesapeake Bay en route to Puerto de Hierro, Venezuela. On board was a State pilot who was directing the movements of the vessel. The run down the bay was completed without incident. While approaching the area where the pilot was to disembark, *Ship B* was navigated to the westward of Tail of the Horseshoe buoys, "3TH" and "1TH," so as to pass buoy "1TH" about 800 yards to port. The engines were stopped, and the vessel placed on a heading of 160° in order to make a lee for the pilot's departure. At about 1940, 19 March, with the engines stopped and the vessel moving through the water "a little," the pilot departed.

While *Ship B* was heading about 165°, the master, who was now in charge of the movements of the vessel, observed the masthead lights and the green side lights from a vessel 10° to 20° forward of his port beam. This vessel was *Ship A*. The master then ordered ahead full and ordered the man at the helm to come left to 115°. As *Ship B* approached this course, the master, wishing to pass Buoy "2A" abeam to port, distant one-half mile, observed the buoy on radar and decided the correct course to pass one-half mile off was 125° (after having been on 115° "just a short while").

As *Ship B* approached Buoy "2A", the master observed the masthead lights and the red side light of another vessel almost dead ahead and several miles away. He decided to come right in order to leave room between his vessel and Buoy "2A" for the latter oncoming vessel to pass. He then came to course 134°.

When *Ship B* had Buoy "2A" abeam, *Ship A* was approximately 50° off the port bow of *Ship B* and still closing. The master, at about this time, ordered his chief mate to sound the danger signal and stop the engines. Both orders were executed. Failing to observe any change in maneuvering by *Ship A*, the master sounded one long blast and ordered hard right. As *Ship B* began turning right, the master, observing that *Ship A* was still closing so as to cross ahead of *Ship B* and thinking that he could not avoid collision by going right, ordered hard left and half astern. The right rudder had been held for about one-half minute. As the bow of *Ship B* was about amidships of *Ship A*, the master, seeing that the vessels would not clear, ordered full astern, just before the impact.

ANALYSIS

The available information indicates that earlier visual detection of *Ship B* was hampered by background lights which were visible beyond the port bow to the starboard bow of *Ship A*. In addition, the question of a proper lookout is also raised. An 18-year-old seaman, standing his fourth lookout watch, was the forward lookout. His position on the signal bridge made it even more difficult for him to see another ship's lights among all the background lights. In any event, he failed to see and report any moving

targets to CIC. A lookout on the bow would probably have seen *Ship B* much earlier.

Radar was also a factor in this case. Although the reason *Ship A* failed to detect the presence of *Ship B* by radar was not evident in the record, there can be little doubt that the speed of the vessel was influenced by the absence of any reports from radar of moving targets ahead.

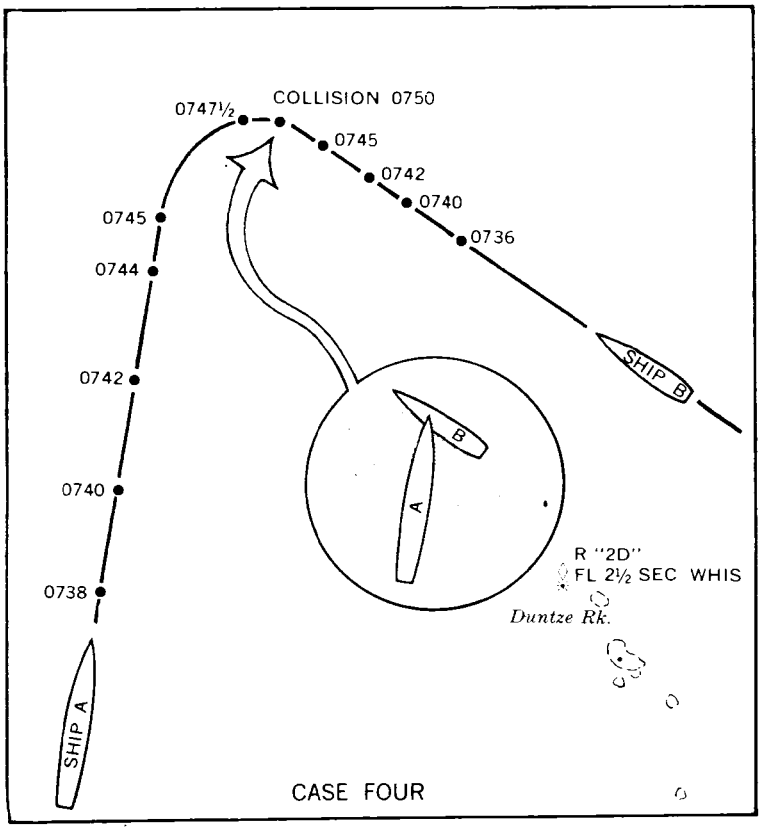
The master of *Ship B*, watching *Ship A* approaching off his port bow, expected *Ship A* to come right and pass to port of *Ship B*. However, in the absence of signals, or other communication, no vessel should attempt to predict the intentions of the other. *Ship A* being the burdened vessel, had the duty to keep clear. Therefore, when her commanding officer first observed the red side light of *Ship B* about 2,000 yards away on his starboard bow, he should have given a one-blast signal and then altered course to pass astern of *Ship B*. An *exchange* of signals was indicated under Section 80.3, Pilot Rules for Inland Waters.

This was a crossing situation in which the proximate cause of the collision was the failure of *Ship A*, the burdened vessel, to keep clear. Factors contributing to her failure were background lights hampering visual detection of *Ship B's* lights and the reported absence of a moving target on radar. Obviously, the CIC failed to maintain a plot, and based its report solely on radar presentation in the absence of reports from the forward lookout. A plot would have disclosed the proximity of *Ship B* in ample time to take proper evasive action.

As a result of this casualty, two crewmembers of *Ship A* were killed and one seriously injured. *Ship A* suffered structural damage estimated at about $350,000; damage to *Ship B* was estimated at about $35,000.

CASE 4

The principals in this case were a U.S. merchant vessel (*Ship A*) of 7,632 gross tons and a U.S. fishing vessel (*Ship B*), a motorboat, of 23 net tons. The merchant vessel was equipped with good operating radar. The weather at the time of the casualty was: wind from the northwest at force 5; approximately a 9-foot sea from the northwest; and dense fog.



SHIP A

Early on the morning of 27 September, *Ship A*, en route San Pedro, Calif., to Seattle, Wash., was proceeding northward off the Washington coast at 11.5 knots. The master and second officer were on the bridge. At 0720 PST, a fog bank was observed ahead about 4 miles away in the vicinity of Tatoosh Island. A lookout was posted on the bow and fog signals were commenced. The engine was placed on "Standby", but no reduction in speed was made. The radar was on and appeared to be operating satisfactorily, showing a good presentation of land mass, but no vessel targets were observed. At 0734, Tatoosh Island was abeam to starboard, and the vessel had entered the fog bank where visibility was between 500 and 1,000 yards. At 0746, with Tatoosh bearing 145° true, distance 3 miles, the master ordered right rudder to enter the Strait of Juan de Fuca. At this same time, the lookout reported by phone that he heard a whistle ahead. Immediately, the engine was stopped and the master checked the radar, which was on the 8-mile scale, but observed no vessel targets. Approximately 1½ minutes later, the lookout reported sighting a vessel 1,000 feet ahead fine on the starboard bow. This later proved to be *Ship B*, which appeared to be underway with little or no way on and heading across the bow of *Ship A* from starboard to port. Upon receiving the report from the lookout, the master ordered full astern. The rudder was already hard right. The response to the engine order was immediate, but these maneuvers did not succeed in evading *Ship B*. At about 0750, with *Ship A* making an estimated 3 to 4 knots through the water, her bow struck and holed *Ship B* on the port side near the forward end of the pilothouse.

Ship A was undamaged, but *Ship B* was severely holed and sank about 3 minutes after the collision. *Ship A* came about, lowered her motor lifeboat, and was able to rescue three survivors. Unfortunately, the master and one crewmember of *Ship B* were lost.

SHIP B

Ship B, a 49-foot, wood hull motorboat, licensed for fishing, with the master and four crewmembers aboard, departed Neah Bay, Wash., at about 0600 en route to the fishing

grounds near Destruction Island at the entrance to the Strait of Juan de Fuca. After clearing the harbor, the vessel headed west at half speed—approximately 5 knots—into a 9-foot westerly swell. At about 0720, fog was encountered. The master came to the bridge, took the wheel, and began sounding fog signals. Five minutes later speed was reduced to 4 knots. Sometime later, the master ordered the stabilizers rigged to reduce the vessel's roll, as the seas had increased. The man who previously had the wheel had remained in the pilothouse. At this time, he went below to call two other crewmembers to assist in the rigging out. Afterward, while waiting for the others, he was standing on the foredeck acting as lookout. He had been there 2 to 3 minutes when he heard the master shout "Look out!" Shifting his gaze from right to left, the lookout saw the bow of *Ship A* about 50 to 60 feet away and felt the engine of *Ship B* being reversed and the revolutions increased. Within seconds, the collision occurred.

ANALYSIS

The principal cause of the collision was the failure of *Ship A* to go at a moderate speed in fog. In this connection, it is apparent that undue reliance was placed on the fact that no vessel targets were observed on the radar and that the radar appeared to be working properly. The record does not indicate whether or not any attempt was made to periodically shift the range scale; such a procedure is often successful in detecting targets not visible on one range scale alone.

There is the question of a proper lookout aboard *Ship B*. The crewmember who was relieved at the wheel by the master indicated that he remained in the pilothouse until he went below to call the other crewmembers. When he returned topside he took position on the foredeck to act as lookout, and within 2 or 3 minutes the collision occurred. During his absence, *Ship B* had no lookout. Had a lookout been stationed on deck well forward and away from any distractions at the time fog was first encountered, there remains the possibility that he might have heard the fog signal of *Ship A*, thereby providing additional time in which to take avoiding action.

The board investigating this casualty was of the opinion that the use of a radar reflector aboard *Ship B* may have made her a more effective radar target. Tests conducted by the U.S. Coast Guard indicate that the increase in radar detectability afforded by available reflector equipment is definitely limited and offers no assurance that vessels so equipped will be observed by radar in time to avoid collision or even that they will be observed at all. However, it appears that owners of small vessels, particularly those of nonmetallic construction, should be encouraged to employ any means which might improve radar detectability.

As a result of this casualty, *Ship B* sank with an estimated loss of $65,000. The master and one crewmember of *Ship B* were lost and presumed dead; one crewmember was injured. *Ship A* was not damaged.

CONCLUSIONS

In a study of collision cases certain conclusions appear obvious. For example, the greater number of collisions occur in narrow channels and other congested waters. At the same time, an important contributing cause is a marked inclination to ignore some of the established rules for avoiding collisions. The latter is convincingly illustrated by a study,[2] completed in 1960, which showed that, of 199 collisions studied, there were 105 violations of article 18, Inland Rules (approaching steam vessels). Fifty-five of these were violations of article 18, rule I (meeting and passing, and whistle signals), and 30 were violations of article 18, rule III (danger signals). Failure to make a normal port-to-port passing, where clearly indicated in a meeting situation, is often aggravated by excessive speed and failure to give proper signals, including a failure to sound the "danger signal", as prescribed by article 18, rule III.

In the study previously mentioned, of the 11 causes considered, excessive speed was a contributing cause in 77 cases. Reference to the study report also discloses that being on the wrong side of the channel was a contributing cause in 58 cases, and failure to sound signals a contributing cause in 45 cases. However, 33 collisions occurred even though a passing agreement had been reached.

The study further emphasized the relatively small number of collisions which result from poor visibility. Of 199 collisions, less than 27 percent occurred when visibility was less than 2 miles. In most instances human factors, rather than physical ones, were responsible for the resulting collisions.

The use of radar information as a help in preventing collisions, particularly in open-sea situations and situations of low visibility, has been a subject of growing importance. Recognizing that this aid is effective only when properly used, the Fourth

International Conference for the Safety of Life at Sea (1960) adopted certain additions to the Rules of the Road which contemplate the proper use of radar at sea. Applicable portions of the proposed changes and the annex to the rules are reproduced at the conclusion of this article.

Case 2 is an impressive example of the misuse of radar information. *Ship A* relied on unplotted ranges and bearings as a means of determining the movements of *Ship B*. It should be remembered that in a relative-motion presentation, such as is given by most PPI scopes, the course and speed of the other ship can be determined only by plotting several successive ranges and bearings. A single reading of another ship's range and bearing fixes its position only for that particular instant. It does not provide enough information upon which to take avoiding action, since it cannot predict any future position. The officer directing the movements of *Ship A* (case 2) erroneously assumed he had the ability to deduce the other ship's movements from the radarscope presentation. Later, when the other ship disappeared in the sea return at a range of about 2 miles, its subsequent movement could not be predicted. As a consequence, *Ship A's* turn to starboard actually produced a collision. A relative-motion plot establishes quite conclusively that the collision would not have occurred had *Ship A* continued on her original course.

Certain research and tests have been undertaken to develop automatic plotting and evaluation of multiple radar targets; for example, by appropriate inputs to a monitoring electronic computer. Preliminary tests have been encouraging, as have other

tests with true-motion radar presentation; however, for the present, ships' officers must utilize the information available from conventional radar. Properly used radar is an effective aid. However, if not used properly, it can help to cause a collision as in case 2. This is particularly so if the available information leads to unwarranted conclusions and a false sense of security.

The above cases are based on actual casualties, but none of the accounts is to be construed as complete factual reports, for facts not essential to this presentation have been omitted. The comments reflect, in general, the opinions and conclusions of the investigative officers and boards concerned with the various casualties.

[2] "A Statistical Analysis of Selected Marine Collisions Occurring During the Three Fiscal Years 1957, 1958, and 1959." U.S. Coast Guard, Washington, D.C., 1960.

CHANGES IN THE RULES OF THE ROAD ADOPTED BY THE FOURTH INTERNATIONAL CONFERENCE FOR THE SAFETY OF LIFE AT SEA

The Fourth International Conference for the Safety of Life at Sea, held in London, England, from May 17 to June 17, 1960, adopted several significant improvements in the Rules of the Road concerning the use of radar at sea. There are now a great number of ships of all nationalities that are equipped with marine radar. It is to be expected that many additional ships will make use of this valuable navigational instrument in the future. At present there is no specific language in the Rules of the Road concerning the proper use of radar at sea. However, during and since World War II there has been a considerable amount of experience and knowledge gained concerning the practical use of marine radar during periods of low visibility. The conference used the lessons learned through collision investigations, the decisions rendered in various admiralty court cases, and many other intensive studies concerning the proper usage of radar, as the basis for the adoption of a new paragraph (c) to rule 16 and a radar annex to the rules.

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 annex 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. Full compliance with the letter and spirit of these new measures, used in conjunction with the existing rules, should aid in the promotion of safety at sea by making each ship aware of the procedures to be followed by other vessels.

It should be borne in mind, however, that these new provisions to the Rules of the Road adopted by the Conference do not become binding until the convention as a whole is ratified by 15 nations, including 7 countries having not less than 1 million gross tons of shipping.

The section of the old rules concerning "Sound Signals for Fog, and So Forth" has been retitled "Part C—Sound Signals and Conduct in Restricted Visibility."

There has been a new preliminary paragraph added, as follows:

PRELIMINARY

"1. The possession of information obtained from radar does not relieve any vessel of the obligation of conforming strictly with the rules and, in particular, the obligations contained in rules 15 and 16.

"2. The annex to the rules contains recommendations intended to assist in the use of radar as an aid to avoiding collision in restricted visibility."

The new paragraph (c) to rule 16 is as follows:

"(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."

The new annex to the rules contains eight principles for using radar to avoid collision at sea and is as follows:

ANNEX TO THE RULES

"Recommendations on the use of radar information as an aid to avoiding collisions at sea.

"(1) Assumptions made on scanty information may be dangerous and should be avoided.

"(2) A vessel navigating with the aid of radar in restricted visibility must, in compliance with rule 16(a), go at a moderate speed. Information obtained from the use of radar is one of the circumstances to be taken into account when determining moderate speed. In this regard it must be recognized that small vessels, small icebergs, and similar floating objects may not be detected by radar.

"Radar indications of one or more vessels in the vicinity may mean that 'moderate speed' should be slower than a mariner without radar might consider moderate in the circumstances.

"(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(b) sufficiently to relieve a vessel of the duty to stop her engines and navigate with caution when a fog signal is heard forward of the beam.

"(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 mariner must be guided by the circumstances of the case.

"(5) Alteration of course alone may be the most effective action to avoid close quarters provided that:

"(a) There is sufficient sea room.

"(b) It is made in good time.

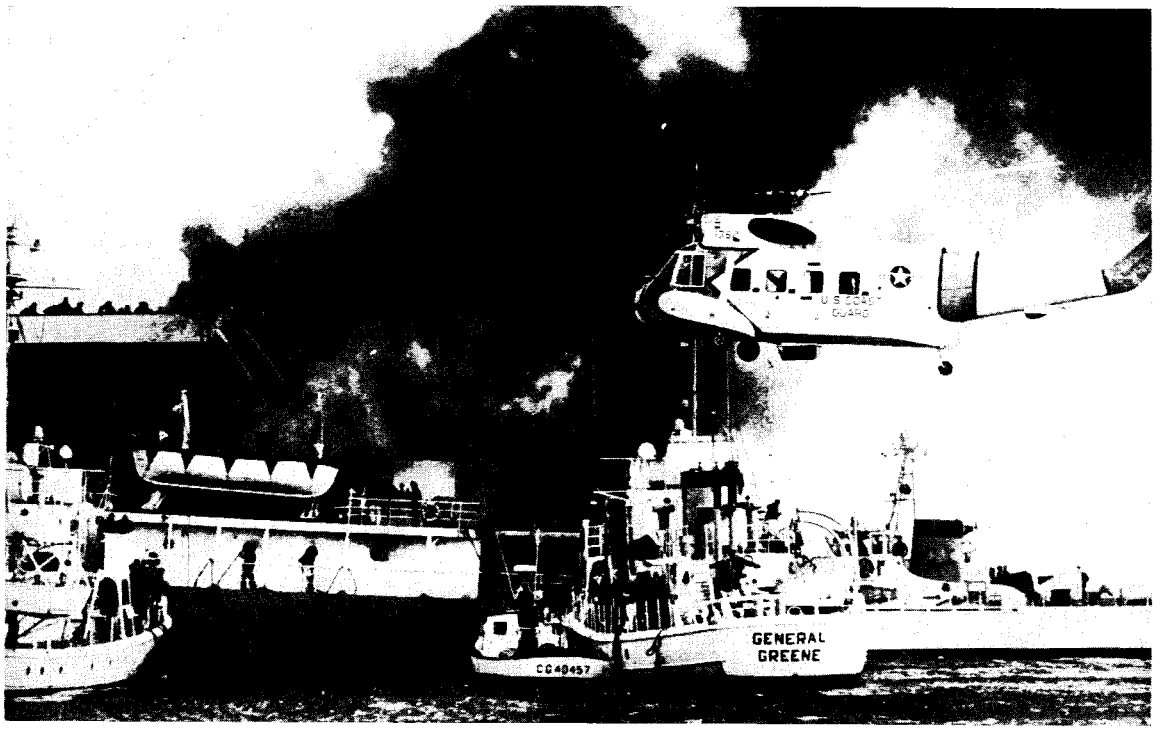
"(c) It is substantial. A succession of small alterations of course should be avoided.

"(d) It does not result in a close quarters situation with other vessels.

"(6) The direction of an alteration of course is a matter in which the mariner must be guided by the circumstances of the case. An alteration to starboard, particularly when vessels are approaching apparently on opposite or nearly opposite courses, is generally preferable to an alteration to port.

"(7) An alteration of speed, either alone or in conjunction with an alteration of course, should be substantial. A number of small alterations of speed should be avoided.

"(8) If a close quarters situation is imminent, the most prudent action may be to take all way off the vessel."



Courtesy New Bedford Standard Times and Ronald Rolo

Section 7.27

A REVIEW OF MARINE CASUALTIES (FY 1963)

By CAPTAIN WILLIAM F. REA III, USCG

THE FOLLOWING ARTICLE is taken from a paper presented by Captain Rea at the 1963 meeting of the Marine Section of the National Safety Congress.

The primary purpose of Coast Guard investigation of a marine casualty is to determine the cause of the casualty to the extent possible so as to prevent or reduce the effects of similar casualties in the future. Major marine casualties are normally investigated by a Marine Board of Investigation appointed by the Commandant.

One means of preventing, or of reducing, the number of similar casualties is to disseminate the pertinent information as to the cause of a casualty. In this way one learns from the experiences of others. Even though there is a wide endeavor to disseminate casualty information, casualties—serious marine casualties—continue to occur on our inland waterways as well as on the high seas. A brief review of the more recent major marine casualties will illustrate the point.

BOHEME-BONNIE D.

The collision of the Norwegian M/V *Boheme* and the tow of the tug *Bonnie D* was one of the most serious during the past fiscal year. On the early morning of October 20, 1962, the M/V *Boheme*, a tanker with approximately 12,000 tons of combustible cargo on board, was downbound in the Mississippi River en route from Baton Rouge to sea. At this same time the diesel-propelled towing vessel *Bonnie D* was upbound from Ostrica, La., to Mayersville, Miss., pushing four tank barges ahead in tandem with a combined total of 80,500 barrels of crude oil. At 0340 on this date these vessels were in collision near St. Elmo's Light. The Western River Rules are the applicable rules of the road at this location.

As a result of this collision and the fire that occurred immediately upon collision, 20 persons died, or were missing and presumed dead. All were crewmembers of the tanker. Additionally, there was considerable structural damage in the area of the tanker's bow and extensive fire damage in way of the bow section and in crew quarters at the stern of the tanker. Interestingly enough, the tanker's cargo did not ignite and none of its cargo was lost. On the other hand, the lead barge of the tow suffered heavy damage and loss of its oil cargo.

The record shows that immediately upon collision, a fire occurred igniting a large pool of crude oil that had been released from the lead barge. This resulted in a fire at both bow and then stern of the tanker.

The Board determined that the primary cause of this casualty was the failure of the tug to reach a passing agreement. To state it in another way, the person in charge of the tug

(REPRINTED FROM PROCEEDINGS OF THE MERCHANT MARINE COUNCIL, USCG, MARCH 1964)

failed to comply with the Rules of the Road which include a requirement that meeting vessels reach an agreement for passing by an exchange of whistle signals. The Rules of the Road are designed to prevent collision, and failure to comply is the most frequent cause of serious casualties. As a footnote, in reviewing the record of this casualty, it was found that neither low visibility or river current were significant factors.

OLYMPIC ROCK-PRINCESS

Another most serious casualty involving failure to comply with Rules of the Road occurred on February 2, 1962, in the Delaware River. This was a collision between the SS *Olympic Rock*, a Liberian tanker, and the diesel tugboat *Princess* and its tow, the tank barge *W. L. Graham*. As a result of this casualty, the tug *Princess* sank and three of its crewmembers lost their lives.

In this case the *Olympic Rock* was proceeding in ballast down the Delaware River en route from Philadelphia to sea. Periods of low visibility due to fog were encountered. Upon reaching Bellevue Range, two contacts on the radar were observed ahead at a distance of approximately 2 miles. According to the record, these contacts were sighted visually a short time later at slightly over 1 mile ahead and identified as two upbound tugs with tows. One of these tows was dead ahead and the other slightly on the port bow of the tanker. The tow dead ahead was later identified as the tug *Princess* with tank barge *W. L. Graham*. In reviewing this case the Commandant stated that the preponderance of evidence clearly demonstrated that, when first within sight of one another, both the tanker and tow were in approximate midchannel positions. The second upbound tow was on its own right-hand side and, other than providing witnesses as to the events that occurred, was not involved in this casualty.

The record shows that the *Olympic Rock*, upon visually sighting the *Princess*, reduced speed, sounded one blast and altered course slightly to starboard. Receiving no response and observing no course change by the tug, the tanker sounded a second single blast and again altered course to starboard. Still receiving no reply, again a single blast was sounded and again a slight alteration of course to starboard. At this point the tanker sounded the danger signal and ordered engines full astern. Collision occurred at 1041, approximately 3 minutes after the initial whistle signal sounded by the tanker.

The person in charge of the tug *Princess*, in describing the events leading up to this casualty, contended that his vessel and tow were beyond the western extremities of the main channel at the time of collision. This was not supported by the evidence obtained during the investigation.

The tug with wheelhouse doors and windows closed was proceeding upbound in the Delaware River at the time of the casualty. None of the single-blast passing signals from the tanker were heard by the tug.

The Commandant considered that the primary cause of this casualty was the failure of the tug to comply with Article 25, Inland Rules of the Road. Article 25 provides that "In narrow channels every steam vessel shall, when it is safe and practicable, keep to that side of the fairway or midchannel which lies on the starboard side of such vessel."

The Commandant also concurred with the Board's conclusion that the tanker failed to comply with Article 18, Inland Rules. This rule provides that "if, when steam vessels are approaching each other either fails to understand the course or intention of the other, from any cause, the vessel so in doubt shall immediately signify the same by giving several short and rapid blasts, not less than four, of the steam whistle." In this case, the tanker on three different occasions sounded a one-blast passing signal and altered course to starboard without having received a response. The evidence supports that the tanker was clearly in doubt as to the tug's intentions well before sounding the danger signal.

ABOUT THE AUTHOR

CAPTAIN REA graduated from the Coast Guard Academy in 1941 and served on the Greenland Patrol and in marine inspection duties during World War II. Subsequently, he has served as Commanding Officer of the cutters *Koiner* and *Tamaroa* and in several marine inspection offices as an Inspector and as Senior Investigating Officer. Captain Rea recently served at Headquarters as Assistant Chief, Merchant Vessel Inspection Division.

DIVERSITY

The most recent casualty included in this review concerns the capsizing of the M/V *Diversity* in the Gulf of Mexico on January 23, 1963, with loss of all five persons on board. The *Diversity* is an uninspected steel hull supply vessel of 132 gross tons. This vessel is typical of a number of such vessels employed, primarily in the Gulf of Mexico, to transport supplies to the offshore oil drilling structures. They are of relatively shallow draft, have a pilothouse and living quarters near the bow, and the main propulsion machinery aft under the main deck. This leaves a large expanse of deck with bulwarks at the sides for transporting deck cargoes.

Although a considerable part of the record pertains to the contractual or charter arrangements of the various parties involved, this discussion will be limited to the casualty aspects. In this case, six large steel tanks were placed on deck. Three of these measured 7 by 7 by 18 feet and three measured 8 by 8 by 16 feet. In addition, a pumping unit weighing 1.4 tons was placed on board on the main deck with these tanks. At the bottom of each tank were two 8-inch I-beams welded to the underside of the tank that served as skids. These tanks were secured to the deck plating by welding the corners of each I-beam skid to the deck plating. The purpose of these tanks was to transport drilling mud to offshore drilling structures.

After "installing" the tanks at Berwick, La., the *Diversity* proceeded to another location where approximately 565 barrels of drilling mud were transferred to 4 or possibly 5 of the deck tanks. According to the record, this caused the *Diversity*, a vessel of 120 feet in length, to trim 6 feet by the stern.

At 1730 on January 22, 1963, the *Diversity* departed Southwest Pass, Vermillion Bay, La., and arrived at a drilling platform some 60 miles distant at 0600 on January 23, 1963. Upon arrival, efforts were made to pump used mud from a tank on the platform to an empty tank on the *Diversity*. After receiving approximately 100 barrels of the used mud, the master of the *Diversity* reported to the platform that he had a loose deck tank and would have to seek shelter at Cameron, La., some 30 miles to the northwest. The weather at this time was becoming worse and the *Diversity* on departure was observed

to be laboring heavily. Later that same afternoon an overturned hull, later identified as the *Diversity*, was sighted about 8½ miles west by north of the platform from which it had departed. The body of one crewmember has been found and the remaining four persons known to have been on board are still missing and presumed lost.

The Commandant concurred with the Board in its conclusion that the *Diversity* capsized as a result of one or more deck tanks breaking loose from their fastenings and, due to the vessel's rolling in the seaway, moving athwartships and bringing about the capsizing moment.

The Merchant Marine Technical Division at Coast Guard Headquarters has been taking a close look at the stability characteristics of this type of vessel with a view toward providing certain loading and stability restrictions for those that may be inspected and certificated in the future.

HAZARDOUS CARGOES

The last two casualties included in this review have a common denominator in that in both cases hazardous cargoes were involved and both occurred on inland waters. Although both occurred in 1961, the review and publication of the Commandant's action was not completed until early this year.

UNION RELIANCE-BEREAN

On 7 November 1961 the Chinese M/V *Union Reliance*, a freighter, and the Norwegian M/V *Berean*, a tanker, collided in the Houston ship channel. The *Berean* was carrying a bulk liquid cargo of various oils and chemicals, including acrylonitrile in the No. 1 tanks. The *Union Reliance* was laden with a general freight cargo including 200 drums of citronella. The Marine Board of Investigation concluded that the casualty was caused by a steering failure on the *Union Reliance*. The bow of the *Union Reliance* penetrated the port No. 1 tank of the *Berean*. The acrylonitrile cargo of the *Berean* ignited with collision and sprayed over the forward half of the *Union Reliance*. The fire on the *Berean* was extinguished in a few hours. The fire on the *Union Reliance* burned out of control in the forward holds for 3 days. As a result of this casualty, the *Union Reliance* was a total loss and 11 crewmembers and the pilot lost their lives.

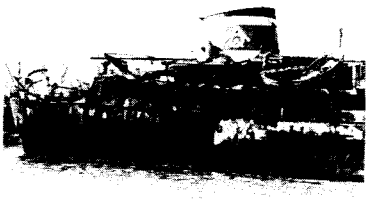
Although the cause of the casualty was apparent, the Commandant did not concur with the Board's conclusion that no toxic effects of the acrylonitrile were felt by the crew. The Commandant's remarks on the subject were as follows:

> The Board's conclusion that no toxic effects were felt by the crew of either vessel is not fully concurred in. Acrylonitrile appears to act similarly to cyanide, inhibiting the utilization of oxygen. Small vapor concentrations may cause symptoms upon prolonged exposure while concentrations in greater degrees may be dangerous to life on short single exposures. If exposure to the vapors is great enough, loss of consciousness will ensue followed by cessation of respiration (asphyxia) and finally death. Therefore, considering its toxicological data, and since autopsies were not performed on those persons who lost their lives in this casualty, the part played by acrylonitrile vapors, if any, is not determinable.

WYCHEM 112

No doubt you are all aware of the loss of the chlorine barge *Wychem 112*. On 23 March 1961, the M/V *Eastern* was upbound in the Mississippi River pushing 17 barges. The tow was four barges long and four wide, with an additional barge on the starboard side forward. The *Wychem 112* was the lead barge on the portside. In the vicinity of Mile 352 Ahead of Passes, as the tow was approaching Natchez, Miss., it passed from an area of relatively calm water into an area of strong currents and eddies. As the *Wychem 112* entered the disturbed water, it is reported to have suddenly sunk by the bow. The securing wires to the adjacent barges parted and the barge was out of sight in about a minute.

The *Wychem 112* was a new barge on its first voyage. It had been constructed in accordance with existing Coast Guard regulations and was certificated. The barge was of the open-hopper type, fitted with 4 tanks and was carrying about 2,220,000 pounds of liquefied chlorine gas under about



100 pounds of pressure. Efforts of the owners to locate and salvage the barge were unsuccessful. Recognizing the hazards involved, the President directed the U.S. Corps of Engineers to remove the hazard. In one of the finest salvage operations ever accomplished, the tanks were removed in a minimum of time once the operations were underway.

As the result of this casualty, and a study of open-hopper-type barges sinking while being towed, it was determined that corrective action was required in three phases: (1) operation, (2) requirements for new construction, and (3) modification of existing barges. Interim regulations with regard to phase (1) are in effect; phases (2) and (3) are still being developed.

In addition, a special task group at Coast Guard Headquarters is studying the current Coast Guard regulations pertaining to the movement of dangerous cargoes to determine whether new or revised regulations are necessary.

The Commandant has not completed his review of the report of the Marine Board of Investigation into the disappearance of the SS *Marine Sulphur Queen*. This ship carrying a cargo of molten sulfur disappeared on 4 February 1963 in the vicinity of the Gulf of Mexico. There were no survivors. Although the exact cause of this casualty may never be known, it appears that further study of ship design and cargo handling, particularly for elevated temperature cargoes, may be indicated.

TRENDS

There were a total of 2,132 vessel casualties during fiscal year 1963. This compares with 2,250 during 1962 and 2,015 during 1961.

There were no passenger's lives lost on any Coast Guard inspected passenger vessel during fiscal year 1963.

The loss of the SS *Marine Sulphur Queen*, with a crew of 39, caused a radical increase in the loss of life of crewmembers on U.S.-flag inspected vessels. Similarly, the death of twenty crewmembers of the Norwegian M/V *Boheme* as the result of a

collision with a tow in the Mississippi River caused a marked increase in the number of lives lost on Foreign vessels.

PERSONNEL CASUALTIES

As in the past, death due to natural causes continues to account for the greatest loss of life on inspected vessels. There were one hundred and eighty-one deaths this year compared to one hundred and fifty-six in fiscal 1962. Passenger deaths accounted for nineteen of the increase. There was no appreciable change in this category on inspected vessels.

Falling overboard continues to take a heavy toll. On uninspected vessels it was the major cause of loss of life accounting for 66 fatalities, an increase of twenty over 1962. On inspected vessels this category is the second major cause of death claiming 21 lives this fiscal year compared to 9 last year.

There were 1835 nonfatal injuries on all commercial vessels compared to 1579 in 1962. Slips and falls on deck or on the same level accounted for the largest number. Slips and falls on ladders or stairs was second.

In closing, while fiscal 1963 brought about fewer vessel casualties, there was a significant increase in nonfatal personnel injuries. Since slips and falls take the greatest toll, greater emphasis must be placed on eliminating hazardous or unsafe conditions and making individuals more safety conscious. It appears this can best be accomplished by a continuing safety educational program.

"TAKE IT EASY"

By R. H. Smith and A. E. Wills

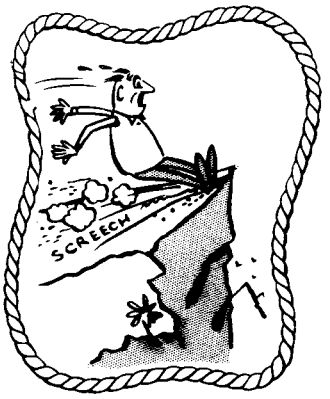
United States P. & I. Agency

American merchant ships at sea are steadily diminishing in number. Yet, obtainable statistics and the experience of our company, based on reports and safety inspections, indicate that the number of collisions involving those ships is increasing. Aids to navigation both on and off ships are improving constantly. Then what is the matter?

The Coast Guard conducted an analytical study of this situation, covering fiscal years 1957, 1958, and 1959. Of 323 collisions studied, the most frequent cause was excessive speed. Wrong side of the channel was second and failure to sound signals was third. In only 3.7 percent were wind, sea or current found to be contributing factors. Except for the 3.7 percent, all collisions seemed due to faults of personnel. Last year 351 Coast Guard-inspected American vessels were in collision—approximately 1 a day—as well as 495 uninspected vessels.

Coast Guard investigating boards find time after time that collisions are caused by "failure to navigate with caution in a restricted channel, in conditions of heavy traffic, and reduced visibility," adding that, "the greatest chance of avoiding collision still lies in careful navigation and strict adherence to the rules of the road."

The outstanding cause indicated by the figures and by our experience, excessive speed, is particularly disturbing because it seems to be getting worse. Volumes (mostly legal) have been written about excessive speed in fog or other low visibility; less about occasions in good visibility when excessive speed can create danger, not only of collision but also of wash damage to other vessels, to craft and to shore installations.



Of course, the tempo of modern shipping is being speeded up to keep pace with economic necessity. Bigger and faster ships move through waterways that seldom grow with them. Licensed Pilots, both Federal and State, seem to feel the speed urge more than ship personnel. In our experience, Pilots are involved in most ship collisions.

Automobile accidents usually are blamed on excessive speed. High speed is dangerous on the road for the same reasons as on the water. Dangerous situations develop more quickly and more often the faster you travel. The quicker they develop, the less time and the less potential you have to escape them. A ship at slow speed can back more quickly than at high speeds and can turn more quickly by speeding up its engines and then putting the rudder hard over than by putting the rudder over when already making high speed.

Sometimes Masters are reluctant to slow down for fear of criticism from the office. Also, they often complain about Pilots. More than once a Master has said "the Pilot got going too fast." That is a weak alibi. The Master is responsible for the ship's safety and navigation. The Pilot's responsibility for the ship's navigation is to the Master—the Master is in charge at all times. He can and must relieve the Pilot any time he considers that the vessel's safety is being jeopardized. Just last month we saw an instance where the Commandant of the Coast Guard approved disciplinary action against a Master for negligence in not relieving a Pilot when his vessel was in apparent danger of collision.

If a Pilot is setting improper course or speed, a Master should not wait until the vessel is in danger before acting but should speak to the Pilot right away. Although a Pilot has special knowledge of currents and hazards in his locality, the Master has special knowledge of his ship, its capabilities and its limitations. Many collisions are due to a Master's failure to intervene until too late. If a Master is down below, working on payrolls or taking a shave while a Pilot handles the ship, he is not exercising the control which is his duty. A Master belongs on the bridge whenever a Pilot is on board.

No schedule is so tight that an extra hour or 2 in pilot waters to navigate safely should cause difficulty for a Master. Collisions disarrange schedules worse than a few slowdown bells. No company condones reckless navigation by its Masters. Usually it is the first to emphasize safe navigation. Do not join the legion of those who acted too little and too late.

CASUALTY REVIEW

This is the first in a series of case histories of MSTS casualties afloat. Ranging from minor damage to million-dollar losses, they share a single and unenviable status: Each was due to personnel failure and therefore was preventable.

At times, tragedy and loss can produce benefit. If the cases presented in this "lessons-from-casualties series" serve to prevent recurrence of similar losses, the original loss may be ameliorated to some extent and the series will be worthwhile.

The facts in each case are taken from official investigation reports.

—Grounding and Loss of Grommet Reefer

An adage passed to us from mariners of old states: "He who goes ashore with an anchor on deck is self-convicted of negligence." A modern corollary might read: "He who lets his anchor drag 800 yards may finish heaving in the anchor after the ship is aground—in two parts." Such a case exists in our log of casualties.

The events which led to an approximate 2½ million-dollar loss and the striking of a R1–M–AV1 reefer-type ship from the Naval Vessel Register started routine enough.

Manned by a civil service marine crew of 11 officers and 28 men, USNS *Grommet Reefer* was enroute to the Port of Leghorn with some 700 long tons of fresh, frozen, and general cargo. In a relatively light condition, she had a draft of 9 feet forward and 15 feet aft. Each of her two anchors was equipped with 120 fathoms of chain.

Ground tackle, navigational equipment, communication installations, and main and auxiliary engineering equipment were in efficient operating condition.

Arriving off Leghorn, Italy, shortly after midnight on 14 December 1952, the ship was assigned an anchorage in Liverno Roadstead. Pilot and tugs were scheduled to be provided in about a day when dock space in the inner harbor would be available. The designated anchorage was on a bearing of 161° True, 2,000 yards from Vegliaia Light and about 1,200 yards from Regina Reef where the chart shows a depth of only 10 feet of water.

The ship anchored in 7¾ fathoms, mud bottom, with 75 fathoms of chain to the port anchor. No bearings were taken. However, after the ship settled down the third officer took a round of bearings which fixed the ship's anchored position approximately 120 yards on a bearing of 010° True from the assigned anchorage. In this position, 800 yards from the 5 fathom curve, the ship already was approximately 90 yards closer to the point where she was to go aground than she should have been.

With all personnel aboard and sea or steaming watches maintained on the bridge and in the engine room, the ship remained in her original anchorage with no appreciable change in position through the night.

Not copying routine weather broadcasts, the ship was unaware that weather conditions would deteriorate and set the pattern for the ship's destruction.

As recorded in the ship's log, the barometer fell .38 inches during the eight hours starting at noon. Although there was no anemometer aboard, shore weather facilities indicated that the wind had increased to 22 knots by 1800.

Shortly after 2000, the master left the bridge. Weather was moderate although intermittent rain was blown before a southeast wind of about 25 knots. The ship's head was approximately into the wind. She was riding safely in the anchorage where she had been for some 20 hours.

Standing orders for conduct of the watch underway were posted in the wheel house, but there were no standing orders for officers on watch while the ship was at anchor.

The night order book for the ship's final night contained no specific entry for the reporting of weather changes to the master. However, prior entries in the book did carry such direction.

During the six hours before midnight, the wind increased in velocity over 10 knots. Although winds had reached 33 knots by midnight, the master was not advised. These winds were to reach 54 knots in the next six hours.

Taking hourly bearings during the mid watch, the third mate discovered from his 0210 plot that the ship was dragging her anchor. He confirmed this by radar.

Five minutes later at 0215, the mate of the watch ordered the engine room on stand-by.

He informed the master—at last.

According to the records available, no additional bearings were taken while the ship was afloat. A plot made from recorded navigational data after the casualty indicated the ship had dragged anchor 120 yards during the first hour of the mid watch, 66 yards during the second hour, and 77 yards in the first 10 minutes of the third hour.

With the master on the bridge and the first officer ordered to heave in the anchor, preparations were made for getting underway. Fourteen minutes after the master ordered *slow ahead*, the first officer commenced heaving in the anchor, a process that would not be completed until the ship had fetched up on the shore.

Engine speeds ranging from *half ahead* to *stop* were utilized to facilitate heaving in the anchor and keeping the ship headed into the wind.

At 0250, 15 December 1952, half an hour after the master reported to the bridge, the ship grounded. Belatedly, *emergency full speed* was ordered and executed.

The general alarm was sounded.

A message reporting the grounding went out.

Assistance was requested.

With the entire crew aft, the ship broke in two. The forward section floated free of the stern only to ground again. With the two parts of the ship separated by 164 yards, all hands were rescued by high line, small boat, or helicopter. There were no injuries or loss of life.

The Court determined:

- The proximate cause of the grounding was the dragging of the ship's anchor in high winds and seas.
- The third officer (officer of the watch) was negligent in standing his watch in that he did not detect the ship's dragging anchor until it had dragged about 263 yards during the period 0000 to 0210, 15 December 1952.
- The master exercised poor judgment in concentrating on heaving in the anchor instead of heading toward deeper water using the full power of his engines when he first noted his ship was being set toward the beach.
- Other effective measures might have been the dropping of a second anchor, running out and slipping the chain on the riding anchor or

dragging it to seaward while on a safe heading and using full engine power.

- As a matter of good navigating practice, a round of bearings always should be taken at the instant the anchor is let go.

The Court was of the opinion that contributory causes included the following:

- The third officer failed to note the dragging that occurred during the first two hours of his watch and to notify the master or take timely action.
- The third officer should have warned the master of the deteriorating weather conditions prior to 0215 after the ship had begun to drag.
- The conduct of the bridge watch from 0215 until the ship took the ground was deficient in failing to take bearings, plot fixes and otherwise ascertain the rapid progress of the ship towards the shore and warn the master of the same.

Lessons To Be Learned

- Notwithstanding the lack of aggressive action in extremis, here is a case where initial safety precautions were not observed. The master did not allow sufficient leeway, in selecting an anchorage, for errors in plotting the ship's position. Secondly, he did not use a second anchor. The use of a second anchor under foot was indicated in order to reduce yawing, particularly since the ship was in light draft. Thus, a major lesson to be learned here is that a ship in light draft, at anchor, will yaw extensively and broaden the sail area which in turn increases the drag on the anchor. Another lesson that appears obvious, is that the master did not properly indoctrinate his third officer in reporting changes in weather and in ship's position.
- There is no substitute for ETERNAL VIGILANCE.

CASUALTY REVIEW

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At times, tragedy and loss can result in benefit. If the cases presented in this "lessons-from-casualties series" serve to prevent recurrence of similar losses, the original loss may be ameliorated to some extent, and the series will be worthwhile.

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—Grounding of USNS LST 281

The landing ship tank (LST), World War II-built vessel designed for landing vehicles directly onto the beach during amphibious operations, performed yeoman service during the past 15 years of war and peace. For inter-island work and runs to remote ports, MSTS has found continued use for the ungainly looking but utilitarian ships. These special purpose work horses have been able to service terminals which conventional deep-water ships would find impossible.

Despite its amphibious nature, the LST is subject to the same natural and irrevocable laws of the sea as any hull type. Although the remarkable LST can steam right up onto the beach without damage (under proper conditions, with a suitable beach gradient, and under skillful control), the ship faces the same destruction from the beach as any ship which fetches up on the shore as the result of wind, sea, and haphazard handling.

The half million dollar loss of USNS LST 281 on Honshu's craggy coastal rocks proved this.

Operated for MSTS by a commercial shipping company, LST 281 loaded cargo at Kokura, a small port near Moji on the island of Kyushu, southernmost of the four main islands of Japan. Her tank deck load consisted of 32 vehicles. Upper deck cargo included an aircraft elevator assembly and conveyor machinery. There was no abnormal distribution of weights, and the cargo was stowed to the master's satisfaction.

Draft forward was 5 feet 6 inches; aft—11 feet 9 inches: Not a particularly unusual trim for an LST.

Receiving her sailing orders from MSTS Office Moji, LST 281 departed Kokura at 1730 April 16, 1954, and set course for Yokohama. Passing through the Shimonoseki Strait, she entered Japan's Inland Sea and proceeded through Bungo Strait which separates Kyushu and Shikoku Islands.

The ship's master had taken LST 281 over this same course two or three times before. He and his deck officers seemingly were well-qualified for their assignments and the routine run up to Yokohama.

The 26 years of seafaring experience of the master included three and one-half years of duty as master of LST 281, four years as master of other LSTs, and service as master of merchant type ships during World War II.

The chief mate, with 12 years at sea, had been in LST 281 for seven months, preceded by over three years as second mate in other LSTs.

The second mate had been aboard LST 281 only a month and a half, but he had nearly three years' duty as third mate in other LSTs.

The experience of these officers belied their navigating proficiency.

At 0730 the day after departure, LST 281 was abeam Okino Island off the coast of Shikoku. At 1000, entering the Pacific in the vicinity of Ashizuri light, the ship's third mate took a cross bearing, the last true navigational fix the LST would ever take underway. The bearings were not recorded in the Bearing Record Book.

THERE WAS NO BEARING RECORD BOOK IN USE.

Bearings for navigational fixes were marked directly on navigational charts.

At 1100 the sea was "rather rough." Winds over the starboard bow were from the east. Visibility was two to three miles. Estimating by dead reckoning that he was four miles from Ashizuri Saki light and rounding Shikoku Island at 1110, the master changed course from

089° Gyro to 075° Gyro. The latter course included what the master called 2° right leeway. (Thus, the compensation for the estimated force vector from starboard; or portside set: The difference between steering course and course made good.)

The relationship of the ship's officers with their gyro was quite unusual. The last entry in the gyro record book was made July 14 although the specific year was not entered.

The second mate stated that his means of ascertaining accuracy of the master gyro was by checking it with bearings on nearby landmarks and by CHECKING IT WITH THE REPEATER ON THE BRIDGE. He had NEVER TAKEN AN AZIMUTH OF THE SUN during his duties aboard LSTs.

The master of LST 281 was in the wheelhouse as the second mate took over the mid watch for the early morning of April 18, 1954. Also in the wheelhouse were the two quartermasters of the 0000–0400 watch.

As ordered by the master, the second mate at 0000 changed course to 080° Gyro which included an allowance for 7° right leeway. The master later stated this change was meant to be a change in the course steered rather than a change in the course made good. The master made this change in order to compensate for an added 5° right leeway, 2° not being considered adequate.

In making allowance for right leeway, in order to make good his plotted dead reckoning course, the master made his decision based on instinct. He did not allow for the estimated 1.5-knot north-northeast current in Kii Suido approaches nor for the estimated 1- to 1.5-knot Kuroshio current which was parallel to and with his course.

Soon after the change of course, the master left the wheelhouse and went to his quarters. The weather was "heavy rain and wind from the southeast with a strong fresh breeze" and "visibility was up to about four or five miles." Instructions he left with the second mate were "to wake him at 0400 and inform him of any unusual circumstances." There were no written night watch orders.

THERE WAS NO NIGHT ORDER BOOK.

The ship was steaming at full speed, about 7½ knots.

At approximately 0300 the master returned to the wheelhouse. When he noticed that the weather had moderated slightly, he again went below. Visibility was approximately six miles.

However, by 0330 the weather deteriorated to zero visibility. Heavy swells caused the quartermaster to veer as much as five degrees on either side of his course.

Despite the lack of visibility and heavy seas, the ship ploughed on at full speed and did not sound fog signals.

At 0400 the second mate called the captain by voice tube and reported that the rain had become "very strong."

Also at 0400 the chief mate relieved the watch. Verbally the second mate told the chief mate "the course of the ship" and handed over the written log describing "the weather and condition of the sea." Following the strange and prevailing custom of the officers aboard LST 281, the second mate did not sign the log. Nor did any of the deck officers follow the usual practice of signing the log at the completion of each watch.

Although the chief mate relieved the watch, he had not allowed sufficient time to become visually adapted to the darkness. He retained the second mate on the bridge as a lookout.

Rolling and pitching, full speed ahead, in zero visibility, without sounding fog signals, LST 281 steamed onward along a dead reckoning tract which included an inordinate share of instinct which would not prove accurate.

The chief mate ordered the bow light turned off in the hope that visibility might be increased. The light was out by 0405, but it did not help the visibility.

By 0410 visibility was "very bad."

Suddenly from his position on the bridge the second mate noticed "a different type of spray" or "whitecap," "other than the usual swells" on the port bow.

He went to the voice tube and ordered the quartermaster in the wheelhouse, "Hard Starboard!" The second mate also called the master by voice tube.

When the master answered, the second mate told him the coast line was "very near."

The captain replied, "Take hard starboard."

The second mate answered, "I have already taken hard starboard."

The master came to the wheelhouse.

As the ship was swinging to a heading of approximately 175°, the master felt a shock and ordered all engines stopped.

He followed with another order to back both engines.

Only the starboard propeller responded. It was backed about one minute.

Initially grounding in the vicinity of the propeller shafts, LST 281 stopped and drifted to port over large submerged rocks and finally settled on a large rock on the portside amidships.

Her back was broken through the tank deck. Ironically she had swung back to her original heading of about 080°.

Flooding began in the shaft alleys and progressed into the engine room through a temporary patch in the after bulkhead. Through a hole in the shell plating, water flooded into the auxiliary engine room. Other compartments flooded as bulkheads bent and cracked and heavy seas buffeted the starboard side. The underwater hull was torn and punctured throughout. At the time of grounding, all watertight closures were secured except those used for troop passageways and access to engineering spaces.

Orders were given by the master to close all watertight doors on the port and starboard sides. To stabilize the ship, he had the carpenter flood the forward ballast tanks by opening sea valves to the tanks from the generator room. Suction was taken by the bilge and ballast pumps on the engine and generator room bilges. However, the pumps' capacity was insufficient.

At 0420 the "all crew standby alarm" was sounded and the crew, except for the engineers, assembled topside for instructions. Although the ship had a Watch, Quarter and Station Bill—one copy in the saloon passageway and one copy in the engine room, according to the master, the Bill did not adequately provide for collision quarters at sea. Also, there was no record of a collision drill being held during the preceding four months.

At 0450 the engine room and lower decks were evacuated due to flooding and electrical power failure. At 0540 the state of the tide at the site of grounding was—high tide.

0930: the crew except for the master, chief mate and quartermaster left the ship for the shore via a fishing vessel.

1600, April 18, 1954: the master, chief mate and quartermaster left the ship.

Entries in the Ship's Log Book were made ashore following the grounding and in reference to the Engineer's Bell Book which also was completed ashore.

There was no loss of life; no personnel injuries.

The Board of Investigation presented these opinions:

The master used poor judgment in relying on his instinct in ordering courses to make good his DR track and in failing to allow for the current.

The second mate was negligent in failing to reduce speed, post additional lookouts, and inform the master when the visibility closed to zero about 0330, and in failing to check the master gyro for error by azimuth (which was his responsibility).

The chief mate was at fault in relieving the watch prior to becoming visually adapted, and he was negligent in failing to reduce speed in restricted visibility.

COMSTSWESTPACAREA Action:

Stated the investigation disclosed that the navigation of LST 281 during this voyage was in violation of elementary rules for safety at sea and fell far short of acceptable standards of seamanship and of navigational procedures.

Stated administrative action was taken to remove the master, chief mate and second mate from positions of responsibility in USNS LSTs.

Stated that the Secretary of the Navy had authorized disposal of LST 281 and cargo thereon for public sale.

LESSONS TO BE LEARNED

This case reaffirms the old truism "Eternal Vigilance is the Price of Safety." The Master of the LST 281 was a seaman of 26 years' experience having an adequate and varied seafaring background. It seems obvious that he was cognizant of the precepts and practices pertaining to the art of seamanship. However, long familiarity with ships and the sea accompanied by good luck apparently resulted in his being lacking in attention to the diligent exercise of those precepts and practices which would

have insured the safety of his ship and the security of his career and reputation.

It is unnecessary to dwell on the numerous departures from good seamanship and navigation, such as faulty dead reckoning, failure to keep adequate logs, compass records, night order books and station bills, or to insure that his subordinates were not only cognizant of their duties but also able and assiduous in performance of them. The ultimate result was the loss of his ship and reputation.

Every seaman should evaluate thoroughly how well he performs every good practice of his calling, whether required by regulation or dictated by good judgment, to the end that he may avoid a similar bitter experience.

There is no substitute for ETERNAL VIGILANCE.

CASUALTY REVIEW

This is the third in a series of case histories of MSTS casualties afloat.

At times, tragedy and loss can produce benefit. If the cases presented in this "lessons-from-casualties series" serve to prevent recurrence of similar losses, the original loss may be reduced to some extent and the series will be worthwhile.

The facts in each case are taken from official investigation reports.

Arctic Tanker Groundings

Normally, the basic research upon which hydrographic charts are prepared consists of hand soundings, fathometer soundings, and wire dragging (to locate any pinnacles or rocks). Due to the lack of accurate charts and navigational aids in Arctic waters, MSTS has experienced instances where bottoms have been sounded with ships' hulls. This case concerns a pair of groundings with a similarity of circumstances nearly identical.

USNS *Caney* and USNS *Pecos* both are T2 tankers. Each carries some new hull plates as a reminder that Arctic charts are something less than infallible.

Both ships were involved in groundings in Far North waters in the late summer of last year. Each of the groundings represented a loss of over one million dollars (repair costs and value of cargo lost). There were no personnel casualties in either stranding.

Participating in Arctic Operations 1956, USNS *Caney* departed Frobisher Bay at 0521, August 19, 1956. She was deeply ballasted to protect the propeller from ice damage. Draft forward was 25′ and aft it was 27′.

With an MSTS pilot aboard, the ship transited Bartlett Narrows. Prior to departing the ship at 0819, the pilot advised the master to keep clear of the reefs east of Allen Island and recommended an initial course of 125° (T). However, the sailing directions (H. O. 76) recommended a course of 145°.

Instead of using either of these courses, the master actually steered 130° and then 135° until he was clear of the "reef east of Allen Island." When clear of this hazard, the master at 0917 changed course—to 141°. At 0922 he increased speed to 9.5 knots.

Part of the track to Vanderbilt Point lay parallel to and slightly outside the area in which the greater number of soundings had been made and included an area of water with sparse and unevenly distributed soundings. Sailing directions (H. O. 76) warn: "Large or irregular blank spaces among the soundings indicate *no* soundings were obtained. Such spaces should be regarded with suspicion if the neighboring areas are shallow or if rocks or shoals are present." However, the neighboring areas did not indicate the presence of shallow water, rocks, or shoals.

The sky was overcast, the sea was calm. The condition of the tide was—7 hours after high water. At 0933, due to Arctic haze, the master decreased speed to 7 knots.

One minute later the ship grounded.

Taking the ground, *Caney* swerved 20° to port and came to rest on a heading of 121° with a 2½° port list.

The master ordered: "Stop," then "Slow Astern," and "Stop." The general alarm was sounded and all boats readied for abandoning ship.

A survey disclosed that 16 tanks were punctured. Vents to cargo tanks were sealed to retain air and minimize flooding. The ship was deballasted as much as circumstances would permit.

Soundings taken varied from 115′ at the port bow to 30′ at the stern with the shallowest points being 25′ at frames 47, 55, and 60 on the portside.

While on the rock, the ship once yawed 10° to port and then returned to her heading of 121°. In about 3 hours, the pilot returned to the ship. Nearly 8 hours after grounding, the master, on the advice of the pilot ordered, "Dead Slow Astern," and the ship backed off the ground under her own power.

The Board's opinion was:

- *Caney* grounded upon an uncharted reef

in Frobisher Bay, the existence of which was not known to any person responsible for her navigation, nor to any person responsible for advising the master.

The convening authority stated:

- The master, in the light of all available information, chose a course that did not appear to involve any measurably increased risk.

En route to the Far North to deliver a load of fuel, USNS *Pecos* stopped at St. John's where available charts were obtained. The ship was crewed properly, inspected and certified, and her equipment was in working order. Carrying out her assignment the ship proceeded to St. Lewis Sound where she anchored in 25 fathoms of water Sept. 18, 1956.

Prior to discharging, the master became concerned over the presence of large rolling swells in the anchorage. He decided to shift to St. Lewis Inlet where the seas were visibly much calmer. His decision was based upon concern for the safety of USNS *Pecos* and other ships involved in offloading operations.

At 0830, Sept. 18, 1956, *Pecos* departed her anchorage. The special sea detail was set. The master was at the conn: No pilot was aboard. Utilizing information in H. O. 77 and Chart H. O. 6590, the master proceeded at 10 knots on an approximate course of 269° Gyro (T).

Eight minutes after getting underway, the T2 tanker grounded on an uncharted reef.

As the ship took the ground, the master ordered "Full Astern" and then, "Stop Engine." The general alarm was sounded.

An inspection of all tanks and engine equipment was ordered.

To minimize flooding, vents to the cargo tanks were sealed so that air would be retained in the tanks.

The ship's draft and soundings taken indicated the ship's situation. Draft forward was 10′, aft 27′ 8″. Soundings gave a depth of 40′ at the bow, 48′ at the stern with the shallowest point some 15′ at the break of the forecastle, portside.

Pecos relayed her predicament to two other MSTS ships in the vicinity. However, they could not get her off her impalement. After being aground for 45 hours, during which cargo was offloaded and water pumped out of the forward tanks, *Pecos* backed off the rock under her own power.

The official investigation stated:

- The grounding was a direct result of inadequate charts and navigational data for the area.

The investigation recommended:

- Detailed presailing briefings of masters of MSTS ships bound for the Arctic should include all pertinent navigational information and hydrographic data WITH SPECIFIC REFERENCE TO INADEQUACY OF CHARTS AND SAILING DIRECTIONS.

Lessons To Be Learned

Hydrographic charts and publications for such well-traversed waters as the coasts of the United States are comprehensive accurate aids to navigation. From experience, the navigator learns to place great trust and confidence in them. Charts and publications of infrequently traveled coastlines, bays, etc., such as Arctic waters, are meager in content, often erroneous, and should be used with extreme caution.

Usually, charts and publications for such areas, where complete and accurate surveys have not been accomplished, state definitely that extreme caution should be exercised in navigating therein. Lacking such definite warning, the navigator should immediately become apprehensive when soundings shown on a chart for restricted waters are widely scattered and few in number.

Areas for which no soundings are given should automatically be avoided. Until such time as wire drags and complete hydrographic surveys can be accomplished and the navigator is assured that the information is accurate and complete, he must exercise the utmost caution. In the meantime, he must depend upon information gathered by other vessels which have visited the area and from safe transits he himself might have made in the past.

The chart of the area where the *Caney* grounded shows sparse soundings. The closest sounding to the point of grounding is about 2 miles to the westward, showing 118 fathoms. No soundings are on the chart to the east of that position for approximately 8 miles. The

proven safe channel and hence the only known safe channel was approximately 3 miles west of the spot where the ship grounded. The vessel had previously entered the bay drawing approximately 32 feet. The departure draft after discharging and ballasting was approximately 27 feet. Had the vessel retraced her inbound track on departure, it is obvious that the casualty would have been averted.

In areas such as the Arctic where hydrographic information is meager at best, the only sure way to preclude grounding is to meticulously follow those tracks which have been proven by past experience to be safe.

The grounding of the USNS *Pecos* further illustrates the unreliability of charts and publications covering areas where complete and accurate surveys have not been accomplished. Even though the master used available information and was piloting in what appeared to him from the chart to be a safe area, the ship went aground. The disaster again highlights how important it is to remember that when operating in an area where hydrographic information is minimum, the only safe practice is to traverse those routes and anchorage areas which have been used and proven safe.

While the two newly discovered reefs by *Pecos* and *Caney* have not been named, it would seem appropriate that they carry the names of the ships which found them. However, at an approximate total repair cost for both ships of $2,600,000, cargo loss approximately $182,000 and 258 tanker-days lost, the cost of such a method to perpetuate ships' names is dubious, to say the least.

CASUALTY REVIEW

This is the fourth in a series of case histories of MSTS casualties afloat. Ranging from minor damage to complete loss of the ship, each shares a single and unenviable status: The casualty was due to personnel failure and therefore was preventable.

At times, tragedy and loss can result in benefit. If the cases presented in this "lessons-from-casualties series" serve to prevent recurrence of similar losses, the original loss may be ameliorated to some extent, and the series will be worthwile.

The facts in each case are taken from official investigation reports.

—USNS *Hersey*-MV *Maipu* Collision

One of the costliest casualties ever to befall MSTS occurred nearly 6 years ago when the troop-laden USNS *Hersey* and the Argentine passenger ship MV *Maipu* collided off the German coast. Her portside torn open, *Maipu* sank in 70 feet of water. The MSTS transport rescued and provided medical treatment for 235 survivors from the stricken motor vessel.

THE STAGGERING COST: *Hersey* received damage to the extent of $100,000; the U. S. Government paid approximately $6 million to the owners of *Maipu*.

On Sunday morning, Nov. 4, 1951, Bremerhaven-bound USNS *Hersey* had her engineering and navigating equipment (including radar) in satisfactory operating condition. Rounding P12 Light Ship, the C4 transport was on proper course for an approach to Weser Light Ship some 8 miles away. Visibility at 0704 was less than 8 miles, possibly 3 to 4 miles. The weather was misty.

Reducing speed to approximately 12.9 knots, the master proceeded on a course of 178° True with a North Sea pilot conning the ship. The deck watch consisted of the second mate in the wheelhouse, a junior officer of the watch on the bridge wing, a quartermaster on the wheel, a lookout on the flying bridge, and a second lookout in the eyes of the ship.

Among the targets illuminated on the radar PPI were pips representing some trawlers off the port bow and the Weser pilot boat, aboard which waited the pilot who soon would board *Hersey* for the trip up the Weser River to Bremerhaven.

At 0707, on the last leg of the approach to Weser Light Ship, the master left the bridge for his quarters after informing the pilot of his intentions. However, he did not advise the second mate, the officer of the watch.

Visibility continued to decrease after *Hersey's* master left the bridge.

● SIGNALS BY POWER-DRIVEN VESSELS IN FOG

A power-driven vessel making way through the water, shall sound (its whistle or siren) at intervals of not more than 2 minutes a prolonged blast.

(International Rules of the Road)

At 0721 *Hersey* commenced sounding fog signals.

The sound of a ship making fog signals pleads with an eerie and frightful plaintiveness. Even passengers, unaware of the signal's meaning, find the sound disquieting. But among all aboard ship, none finds a fog signal so alarming as a ship's master who is not on his bridge.

Hersey's master was in his quarters shaving.

Among those hearing the first blast of the fog signal was *Hersey's* bow lookout. He also heard a fog signal from another ship and reported his findings to the bridge. The second mate put *Hersey's* engines on "stand by."

● SPEED IN FOG

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 the danger of collision is over.

(International Rules of the Road)

Turning at 60 r. p. m., *Hersey's* propeller gave the ship a speed of 12.9 knots.

● SPEED IN FOG

Every vessel on the water shall, in fog, mist, falling snow, heavy rainstorms or any other condition similarly restricting visibility go at a moderate speed, having careful regard to the existing circumstances and conditions.

(International Rules of the Road)

Putting the engines on "stand by" did not change the speed of the ship. It only alerted the engine room to the possibility that changes in speed might be forthcoming.

If there is a sound more unnerving than a ship's fog signals during reduced visibility, it is the jingle of an annunciator, or engine order telegraph, indicating that bridge personnel are concerned over the ship's speed. Although changes on the annunciator do not make a great amount of noise, they do make a bell-like sound which can be heard in the vicinity of the bridge and in the master's quarters.

The master was in his quarters shaving.
At 0729 speed was reduced to 8 knots.
The master was in his quarters shaving.
At 0730 speed was reduced to 4 knots.
The master was not on the bridge.

At 0731 MV *Maipu* loomed into sight through the fog, 250 yards close aboard on the starboard bow, underway with way on in the ahead direction.

Hersey's engines were ordered full astern, rudder full right. Three blasts of the whistle signaled the astern order. In about 30 seconds a double jingle of the annunciator alerted the engineroom that this was emergency full astern.

The master now was on the bridge.

The bow lookout on the forecastle, in the process of telephoning the bridge, was understandably shaken by the frightening prospect that he was about to witness a collision from within a few feet of the points of contact. He dropped the phone and braced himself.

At 0732, with *Hersey's* engines going full astern at 60 r. p. m., the two ships collided amid a shower of flying sparks as railings sheared and hull plates crunched.

The bridge lookout was thrown against the chartroom door.

With engines still full astern, *Hersey* slowly withdrew from the *Maipu*.

At 0741 she was well clear of the listing motor vessel.

Her side opened up, *Maipu* sank in about 3 hours and 13 minutes.

All aboard *Maipu* were taken aboard *Hersey*.

There were no deaths among the crew or passengers of either ship.

Among the findings of the Court:

- The presence of the pilot in no way modified the fundamental responsibilities of *Hersey's* master, or his representative, for the safe navigation of the ship.
- The maneuvers of *Hersey* on sighting *Maipu* were the only ones under the circumstances that could minimize the collision.

Among the opinions of the Court:

- The master erred in retiring to his cabin immediately after 0704 on the last leg of the approach to the Weser Light Ship for any reason except an emergency or urgent call of nature.
- The master's attitude toward the North Sea Pilot and his own watch officer indicated an erroneous conception by the master of the status and responsibility of the pilot as evidenced by the master informing the pilot of his intentions upon leaving the bridge—whereas his watch officer knew of his action only by overhearing and observation. This attitude and concept of the pilot's status was reflected by the watch officer whose actions indicated a surrender of command and control of the vessel to the pilot.
- The master erred in failing to return to the bridge from his cabin upon hearing the first fog signal at 0727 and the engine telegraph and that he erred grievously by not proceeding to the bridge immediately even in a state of dishabillé, upon hearing the second telegraph signal at 0729 and although he did not go to the bridge, he still could not divest himself of the responsibility for the safety of his ship.
- The second officer was negligent in the performance of his duties as watch officer in that he failed to reduce speed below 12.9 knots at 0727 when thick fog was imminent and he started fog signals. Had he observed the radar properly at this time he could have obtained information for avoiding action. He failed to stop engines and proceed with due caution at 0729 upon receiving a report of a fog signal from another vessel apparently forward of his beam.
- *Hersey's* radar was in good condition and reflected the *Maipu* on its scope and was not observed by bridge personnel due to their concentration on picking up Weser Light Ship and that no particular individual was designated to maintain a careful radar watch.

Among the Court's recommendations:

- That the master be charged with inefficiency and neglect in that—

(1) He suffered his ship to be in collision;

(2) He failed to indoctrinate his officers properly;

(3) He failed to go to the bridge, well knowing that unusual events were taking place.

- That the second officer be charged with negligence in that—

(1) He failed to adhere properly to the Rules of the Nautical Road;

(2) He did not make full use of navigational aids (ship's radar).

Lesson To Be Learned

The lesson to be learned in this case can be phrased in the oldest of seaman's quotes: "Eternal vigilance is the price of safety."

It appears that the major factors leading to this accident are:

(1) Unwarranted reliance by the master on the pilot;

(2) Failure to slow promptly before entering an area of reduced visibility, and failure to stop when hearing a fog signal, and;

(3) Failure to utilize all of the knowledge (radar) available for safe navigation.

Deference to the knowledge of the pilot regarding local waters must never lull a master into a false sense of security. The master must not presume that the pilot feels the same sense of responsibility for the safety of the ship as he does. Further the master must keep in mind that he remains responsible regardless of his confidence in the pilot. To augment the pilot's advice, he should demand that his officers continuously provide him with all of the vital information available upon which to base his decisions. In this case, in the absence of the master, the second mate instead of acting for the master unquestionably allowed the pilot to make the decisions affecting the ship's safety. Had the master remained on the bridge, as was his duty, he would have been in a position to discharge his responsibility for the safety of the ship.

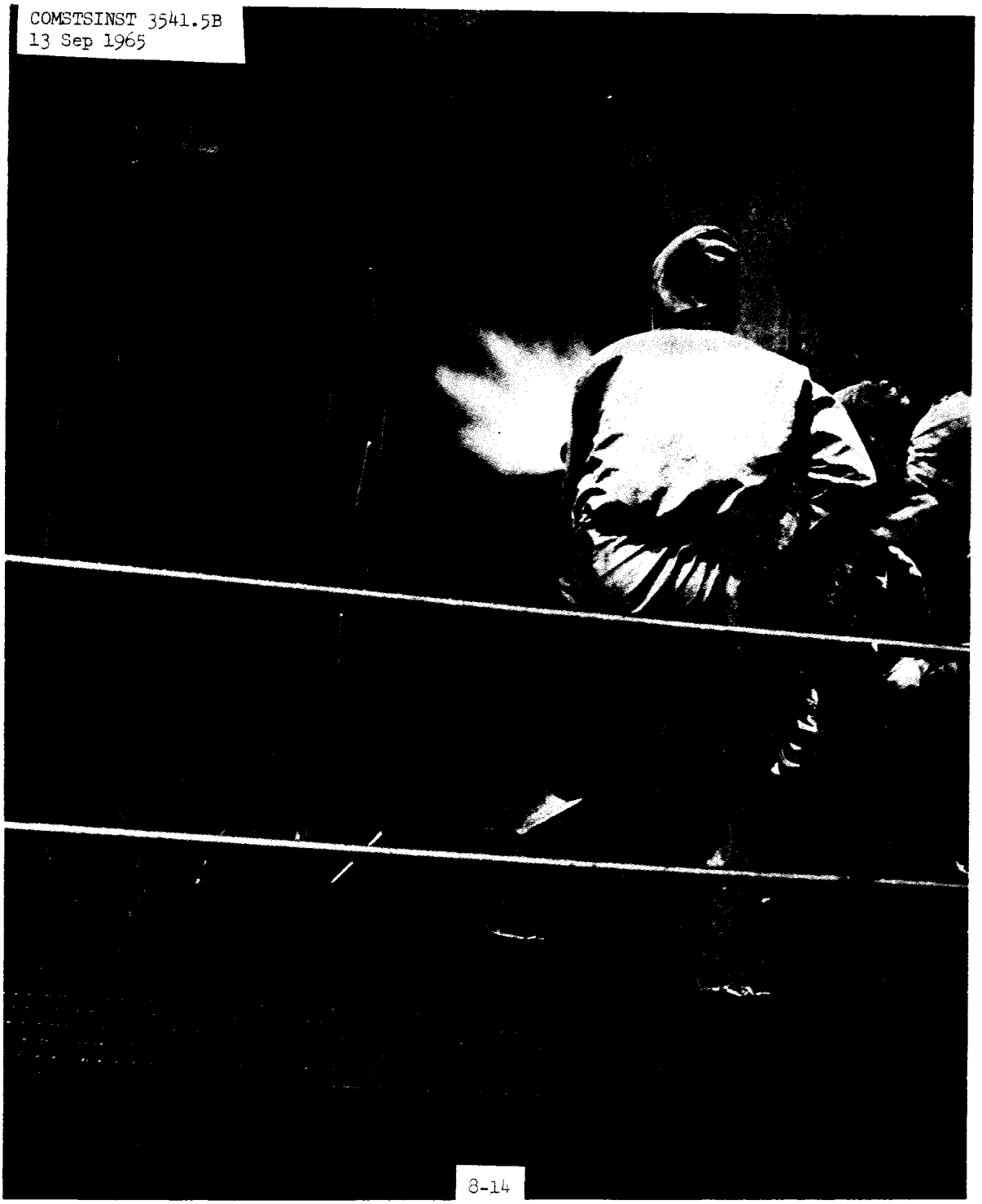
No maneuvering in reduced visibility should be considered routine. Any assumption that the pilot would be better qualified to make decisions regarding maneuvering of the ship in the circumstances existing in this case was unwarranted. Also no pilot has magical powers of observation or secret sources of information on the presence of other vessels which would entitle him to maneuver the ship in a manner which the master could easily determine from information at hand to be unsafe.

Failure to observe the Rules of the Road is, in most every case of collision at sea, fatal to the master's position. If the *Hersey* had abided by the Rules of the Road in "stopping her engines and then proceeding with caution" it is probable that she would not have found herself "in extremis."

If the navigator had passed all of the knowledge he could have obtained from the radar and lookouts to the master, the latter would have had timely knowledge of the position of the other vessel and could have readily avoided the collision.

The records do not show if the other vessel made any maneuver or signal to attempt to avoid collision. Neither has it been established that she was in fact within or approaching an area of reduced visibility.

It may be that proper action by the other vessel would have been sufficient to avoid collision. However, based on this record alone, as far as the *Hersey* is concerned the collision was caused by absence of the master from the bridge, failure to follow the Rules of the Road, and failure to use available aids to navigation.



CASUALTY REVIEW

This is the fifth in a series of case histories of MSTS casualties afloat.
At times, tragedy and loss can produce benefit. If the cases presented in this "lessons-from-casualties series" serve to prevent recurrence of similar losses, the original loss may be ameliorated to some extent and the series will be worthwhile.
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Fire in USNS *Rose*

Ultimate responsibility for the safety of a ship, her passengers and cargo is vested in the master (or commanding officer). The responsibility cannot be delegated. Although ultimate, this responsibility is not singular. It is shared by everyone aboard ship.

There is no way of predicting the indentity of the person who may have the opportunity to save the ship by his alertness and ability or destroy the ship by his lack of positive action.

Even the most routine shipboard tasks have a potential for ship destruction: Cooking in the galley, Opening a port, Standing lookout, Chipping paint, Switching lube oil strainers. One of these acts performed routinely, yet dangerously, could have made a flaming pyre of an MSTS transport had not firefighting crewmembers employed superb skill in quickly subduing a potential runaway blaze. The ship was saved, no lives were lost and no personnel injuries experienced. However, despite the quick response of firefighters, the ship suffered an estimated three-quarters of a million dollars damage. Two and one-half months in the yard were required for repairs.

The turbo-electric P2-type transport USNS *Rose* was in the North Sea July 5, 1952, enroute from New York to Bremerhaven. Both of her main propulsion enginerooms were in operation. Four men were on watch in No. 1 engineroom: The second assistant engineer, junior engineer, firemen-watertender, and oiler. At 1800 the second assistant was checking main propulsion exciters. The junior engineer was adjusting the combustion control board following the changing of burners by the fireman-watertender. The oiler was preparing to change the strainers which helped to clean the 100 gallons of lubricating oil in No. 1 auxiliary generator.

The oiler had been aboard USNS *Rose* for 5 months and had about 10 years merchant marine experience. He had performed similar duties in the Navy and had advanced to machinist mate first class during his 4 years of service. He was the only person assigned to the daily checking and cleaning of the lube oil strainers of the generators in No. 1 engineroom. (Lube oil strainers perform a filtering function. They generally consist of tube-like screens or baskets fitted into cylinders. The screening of oil is designed to entrap pieces of metal or other solid material in suspension which could damage the engine. They usually are built in banks of two so that either basket can be cleaned without disrupting the flow of oil to the engine. The flow is switched by means of a lever on top of the strainers. A second lever or handle serves as a locking device to prevent the flow lever from loosening.)

In preparation for cleaning the outboard strainer which had been in use for 24 hours, the oiler loosened the locking handle. He had cleaned the other strainer the night before and had reassembled the apparatus. He assumed that he had put the strainer, gasket, and cover back together properly and that no one had tampered with it. Without checking the fit or assembly of the strainer cover, he switched the flow of oil to the inboard strainer.

A deluge of hot oil squirted from beneath the inboard strainer cover. It sprayed over the oiler, blinding him as it covered his eyeglasses, splashed against hot steam lines of the generator and flashed into flame. Due to his personal panic or because of a jammed transfer lever, the oiler was unable to shift the flow of lube oil back to the outboard strainer. Nor did he stop the generator by tripping it.

The oil pump continued to force 140° F. lube oil from beneath the strainer cover, lending more fuel to a conflagration that soon became

so searing that no one could have tripped the generator.

After notifying the engineering watch officer of the fire, the oiler raced up to the first assistant's quarters, reported the situation, and returned to help fight the fire.

Training, particularly in firefighting, pays off. The remaining three men in the engineroom slipped automatically into a well-machined routine of isolating the fire and shutting off the fuel and air which fed it. Boiler fires were secured, forced draft blower switches pulled, fuel oil and transfer pumps shut down, and fuel oil settler valve closed.

The second assistant's attempt to secure the main propulsion switches was futile against the singeing, blistering flames flaring against the main control.

The chief engineer, trying to descend into the engineroom, was halted by the heat and flames. He ordered everyone out so that the compartment could be filled with CO_2.

After engine room personnel had left by various escape hatches, the remote control fire-extinguishing banks of carbon dioxide were opened. The CO_2 alarm went off, warning all hands that entry into the area was dangerous. Fire hoses were led out. Adjacent decks and bulkheads were cooled down to keep the heat from igniting other areas. Holes were cut in the deck to permit fire hoses with fog nozzles to be inserted and played directly on the generator flat. Men with oxygen breathing apparatus entered.

At 1915 the fire was completely under control. By 2000 smoke had cleared. The engineroom was found to be inoperable and was secured. A fire watch was posted.

The transfer lever on the lube oil strainer was examined to see if it could be moved. It worked.

The Board of Investigation was of the opinion:

- The cover on the lube oil strainer was not properly seated immediately before the outbreak of the fire.

Action of MSTS:

- The oiler should be administratively cautioned.
- A new design should be used for lubricating oil strainer covers. (An insulated plate subsequently was approved by MSTS for use as a shield around the oil strainers of the ship's auxiliary generator.)
- The engineering department of USNS Rose should be officially commended for its efficiency in fire-fighting.

Lessons To Be Learned:

Firefighting training for ship's force is very essential. In the case of the *Rose*, the engineers remained to secure the boilers and other machinery, although they knew a serious fire existed in the engineroom.

Lube oil strainers should be shielded from hot surfaces of machinery or be relocated away from hot surfaces.

Mechanical features of equipment should be visually inspected before being placed in service to assure that the equipment has not been tampered with during the past idle period. The lube oil strainer in this case has matched parts which must fit properly to obtain tightness. The clamp or strongback on the cover must be placed against the strainer lugs. The final operation to secure the cover is to tighten down on the tee handle screw. A visual inspection and hand test should be made of the cover connections before the strainer is placed in operation.

NOTE: The Navy has experienced a series of similar fires in machinery spaces resulting from the impingement of fuel or lubricating oil on hot surfaces; such as, steam lines, boiler parts, or unguarded light bulbs. The serious likelihood of fire exists when an oil leak under pressure sprays oil on hot metal surfaces. Therefore each naval ship was directed (SECNAV message 171558 Nov 1961) to make a survey of engineering spaces and to lag or shield any surface with a potential temperature of 500 degrees or greater. Naked incandescent lamps must be removed from engineering spaces. These provisions will be incorporated in shipbuilding specifications and in BUSHIPS Technical Manual.

CASUALTY REVIEW

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At times, tragedy and loss can result in benefit. If the cases presented in this "lessons-from-casualties series" serve to prevent recurrence of similar losses, the original loss may be ameliorated to some extent, and the series will be worthwhile.

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USNS *Sagitta*'s Collision with Texas Tower

Smallest ports served by MSTS are the Texas Tower radar warning stations sitting atop three-legged steel islands located off the U. S. northeast coast. Sealift resupply of the tower at Georges Shoal poses one of the trickiest situations in seamanship's realm. Miscalculation of the problem by USNS *Sagitta* resulted in ship repairs costing nearly $70,000 and extensive damage to over 100 tons of cargo which included vehicles, stores, baggage and household effects.

USNS *Sagitta* is classed as N3–M–AV1, a small cargo ship with a light displacement of 2,470 tons. She is 270 feet long and has a 42½-foot beam. Extending forward from her bow is a 20-foot catwalk known as a cat head aboard net tenders. Low-powered (1,325 horsepower) direct reversible diesel engines give *Sagitta* a speed of 10 knots.

Although the Texas Tower which sits at Georges Shoal is a small port, it is no small structure. A triangular platform with 210-foot sides rests on 200-foot legs or caissons which are sunk 48 feet into the ocean floor. There are no fenders on the tower legs. The bottom of the strange looking platform is 61 feet from the surface of the water. The electronic defense station is equipped with two derricks which extend 70 feet out from the platform.

One of the navigational difficulties at the tower is the 2-to-3-knot tidal current which rotates 360° every 12 hours. Another hazard is the depth of water which within 1 mile from the tower varies from 2½ fathoms to 9 fathoms.

In mid-January 1956 the Texas Tower at Georges Shoal urgently needed supplies. The only ship available for the sealift was USNS *Sagitta*. The cognizant area command decided to have the ship service the tower, while en route to Newfoundland. Previously the tower had been resupplied by a ship with higher propulsion power than USNS *Sagitta*.

For the transfer of fresh water from ship to tower, two P–500 pumps were placed aboard *Sagitta*.

A briefing was provided for the ship's master by command operations officers. He was told to be very careful, to take his time, no matter how long.

The master of USNS *Sagitta* had been sailing since 1927. He had been aboard *Sagitta* for 3½ years.

USNS *Sagitta* arrived off the Texas Tower on January 16, 1956, but weather delayed cargo delivery to the tower for 4 days. Unfortunately, the ship's radar was inoperative; the radioman was unable to repair it. There were other electronic problems. The MSTS cargo ship had difficulty establishing a working radiotelephone frequency with the tower. An unsuccessful attempt was made to use the frequency used by fishing boats in the area, but there was a great deal of disturbance. The tower did not respond to blinker.

On the morning of January 20 weather conditions were considered favorable. Visibility was good: 15 miles. There was a 10-knot northeast wind. Set was about 180°; drift was about 2–3 knots. Waves from a northeasterly direction were some 5 feet in height.

The master's plan was to anchor up current from the tower and to let the ship swing to the anchor, stern to the tower. At 0711 *Sagitta* began an approach to the tri-legged island. The master was at the conn. Course was 135° True.

Approximately ½ mile from the tower the course was changed to 075° and then to 090°. When *Sagitta* was about 700 feet north of the tower, course was changed to 125°. As the side of the tower came abeam, about 600 feet distant, the port anchor was let go. The ship had little way on. Chain was snubbed at 45 fathoms. There was no strain to the 3 shackles. The vessel was approaching the tower broadside.

The master ordered chain veered as fast as possible and simultaneously ordered half ahead and right rudder in an effort to avoid collision with a leg of the tower.

The maneuver was not successful. *Sagitta* struck the tower leg at 0849.

The ship's hull was penetrated between frames 48 and 54. Number 2 hold began to flood. A starboard list developed. The collision alarm was sounded. Watertight doors were closed. The ship worked her way clear of the caisson and with 105 fathoms of chain to the port anchor, came to rest about 50 feet from the caisson which was struck but undamaged.

As number 2 hold flooded to the waterline ballast was shitted. Rigging a collision mat was attempted but failed because the mat's lines fouled on the ship's bilge keels and prevented positioning of the mat. The fire and bilge pump, a P–500, and an eductor were activated.

At 0942, the master ordered the cable slipped. A link was sawed. Approximately 630 feet of chain and the 5,400-pound port anchor were jettisoned.

At 1047 flooding was considered under control, and *Sagitta* departed for Boston. She arrived safely the next morning.

Board of Investigation Opinions:

- The proper approach to the tower depends on the type of vessel employed.
- The master's plan of approach was sound, but the point selected for letting go the anchor was too close to the tower.
- *Sagitta*'s radar would have been useful had it been operating.
- The strong rotary tidal currents make a close approach to the tower hazardous, except for small vessels with good maneuvering characteristics.
- A steel pad protruding from the caisson, about 20 feet below the surface of the water, caused the holing of the *Sagitta* on contact.

Among the Board's recommendations:

- That appropriate disciplinary action be taken in the case of the master.
- That the voice radio frequency from ship to tower be changed to eliminate interference from fishing boats.

Lessons to be learned:

Since the *Sagitta* was not ideally suited for a mission of this nature by reason of size, maneuvering characteristics and design features, it might appear that faulty command decision was involved in directing her to proceed to the Texas Tower. However, the cognizant command after careful evaluation of the urgency of the requirement and all attendant circumstances determined properly, since no other ship was available for assignment, that the mission was not beyond the ship's capability. The master was completely briefed on all aspects of the problem. No deadlines were imposed upon him; in fact, he was cautioned to use all the time he desired and to observe all precautions deemed necessary.

Seamen may question the master's plan of approaching the tower down current and down wind rather than on a course into the wind and current which would tend to set his ship away from the tower, as is conventionally done when possible in approach situations. Proper action in any situation depends on the type of vessel and a thorough evaluation of all factors. The master's plan is considered sound since design features of the *Sagitta* and of the tower rendered his plan as the most workable of several possibilities.

The real lesson to be learned, therefore, is not to be derived from the command decision to use the *Sagitta* nor from the master's plan of approach but from his failure to take into consideration all factors and forces exerted against his ship. This failure resulted in the casualty. He completely ignored the fact that a 3-knot current in which the *Sagitta* was operating, at the commencement of his approach to the tower, equals 300 feet or 100 yards per minute and that if, as he planned and estimated her to be, the *Sagitta* was 700 feet distant as she passed through the point due north of the leg of the tower, and turned to course 125° to parallel the tower face, in the 1 minute or so which she required to reach the anchorage point she would have been carried to within 400 feet of the tower. Since the length of the *Sagitta* plus 45 fathoms of chain is something over 500 feet, 100 feet of the ship would have been carried under the tower even if the anchor held instantly.

The simple arithmetical process necessary to the foregoing computation was well within the master's ability, and it was his responsibility and his duty to make them, if not in exact figures, at least sufficiently complete to reach a sound conclusion as to the margin of safety, which should have been present in his estimate of the distances involved.

CASUALTY REVIEW

This is the seventh in a series of case histories of MSTS casualties afloat. Ranging from minor damage to complete loss of the ship, each shares a single and unenviable status: The casualty was due to personnel failure and, therefore, was preventable.

At times, tragedy and loss can result in benefit. If the cases presented in this "lessons-from-casualties series" serve to prevent recurrence of similar losses, the original loss may be ameliorated to some extent, and the series will be worthwhile.

The facts in each case are taken from official investigation reports.

Boiler Fire in USNS *Marine Fiddler*

Collision and shoal water often are the themes of deck officers' nightmares. Engineers have their own brand of bad dreams, usually fashioned with a persistent view of a dropping water level in a boiler's gage glass and tubes, deprived of their water supply, overheated to a molten glob that cascades down through other tubes to a pool of misshapen metal on the fire box floor. The bad dream became reality for USNS *Marine Fiddler* and resulted in a boiler casualty costing an estimated $96,000 in repairs and uncalculated amounts for the ship's lost working time.

USNS *Marine Fiddler* is one of two MSTS C4-type heavy-lift cargo ships. Together they represent the foremost pair of heavy-lift ships in the world. Each has two 150-ton booms mounted on an unstayed mast. Supplementing the giant booms with their 7-sheave blocks are four 10-ton booms installed over enlarged cargo hatches. *Marine Fiddler* has a total boom capacity of 420 tons—provided her boilers produce sufficient steam to generate electric power to run electric hoisting winches.

During August 1956 USNS *Marine Fiddler* transferred from the administrative control of MSTSWESTPACAREA to MSTSLANTAREA. In the early morning of August 18, with a Lant replacement crew on board, the ship shifted from Hoboken, N. J., to Brooklyn, N. Y. Only a few members from the former WestPac crew remained in the ship.

A few days prior to the Hoboken-Brooklyn shift an experienced Lant engineer, serving with MSTS since its beginning, relieved the WestPac chief engineer. The starboard boiler was on the line at the time, and its interior condition could be judged only by machinery history cards. According to the engineering records, firesides of the boiler had not been mechanically cleaned in 10 months during which time the boiler had steamed over 2,000 hours.

After *Marine Fiddler* moored to Brooklyn's Pier 45, the starboard boiler was left steaming on the line to furnish steam for inport auxiliaries. The starboard boiler had been in constant use for inport steaming for 6 days. Tubes had not been blown by steam during this time.

At 1100 the chief engineer departed the ship. The engineering plant was left under the supervision of a relief engineer, also well experienced. He had been with MSTS 4 years. On duty with him was a fireman who had been with MSTS over 2 years.

After the chief engineer's departure, conditions in the engineroom appeared normal although the fireman had some difficulty maintaining a steady water level in the boiler gage glass. The level dropped to an inch from the bottom, and the fireman speeded up the reciprocating-type feed pump which brought the water back up to about the 3-inch level. Steam pressure showed about 420 pounds on the gage.

At 1120 the fireman was relieved by an oiler. Although signed on the ship as an oiler, the fireman's relief was a qualified fireman who had spent about half of his 11 years' employment in U. S. military ships performing fireman-watertender duties.

When he relieved the fireman, the oiler found the steam pressure normal and the water level at about the 3- or 4-inch level. As a precautionary measure, he blew down the glass to verify that the water level actually was at the height indicated and had not stuck and was giving a false reading.

In about 5 or 10 minutes the water level be-

gan dropping. The oiler went below to speed up the feed pump and add a greater volume of water to the boiler. Attempting to keep sufficient water going in the boiler, the oiler pushed the feed pump until it was pounding at its maximum speed. The pump couldn't put in enough water to bring the level up from the 1-inch mark. The oiler notified the relief engineer.

The relief engineer checked. He ordered fires secured. Steam pressure dropped.

As the ship's generators slowed with diminishing steam pressure, the lights dimmed throughout the ship. The fireman who had been relieved noticed this as he ate lunch in the crew's mess. He left to offer his services in the engineroom.

The lights flickered and their normal intensity began to return as the ship's emergency diesel generator automatically kicked in.

Steam pressure dropped to 300 pounds. The boiler feed pump ran on, using the steam still left in the boiler. In about 10 minutes, the pump had brought the water level up to about 4 inches.

The relief engineer checked the boiler for leaks and faulty feed suction. He ordered the fires lighted.

In a few minutes the water level in the gage glass again began to drop. The relief engineer ordered the fires cut out a second time.

MOLTEN MAZE of superheater tubes and lumps of metal was the result of *Marine Fiddler's* improper boiler operation.

He telephoned the ship's chief engineer at home at 1310 and reported the situation.

The chief engineer returned. After checking the starboard boiler, he had the port boiler lit off, raised steam and at 1715 placed the load on the boiler.

Half an hour later, with the situation apparently under control except for undiagnosed difficulties with the starboard boiler, the oiler was sent up to secure the emergency generator, reset it and put it back in *start* position. On the way up the ladder, the oiler noticed the boiler casing was glowing—cherry red—just above the drums. He quickly reported this to the chief engineer who then went up to verify if there was a fire. A quick glance at the casing around the air heater was followed by a hurried search for a crossover connection in the hope that the soot blower could put out the fire with steam from the boiler on the line.

He found no crossover.

Hoses and CO_2 fire extinguishers were broken out. The master was notified that his starboard boiler was afire. The duty officer at area command headquarters was called. An alarm went out to the city fire department.

At 1906 city firemen arrived. Four minutes later the city fireboat was alongside.

Furnace fronts were removed and 2½-inch hoses and fog nozzle applicators inserted through the front openings. Firemen directed water up through the generating nest to the air heater and uptakes.

At 2000 the fire was quelled.

By the next day the boiler had cooled and inspection doors were opened. The firesides revealed a congealed mass of air heater tubes, superheater tubes, generating tubes, and soot blower elements. Support sheets were melted away through the center section of the after part of the boiler. Recirculating tubes and air heater support sheets sagged.

There was no apparent damage to the outside of the boiler.

The Investigating Officer was of the opinion that the cause of the damage to the starboard boiler was twofold:

- The soot fire which started in the air heater from sparks from the port boiler uptake gases; and
- A leak from the waterside in the starboard

boiler emptying the generating tubes which then, in their overheated condition, easily burned and helped carry the fire down through the superheater elements and into the fire box.

Recommendations of the Investigation Officer included:

- A letter of reprimand and warning to the ship's chief engineer for not familiarizing himself with the condition of the starboard boiler when relieving the WestPac chief engineer;
- A letter of reprimand and warning to the relief engineer for lighting off the starboard boiler a second time on the day of the casualty without ascertaining the cause of the rapid drop in water at a time when the boiler had a light inport load; and
- Initiation of appropriate disciplinary action against the WestPac chief engineer and second assistant engineer for turning over *Marine Fiddler's* starboard boiler in critical condition and for exceeding prescribed steaming hours limit for firesides cleaning.

These recommendations were approved by the convening authority and COMSTS.

Lessons To Be Learned:

This casualty gives emphasis to the two sayings "a dirty boiler is a dangerous boiler" and "don't fire a dry boiler."

The manufacturer of the boiler, in his instruction book, states that for an air heater fire to occur, two general fundamental conditions usually prevail:

(1) That the gas passages of the air heater must be fouled with soot accumulations or other combustible deposits; and

(2) Through some circumstance this combustible material must become ignited.

He states that any factors contributing to these conditions can be considered as air heater fire hazards. In this case, the operating personnel on the ship had obviously not kept the boiler firesides in a clean condition, and the accumulation of soot resulting from their neglect provided a perfect medium in which the fire gained its original foothold. It cannot be emphasized too strongly that cleanliness of both firesides and watersides of boilers must be given scrupulous attention and they must be cleaned when necessary. Failure to take such elementary engineering precautions is the primary cause of air heater fires, tube rupture, lack of efficiency, and high maintenance costs. COMSTS INSTRUCTION 4700.7 requires that the firesides of boilers be inspected semiannually and each time the boiler is cooled down. If such examination reveals the need for cleaning, it must be accomplished at the first opportunity.

In the case of the *Marine Fiddler* the damage caused by the air heater fire was aggravated by firing the boiler dry or with low water. Personnel operating boilers, when noting an unexplained drop in the water level, should be immediately suspicious of a leak somewhere within the boiler, and the boiler should not be fired, except in an emergency, until such a time as the leak has been located and repaired. The fact that operating personnel, after suffering a sudden drop in the water level for no explainable reason, refired the boiler after having secured it, indicates a lack of appreciation of the dangers inherent in firing a dry boiler or one in which a serious leakage exists. While it is expected that licensed engineers aboard an MSTS ship have the basic engineering knowledge and understanding to handle casualties of this type, they should continue to improve their professional skills by studying engineering manuals such as the *Bureau of Ships Manual*, which is quite specific as to the proper actions to be taken in the event of low water.

CASUALTY REVIEW

This is the eighth in a series of case histories of MSTS casualties afloat. Ranging from minor damage to complete loss of the ship, each shares a single and unenviable status: The casualty was due to personnel failure and, therefore, was preventable.

At times, tragedy and loss can result in benefit. If the cases presented in this "lessons-from-casualties series" serve to prevent recurrence of similar losses, the original loss may be ameliorated to some extent, and the series will be worthwhile.

The facts in each case are taken from official investigation reports.

USNS *Pvt. Joe E. Mann* Grounding

Land of the horizontal rain is the phrase often used to identify Adak in Alaska's chain of Aleutian islands. The description is not completely in error. Adak is whipped nearly constantly by rain and wind. The williwaws—violent windstorms—have produced winds clocked in Adak at 130 knots.

As though to compensate for the weather, nature has provided Adak with 4-mile-wide Kuluk Bay, one of the best natural harbors in the Aleutians.

This was not good enough for USNS *Pvt. Joe E. Mann*, an MSTS *Victory*-type ship.

After completing her assignments north of the Arctic Circle during MSTS Arctic Operations 1956, the *Mann* departed Icy Cape on Alaska's northwestern coast and headed for the island of Adak. Four days later, September 18, 1956, she arrived off Kuluk Shoal buoy. Weather conditions were not favorable for docking. Southerly winds were blowing at velocities of from 20 to 30 knots. Haze caused visibility to vary from 1 to 6 miles. At 0827 the U. S. Naval Station on the shores of Sweeper Cove requested *Mann* to remain underway in Kuluk Bay until the weather improved.

The ship steamed on various courses and speeds although neither an accurate plot of her track nor adequate navigational data were recorded. The bearing book gave indications that the ship did not follow a constant course, but neither the deck log nor the chart reflected this.

At 1200 the third officer relieved the fourth officer on the bridge. Rain and a 500-foot ceiling limited visibility to about 1 mile. The 20-knot wind carried gusts of up to 40 knots. The ship's engines were making 40 r. p. m. Course was 255° Gyro. The two able-bodied seamen on watch on the bridge were relieved by the ABs of the 12–4 watch. Although the ship's manning scale provided for 3 seamen on watch, the *Mann*'s master followed a practice of operating with only 2 seamen per watch in order to provide additional manpower for maintenance work.

One seaman took the wheel, the other took lookout duties. They alternated their duties each hour.

At 1345 the rain ended. The ceiling lifted to 2,100 feet. Visibility improved to 7 miles.

At 1445 a voice radio message from the Naval Station advised *Mann* to proceed into the harbor. An "advisory" pilot and 3 tugs were standing by off Gannet Rock at the 1-mile-wide entrance to Sweeper Cove. The master had the conn. The engine order telegraph was at "Ahead Full." The ship was making 60 r. p. m.

At 1500 the lookout relieved the helmsman. However, before the relieved helmsman could assume the duties of lookout, he was ordered below to check the pilot's ladder.

The engineroom opened the main engine throttle valve slightly at 1509 in order to increase turns to 80 r. p. m. in accordance with instructions received via telephone from the bridge.

At 1512 the seaman rigging the pilot's ladder completed his task and returned to the bridge. At 1528 he went below to call the watch. There was no lookout on the bridge, other than the master.

The special sea detail was not set.

The ship's deck log did not state what course the ship was on at 1530. The steersman stated that since he came on the wheel at 1500 when the course was 250°, he had received orders to change course to the left 3 or 4 times until by 1530 he was steering 25° to 30° left of 250°.

At 1530 the third officer obtained a radar range and bearing on what he believed was an

offshore rock, Gannet Rock, and the course was changed to the left to pass the rock to starboard at 500 yards and head into Sweeper Cove.

USNS *Mann* was making full speed, turns for 13 knots, although her light draft condition gave her a speed of only about 8.5 knots.

At 1532 the advisory pilot aboard one of the three awaiting tugs messaged by voice radio, "Come right, you are headed right into Finger Bay."

The third officer heard the message and placed the engines on "Standby."

Almost simultaneously the master sighted Finger Shoal buoy and placed the engines on "Full astern." The rudder was thrown hard right.

USNS *Mann* grounded on Finger Shoal at 1534.

The bridge lookout was below calling the watch.

The special sea detail had not been set.

The depth of water at the point of grounding was neither recorded nor remembered.

The three tugs which had been waiting for USNS *Mann* came to her assistance and in about 3 hours succeeded in freeing the stranded ship.

Estimated damage was nearly $25,000.

After analyzing the sketchy navigational records of USNS *Mann*, the investigating officer concluded that the radar range and bearing at 1530 was not taken on Gannet Rock as supposed, but on Pit Rocks, an offshore group lying about 1 mile east southeast of Gannet.

The investigation determined:

- Primary cause of the grounding was a navigation error on the part of the third officer in mistaking Pit Rocks for Gannet Rock.
- The major responsibility for the grounding must be placed on the master. He was negligent in his duties in that speed was excessive and the bridge inadequately manned while making an approach to a harbor under unfavorable conditions of weather and visibility, and with known dangers in close proximity on both sides of the approach course.
- The master should have required the second officer to report to the bridge to assist with the navigation immediately after receiving orders to proceed into the harbor. In order to proceed with due caution under existing conditions, the full-time attention of one officer should have been devoted to the navigation of the ship.
- The master's practice of operating with only two seamen on each watch is not approved nor condoned. Due to having insufficient personnel on duty, the master was the only lookout at the time of the grounding and the third officer was acting as navigator in addition to his other duties. The result was an inadequate lookout, faulty navigation, and failure on the part of the master to conn the ship safely to the pilot station.

Results of the investigation:

- Removal action was initiated against the master.
- The third officer received a 30-day suspension.
- The second officer received a letter of reprimand and warning for not providing the bridge with suitable charts.
- The fourth officer received a letter of reprimand and warning for not keeping an accurate plot of his position on the 8–12 watch.

Lessons to be learned:

Under unfavorable conditions of weather and visibility with known dangers in close proximity, *Mann* was navigated at excessive speed with insufficient personnel posted for adequate navigational and lookout duties. Accurate plotting of the ship's track was not performed nor were complete records of navigational data kept in logs or bell and bearing books. There

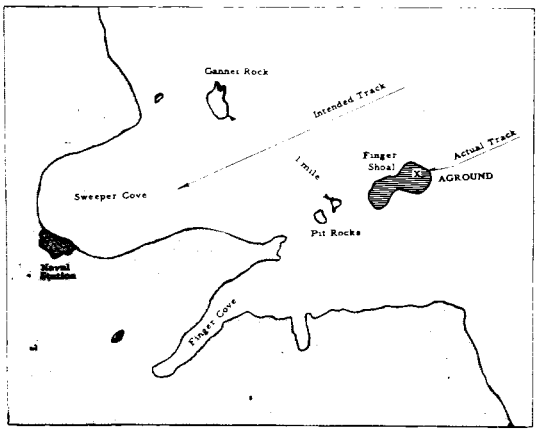


DIAGRAM OF USNS *MANN* GROUNDING ON FINGER SHOAL.

is evidence of inadequate study by the navigational personnel of pertinent charts, light lists, sailing directions, and other navigational aids and, also that these aids were not corrected to conform to latest available information. Anchors were not manned on entering port. It was developed that the master possessed very little knowledge of the maneuvering characteristics of his ship nor did he know where such data could be found. The report of the investigating officer lists 40 such departures from good seamanship and navigation practices in the opinions section. COMSTS and the administrative commander's instructions were not followed, were improperly maintained, and were not fully disseminated to subordinate personnel by the master.

Many mariners, unfortunately, do not follow their profession with that assiduity and nice attention to detail that they were required to demonstrate before the examiners or to achieve the positions they hold. They can profit from the *Mann* grounding to reflect on how well they follow the precepts and requirements of their calling. They must insure that there exists no neglect of any good practice on their part, whether dictated by good judgment, the ordinary practice of seamen, or by regulation, to the end that no similar misfortune befalls them.

CASUALTY REVIEW

Accidental Dropping of Lifeboats

This is the ninth in a series of case histories of MSTS casualties afloat. Ranging from minor damage to million-dollar losses, they share a single and unenviable status: Each was due to personnel failure and therefore was preventable.

At times, tragedy and loss can result in benefit. If the cases presented in this "lessons-from-casualties series" serve to prevent recurrence of similar losses, the original loss may be ameliorated to some extent, and the series will be worthwhile.

The facts in each case are taken from official investigation reports.

Cartoonists caught by a sudden deadline often resort to innumerable varieties of one of the oldest devices of graphic humor—depiction of the unfortunate tree trimmer who saws off the limb and the perch upon which he rests. The nautical version of this episode can be found in the countless times some lifeboat crewman throws the lever of the quick release gear while a lifeboat is still suspended in air. Lifeboat and occupants crash down to water or pier.

There is little humor in the 11 such accidents which MSTS has experienced in the past 8 years. The cost of these accidents is grimly sobering: One life, 39 injuries, $42,850 in material damages, $118,322 in compensation and medical costs. The last figure is but a starting point. Some of these cases will require compensation for years.

Skill in launching a lifeboat always has been a surprisingly accurate means of measuring seamanship ability. Up until a few years ago, proper launching of a lifeboat required extraordinary precision and good judgment, particularly at the moment when the boat was cast off from its falls. Slight miscalculation often resulted in the lifeboat plunging head down into the water or hanging by its bow and swinging pendulum-like into the drink.

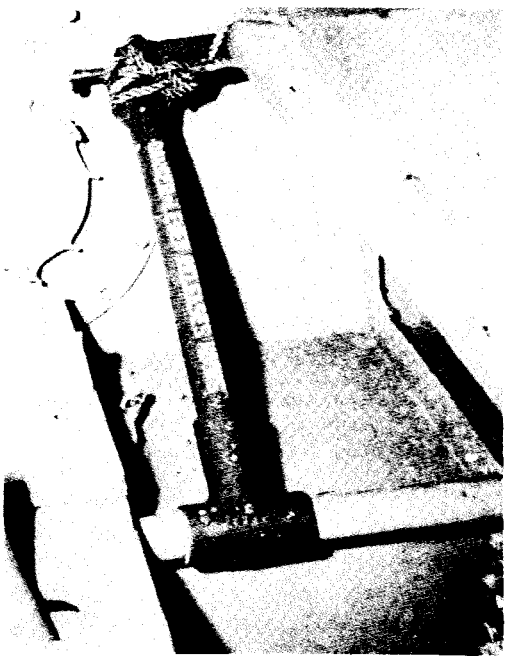
Most of the lifeboat accidents in those days were caused by inability to release fore and aft boat falls simultaneously.

As old style radial and quadrantal davits were replaced by gravity davits with power winches, lifeboat launching became nearly automatic. Provision even was made to simplify the troublesome task of casting off falls. The device which has won wide acceptance and which is installed in all MSTS lifeboats is the Rottmer-type releasing gear. Merely by moving a lever, the falls at each end of the lifeboat are freed simultaneously, automatically. Unfortunately, in this age of automation, one can push a button or pull a lever without understanding the results of the button or lever action.

To prevent the release lever from being operated accidentally, MSTS identifies it as conspicuously as possible. The lever is painted red. A toggle pin locks it in its closed position. Raised letters on the lever warn, **DANGER - LEVER RELEASES HOOKS** or in new boats, **DANGER—LEVER DROPS BOAT.**

MSTS' *Lifeboat Training Guide*, acclaimed as one of the best in existence, states that the lever is to be operated only on order of the boat commander. Normally, in calm weather, he gives the order when the boat is waterborne. In a seaway, he times his order so that the boat will be released onto the crest of a swell.

RELEASE LEVER near the stern of the boat turns a fore-and-aft rod which unhooks both boat falls at once. Rope lashing guards against accidental tripping when the boat is not in use. Photo by *Proceedings of the Merchant Marine Council*, USCG.



An MSTS Victory ship, USNS *Crain*, suffered a lifeboat accident which might be called typical of those resulting from incorrect use of the release lever.

In the early afternoon of August 17, 1956, USNS *Crain* held an abandon ship drill while the cargo ship was moored starboard side to the pier at Narsarssuak, Greenland. Her outboard (portside) boats, Number 2 and Number 4, were lowered into the water.

The master gave the recall signal after the boats had practiced maneuvering about the ship for about 10 minutes. Number 2 boat took position under the falls. Normally before a lifeboat is raised, the boat commander retains only a crew of 4 in the boat. He sends the others up a ladder rigged over the side.

In this case, there was no ladder rigged. The boat was hooked onto the falls. The first officer ordered it hoisted to a position slightly above the embarkation deck. At this point the boat crew stood up as if to get out. The first officer directed them to remain in the boat until the tricing pendants were hooked on and the boat brought in close to the ship's side.

The boat commander (the ship's bosun) noticed water in the boat. He ordered one of his boat crew, a wiper, to "Remove the plug now so the water won't drip on deck."

Suddenly, without warning, the boat dropped 27 feet to the water. One man in the boat nimbly grasped at the davit-span line. He was left swinging. The other lifeboat crewmen fell with the boat. Eight men were injured; the boat damaged considerably.

The master, who had been observing the retrieving of the lifeboat, ordered Number 4 boat alongside the damaged boat. He had a ladder lowered over the ship's side so the injured could be given aid.

Photographs taken immediately after the boat dropped showed the release lever in the vertical (released) position, with the toggle pin on the floor boards.

The Investigation Determined:

- The direct cause of the casualty was the ignorant or inadvertent operation of the release lever by the wiper.
- Contributing causes of the accident included the first officer's failure to order all but 4 of the crewmen out of the boat before it was raised; and the boat commander's failure to properly carry out his duties as boat commander.

Commissioned ships are just as susceptible to these lifeboat accidents as "in service" ships. The P2-type tranport USS *Butner* was anchored in Newport Harbor, R. I., the morning of May 9, 1957. The ship's commanding officer ordered boat drill to commence at 0923. He emphasized the drill should stress "safety" and not "speed." Operating conditions were ideal for the drill. The sea was calm, the weather clear.

The boat officer of boat Number 5 was a lieutenant commander (Supply Corps). He and his crew entered Number 5 after the boat was lowered to the promenade deck.

As the boat officer took his position in the stern, the crew continued preparation for launching. The boat officer moved forward to check a fouled tricing pendant. He ordered a crewman to "check the propeller gear."

Apparently confused by lifeboat nomenclature, the crewman instead pulled the toggle pin from the boat falls releasing lever. He then pulled and kicked the release lever in the "opening" direction. The boat dropped from the embarkation deck to the water. All 6 persons in the boat were injured. Two men broke their backs; one of these also broke his hip. Two men had broken legs. One broke an ankle. The other wrenched his back.

The Investigation Determined:

- The boat commander erred in leaving the release lever unguarded when he went forward to correct the fouled tricing pendant.
- USS *Butner* made very limited use of available training aids in her lifeboat training program.
- The ship's training of lifeboat crews was affected by excessive crew turnover: Over 100 percent during the year preceding the accident.

Lessons To Be Learned:

"Accidental" dropping of lifeboats occurs only when someone *in* the boat operates the release lever and works pretty hard to do it. The release lever is *in* the boat, is painted and marked distinctively, and requires considerable

effort to operate by moving it from one side to the other. It is apparent that "accidental" release can occur if any of the following conditions exist:

- Crewmembers do not understand the location, operation, and function of the release lever.
- The release lever is not guarded during launching and recovery operations.
- Orders are not given clearly, concisely, and in understandable terms.
- The lifeboat commander does not supervise all operations properly.

"Accidental" dropping of boats can be avoided by any one of the following and will *surely* be prevented if all are observed:

- Indoctrinate all hands in location, function, and operation of the release lever.
- Assign the stern tender to guard the release lever throughout launching and recovering of boats.
- Prevent accidents before they occur by having boat commanders supervise all boat handling operations closely to assure that orders are carried out properly and safely. To supervise effectively, a boat commander must not perform any of the operation himself but should observe and direct the entire operation. He must not divert his attention from this close supervision for any reason, for that is when "accidents" happen.
- Give standard boat handling orders in clear, concise, readily understandable terms to avoid misunderstanding; use the word "release" only in connection with the release lever to drop the boat.
- Understand and follow procedures for handling boats set forth in the *Lifeboat Training Guide*. Everyone should review and know the precautions in paragraph 5.4 of the *Lifeboat Training Guide*.

Treat the release lever as a loaded gun. You don't point a gun at anything you don't intend to shoot. Similarly, don't touch the release level unless you intend to drop the boat and yourself with it. Lifeboat dropping accidents don't just happen—someone in the boat has to work hard to do it.

LIFEBOAT CASUALTIES FROM RELEASING GEAR TRIPPED IN ERROR

DATE	SHIP	LOCATION	INJURED	DEAD	APPROXIMATE MATERIAL DAMAGE	COMPENSATION & MEDICAL COSTS*
July 5, 1951	USNS *Taylor*	At sea	1	0	$3,000.00	$752.00
July 10, 1951	USNS *McRae*	At sea	2	1	3,500.00	51,510.00
July 24, 1951	USNS *Aiken Victory.*	At sea	2	0	3,000.00	675.00
Apr. 14, 1953	USNS *Shanks*	San Francisco	3	0	5,000.00	2,500.00
July 23, 1953	USNS *Hennepin*	At sea	1	0	1,500.00	226.00
Nov. 6, 1953	USNS *Walker*	Off Sasebo, Japan.	7	0	5,000.00	18,371.00
Jan. 5, 1954	USNS *O'Hara*	Pt. Angeles, Wash.	3	0	5,000.00	12,152.00
Sept. 1, 1954	USNS *Gaffey*	San Francisco	3	0	3,850.00	2,711.00
May 28, 1956	USNS *Rincon*	Off Inchon, Korea.	3	0	3,000.00	1,225.00
Aug. 17, 1956	USNS *Crain*	Narsarssuak, Greenland.	8	0	5,000.00	3,200.00
May 9, 1957	USS *Butner*	Newport, R. I.	6	0	5,000.00	†25,000.00
			39	1	$42,850.00	$118,322.00

*Approximate costs to date. Compensation in some cases will continue for years.
†Approximate cost of hospitalization, pay, and allowances of Naval Personnel.

CASUALTY REVIEW

This is the tenth in a series of case histories of MSTS casualties afloat. Ranging from minor damage to complete loss of the ship, each shares a single and unenviable status: The casualty was due to personnel failure and, therefore, was preventable.

At times, tragedy and loss can result in benefit. If the cases presented in this "lessons-from-casualties series" serve to prevent recurrence of similar losses, the original loss may be ameliorated to some extent, and the series will be worthwhile.

The facts in each case are taken from official investigation reports.

USNS *T-AKL 17* Grounding

La Escuela Naval de Cadetes at Cartagena, Colombia, is one of a number of naval and maritime academies using MSTS-developed damage control practices and selections from this magazine as part of their curricula. From their classrooms at the edge of Cartagena's inner harbor, the Colombian midshipmen can view the area where an MSTS ship ran into trouble.

Cartagena has not always been a difficult port to enter. The clumsy high-castled sailing ships of the early 1500's, which the Old World sent westward, found little trouble in navigating Cartagena harbor. The ease of access became a handicap to the city's progress—and life. The city was repeatedly plundered by pirates who boldly sailed their ships through the *Boca Grande* (large mouth) harbor entrance.

To cope with these forays from the sea, Cartagena blocked off *Boca Grande* by filling it with stone. The only other entrance was by way of *Boca Chica* (small mouth). This narrow waterway could be more easily defended. It is the entrance used today.

During daylight, under favorable weather conditions, the harbor presents no great problem in navigation. At night it is risky. USNS *T-AKL 17* confirmed this fact.

The AKL is the smallest ship type in the MSTS nuclear fleet. With small draft and twin-screw maneuverability, the steel-hulled 176-foot AKL is ideally suited for lifting small loads into ports which may be inaccessible to larger ships. There is some doubling up of duties aboard an AKL for the crew numbers only 21. The master stands a bridge watch in rotation with 2 other deck officers.

A veteran of 4 years with MSTS, the master of USNS *T-AKL 17* had been aboard 4 months when the ship arrived at Cartagena harbor the evening of November 4, 1955, after a routine trip from the Canal Zone.

MSTS officials at Balboa, C. Z., had advised the master that the port of Cartagena would be difficult to enter at night, and the ship should not attempt to adhere to schedule if docking conditions were unfavorable. The master had some knowledge of the harbor. He had taken his ship in two months previously.

The night was dark but clear as *AKL 17* made her landfall. At 8:08 p. m. a Colombian Navy liaison officer was embarked at buoy number 6. The officer presented the compliments of the captain of the port and delivered berthing instructions to the master.

The ship resumed full speed ahead—620 rpm., 10.1 knots.

The master had the conn. An able seaman was at the helm. Another AB was on lookout station on the flying bridge.

The master directed the 1st officer to maintain a constant plot of the ship's position and the ship's yeoman to record the plots and soundings. The 1st officer's regular position on the bow was taken by the other deck officer, the 2nd mate. He was assisted by the boatswain at the windlass.

The master stated that he had the 1st officer on the bridge in order to "initiate" him into the Navy's system of plotting ships' positions, recording depths of water, and conning. Thus, the 1st officer was on the bridge in the capacity of receiving instructions rather than carrying out the duties for which he was supposed to be qualified.

At 8:23 *AKL 17* passed buoy number 8 abeam to port and changed course to 344° True. About 14 minutes later, abeam to starboard, was the flashing green buoy near the entrance to the inner harbor. The main channel split into a

"Y". To the right was *Puerto Manzanilla* lighted channel. The master had laid out a course for this channel.

As USNS *T-AKL 17* approached the turning point, the Colombian liaison officer advised the master to take the left channel.

The master replied that he had entered through the right channel on his last trip and that the harbor pilot at that time used and recommended that route. At this point, clarity of discussion became somewhat handicapped by language difficulties. The Colombian officer requested the master to examine the chart. They went to the chart room.

As the master began to check the chart, he suddenly realized that the 1st officer had followed him into the chart room. No officer was on the bridge.

The master quickly ordered the 1st officer to resume his station on the bridge where he could take bearings.

The master continued in his decision to use the channel to the right.

As the 1st officer stepped out to the starboard wing of the bridge he saw and reported an unlighted buoy close aboard to starboard. A flashing white buoy also was close aboard 3 points on the starboard bow.

The master ordered right full rudder; all engines full astern.

The ship's head moved rapidly to the right.

It stopped with a gentle impact . . . Aground.

Depth of water at the bow . . . 1 fathom.

Ship's heading . . . 029° True.

Time 8:38 p.m.

Weather conditions . . . Calm sea, no apparent wind, no appreciable current, visibility unlimited.

Soundings showed the ship was aground from the bow aft to frame 40. The following day, after forward ballast and part of the cargo were offloaded, a tug assisted USNS *T-AKL 17* in refloating.

Fortunately, the only apparent damage was a scouring of the hull's plastic coating. There were no personnel injuries.

The Investigation Determined:

- The master should have checked his ship's headway until an accurate and proper decision could be reached concerning the safe and correct course to take.
- The master did not exercise good judgment in leaving the bridge and going into the chart house, without a qualified officer on the bridge, until he had brought his ship to a complete stop.
- The master, through his failure to exercise mature, prudent ship handling, required by the rules of good seamanship, endangered the safety of his ship, its personnel, cargo, and equipment. Through carelessness and negligence, he suffered his ship to be grounded.

Result of the Investigation:

- The master was removed from his position.

Lessons to be Learned:

The errors of judgment and mistakes in navigation leading to the grounding of *AKL 17* are all too apparent from the casualty review, yet the records show that she was commanded and manned by capable and qualified personnel.

Thoughtlessness—not inexperience, **carelessness**—not incompetence, were the factors responsible. The result was no different than if inexperience and incompetence had been involved. In fact, thoughtlessness and carelessness are more insidious and evil than inexperience and incompetence which can be and are identified and guarded against by superior authority.

The lesson we learn from this, as from all casualties, is that we should always be alert to all our responsibilities and the consequences of neglect of any of them. END

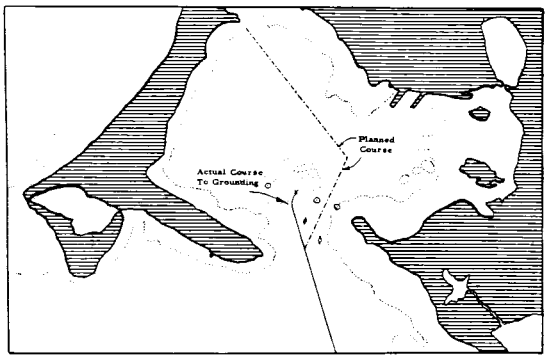


DIAGRAM OF USNS T-AKL 17 GROUNDING AT CARTAGENA

CASUALTY REVIEW

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LST Ramp Accident

How could such an accident happen in MSTS, the safest maritime organization in existence? On August 6, 1956, a U. S. Marine Corps sergeant was fatally injured when he was crushed under the truck ramp of an MSTS landing ship. This was not MSTS' first LST ramp death. Nor will it be the last if "ramp safety" is only a phrase in safety manuals, winked at by those who say, "It can't happen in our ship."

It could. It did.

The MSTS landing ship USNS *LST 694* made a good beaching as she slid gracefully up the beach gradient at Vieques Island, P. R. Her bow doors opened and cargo unloading began.

Despite her age, *LST 694* can perform some surprisingly modern operations. With her twin deck arrangement for vehicles, *LST 694* routinely conducts roll-on roll-off activities in a manner not too different from that of much newer ships, specially designed for this exciting field of ocean shipping. While many LSTs have elevators for moving cargo from the tank deck to the main or topside deck, *LST 694* has a special truck ramp which permits vehicles to be loaded through the bow door and then drive under their own power to the upper deck.

Hinged to the main deck, the truck ramp is raised and lowered by an electrically powered warping winch. A lever operated clutch switches the winch's drive to the gipsies or to the ramp's cables. When the ramp is to be lowered or raised, an alarm bell warns personnel on the tank deck.

Rising to the upper deck and completing its arc, the ramp trips a special limit switch and stops. This prevents the winch from two blocking the ramp's hoisting apparatus, exerting excessive pressure to the point where the cables would snap and let the ramp drop. When the ramp has been raised to the hatch combing, bottle ratchet screws secure it in its stowed position so that personnel on the tank deck will not be endangered.

A few months before *LST 694* arrived at Vieques, the truck ramp acted up. Apparently, one of the hoist cables parted or pulled free of its socket. Also, the alarm bell was not completely reliable. In addition, the ramp's automatic clutch switch was found to be defective and beyond repair. This switch was mounted so that it was actuated when the clutch lever was placed in position to engage the ramp hoist. No spare switch was available to replace the defective switch. In order to provide current to the warping winch so that the deck department could use the catheads for heaving, the engineering department installed a manually controlled clutch switch.

This jury rigged contraption required a different operating procedure than the originally installed automatic switch.

Unfortunately, the deck department was not informed of this change even though deck personnel were responsible for operating the ramp controls. Nor was the master advised of the equipment change.

Exchange of pertinent information between deck and engineering departments was withheld from both directions. The deck department did not inform the engineers that the truck ramp's limit switch arm had been tampered with, although the engineering department was responsible for the electrical-mechanical operation of the limit switch. The "tampering" or "adjusting" was performed by an able seaman as ordered by the first officer.

U. S. Marines were working cargo on USNS *LST 694's* tank deck the morning of August 6 1956. They requested the ship to raise the truck ramp so that cargo on the forward end of the tank deck could be moved.

The third officer could not find the ship's boatswain so he ordered the chief electrician to operate the controls of the truck ramp-warping winch and raise the ramp.

The electrician was not among the shipboard personnel authorized by the first officer to operate the controls. He had never performed such a task during his 1 month aboard the LST.

But he accepted the order.

The third officer was little better qualified to operate the controls. He, also, had been aboard the ship for only 1 month. He had never operated the controls until the previous night when he raised and lowered the ramp after a rather perfunctory indoctrination in the intricacies of ramp operation offered by the first officer (also designated as ship's safety officer).

This indoctrination did not include an on-the-spot demonstration for the third officer nor supervision of his initial attempts to raise and lower the ramp. But the third officer raised and lowered the ramp without injuring anyone.

The electrician's efforts were far and tragically short of safety.

After a somewhat cloudy combination of verbal and hand-signal instructions to the Marines to clear the tank deck area in the vicinity of the ramp, the third officer signaled the chief electrician to raise the truck ramp.

Up it came.

The electrician watched for the third officer's signal—arms outstretched, palms down—to stop the ascent.

As the ramp approached the top of its arc, the third officer signaled, "Stop."

The electrician reached for the "Stop" button. Unfamiliar with the controls, he apparently missed making proper contact.

The hand-signaled "Stop" became a shouted "Stop."

"Stop it," screamed the third officer. "Stop it!"

The winch continued turning, tightening the hoisting gear and cables. They two blocked. The winch strained. Tension increased until the cables reached their breaking point. They parted.

Crashing to the tank deck, the truck ramp pinned a U. S. Marine Corps sergeant against a bulkhead.

Although the ship's crew expeditiously jacked up the ramp, the sergeant's injuries were fatal.

The Investigation Determined:

- The chief electrician did not have a clear understanding of the operation of the electric switches which controlled the truck ramp-warping winch system.
- The third officer was negligent in the performance of his duties and in his disregard of safety procedures in: (1) Ordering the electrician to operate the winch control switches; and (2) failing to insure that personnel on the tank deck were clear of the truck ramp area.
- The first officer (safety officer) failed to insure that adequate safety measures were established and practiced even though he had knowledge of previous discrepancies and failures of the truck ramp.
- The chief engineer was remiss in the performance of his duties when he failed to notify the master of the procedural changes involved in the operation of the warping winch switches, which resulted from installation of the temporary manually operated switch. The chief engineer held the chief electrician responsible for maintenance and repair of all of *LST 694's* electrical equipment without properly instructing the electrician in all of the requirements of his work.
- The master was remiss in the performance of his duties and in carrying out his responsibilities. His participation in the ship's safety program was more passive than active.

Lesson To Be Learned:

A young and vigorous man, with a potential of many useful years of life, was killed in this casualty. *Failure of personnel in charge to observe and direct adequate safety procedures and precautions, as required by regulations and good commonsense, was directly responsible for this death.*

A jury rig may be a potential safety hazard and should not be resorted to except in emergency. This is especially true of electrical control systems because the full effect of the jury rig may not be apparent. In the present case the jury switch had the effect of bypassing the truck ramp limit switch, rendering it ineffective. When circumstances are such that a jury rig must be utilized, it is imperative that *all persons* authorized to use the equipment are aware of the jury alteration and its effect on the operation of the equipment. Jury rigs must be removed as soon as practicable and should be replaced with the proper repair item at the earliest availability.

The disciplinary action imposed dispassionately and in all justice by superior authority upon the responsible parties, affecting adversely their careers and future hopes, is undoubtedly not as hard for them to bear as the remorse and self-recrimination which they must endure indefinitely.

CASUALTY REVIEW

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Freeman-Obispo Collision

The collision between an MSTS transport inbound for Puget Sound and an outbound tanker occurred as if it had been carefully planned. Had an aerial observer with the ability to see through fog been present, he would have witnessed a pattern of maneuvering more like two ships bent on mutual self-destruction. The casualty emphasized some pertinent points about the use of marine radar.

There are some recently developed radar units with scopes which provide true motion representation similar to a bird's eye electronic view of ships in the vicinity and their tracks. Most radar installations, however, present a relative motion analysis. This analysis can be meaningless if a maneuvering board plot, or a similar method of tracking, is not performed. A deck watch officer observing a radar target showing up off his starboard bow may, without full knowledge of the relative situation, turn his ship to the left in an attempt to avoid a collision course. By moving to port, he may turn directly into the path of the oncoming ship. Perhaps if he made no change of course, the two ships might pass in a normal port-to-port manner. This situation was described in a fictitious incident related in "Chronology of a Casualty," *MSTS Magazine*, November 1957.

The USNS *Mission San Luis Obispo* also picked up a radar target off her starboard bow. No maneuvering board plot was conducted. The ship turned left. There was no fiction in the expensive results—repair costs totaling over $100,000.

Weather conditions deteriorated after the T2 tanker USNS *Mission San Luis Obispo*, commercially operated under contract to MSTS, departed Seattle, Washington, at 3:00 a. m., July 21, 1956, for a voyage to the Persian Gulf. Soon after *Obispo* left her mooring, her master went below, leaving no special orders for the bridge watch or the Puget Sound pilot who had the conn. The master was on the fourth issue of his master's license, unlimited. He had 26 years of seagoing experience behind him.

Entering Admiralty Inlet, the 18 miles long and 2½ to 5 miles wide body of water connecting Puget Sound and the Strait of Juan de Fuca, *Obispo* was under a full bell despite the lack of visibility. There was fog and a light wind from the northeast; no sea. The tide was ebbing, the current running north at approximately 3 knots.

Obispo was not making her fastest speed although the engine order telegraph pointed to

BRUISED BOW of USNS *Mission San Luis Obispo* resulted from collision between the tanker and the transport USNS *Freeman*.

PORTSIDE AREA, in way of mainmast, shows damage to USNS *Freeman* after the collision in Admiralty Inlet, Washington.

Full Ahead, and the bridge had confirmed, by telephone, this order to the engine room. With the ship just out of the yard and overhaul, the chief engineer limited propeller shaft speed to between 60 and 70 rpm until he settled the plant down. Even with the reduced rpm, the ship clipped along at 13.2 knots over the ground according to a speed check at 4:47.

As *Obispo* cut into the fog, visibility improved, but only momentarily. Fog signals were begun at 5:04. The master heard the signals and went to the bridge. A few minutes later, *Obispo* determined from her radar that her position was 1 mile from Bush Point Light, abeam to starboard and obscured by fog. Sound signals from the diaphone confirmed this distance.

Course was changed to 340° gyro.

Shortly thereafter the chief officer observed a target on the radar scope and reported it as being on the starboard bow, range about 4 miles. The pilot checked the scope at 5:27 and calculated the range as reduced to 2½ miles, target still on the starboard bow. He ordered a course change to the left to 313° gyro, anticipating a starboard-to-starboard passing. A minute later, the *Obispo* lookout reported hearing a fog signal coming through the fog. The master acknowledged the report.

The pilot ordered speed reduced to Half Ahead, then Slow, then Stop at 5:29.

The radar target remained approximately 1 point on the starboard bow. Range decreased to 1½ miles. Time—5:31.

The radar target still had not materialized into view of *Obispo's* bridge personnel striving to see through the fog. The pilot sounded a danger signal, 5 short blasts.

Through the curtain of fog, bridge personnel aboard another ship—USNS *Freeman*—also strained for a view through the vapor blanket. They heard *Obispo's* whistle and observed a target bearing 25° (relative) on the bow of *Freeman*, a C4 transport running at "on the block" speed. When he heard *Obispo's* danger signal, *Freeman's* pilot ordered speed reduced from Full Ahead to Slow, then—Stop.

Tacoma-bound from Anchorage, Alaska, USNS *Freeman* had faced fog since embarking her pilot at Ediz Hook off Port Angeles, Washington. The master of USNS *Freeman* had served in various MSTS ships and had been in command of *Freeman* for about 1½ years. Both the master and pilot were on the bridge as the transport headed eastward at full throttle through the Strait of Juan de Fuca. Visibility was so poor that fog signals were sounded every minute.

At 3:03 a. m. the telegraph was placed on Full Ahead, then changed to Stand By, and the engineroom told to "run on the block," or at full throttle. The shaft turned at 70 rpm, providing a speed of nearly 15 knots through the water. About 5:19 *Freeman's* radar picked up a target, presumed to be a ship, ahead and to the left of the transport's intended track. Course was changed to the right to 160° gyro.

At 5:22 a pip on *Freeman's* radar scope revealed a ship to be dead ahead, range slightly over 4 miles. The pilot changed course more to the right to 170° gyro. Unaware of the starboard-to-starboard passing being planned by USNS *Mission San Luis Obispo's* pilot, USNS *Freeman's* pilot anticipated a port-to-port passing.

He watched the target close the range to 3 miles and ordered a series of course changes to the right, to 175°, then 180°, finally 185°. This put the target 25° (relative) on the port bow at a range of slightly more than 2 miles.

The target's relative bearing increased to 28° on the port bow. Range decreased to 2 miles. Someone reported hearing a fog signal. Then the pilot heard a signal from ahead and off the port bow. He ordered speed reduced from Full Ahead to Slow, then—Stop. Time—5 : 31.

Distance closed between USNS *Freeman* and USNS *Mission San Luis Obispo*. Between 5 : 33 and 5 : 34 the ships came within sight of each other. Both began backing, Full Astern. Each gave the 3-blast signal. *Freeman* then shifted to Full Ahead in an attempt to swing her stern clear of the approaching tanker.

At 5 : 35 the tanker's bow crunched along the *Freeman's* portside in the vicinity of the transport's waist. The ships separated almost immediately. *Obispo* was damaged from stem to hawse pipes. There were no personnel injuries in either ship.

Without need of assistance, the two ships proceeded to Seattle and repairs.

The Investigation Determined:

• The collision was caused by failure of both vessels to observe the mandatory and most exacting requirements for safe navigation; *viz.*, moderate speed and great care. The vessels were aware of each other while they were still 4 miles apart. Each pilot recognized that risk of collision existed, yet they continued with no reduction in speed—the *Freeman* for 10 minutes, the *Obispo* for 6 minutes. Neither pilot had any constructive knowledge of the other vessel's course, speed, or intention.

• The pilot of *Obispo* made a serious error in judgment in changing course 27° to port at 5 : 27. This final course change was the immediate cause of the collision and even had it not occurred, *Obispo* would have found herself in an awkward position relative to the shoreline.

• Both pilots made use of radar information, but tracks were not maintained, and they drew erroneous conclusions from incomplete information.

The following lessons should be learned from this collision:

• REDUCE SPEED IN FOG—It is a mandatory requirement that, in fog, a vessel shall go at moderate speed and give very careful consideration to the existing circumstances and conditions.

• USE RADAR PROPERLY AND ACCURATELY—In order to use radar as it should be used, its information should be plotted and interpreted accurately and a track maintained of the other vessel. This includes converting relative radar observations to true before any conclusions can be made on the true course and speed of another vessel.

• MAKE REASONABLE, PRACTICAL, CONVENTIONAL, AND TIMELY MANEUVERING DECISIONS—unless there are compelling reasons to do otherwise.

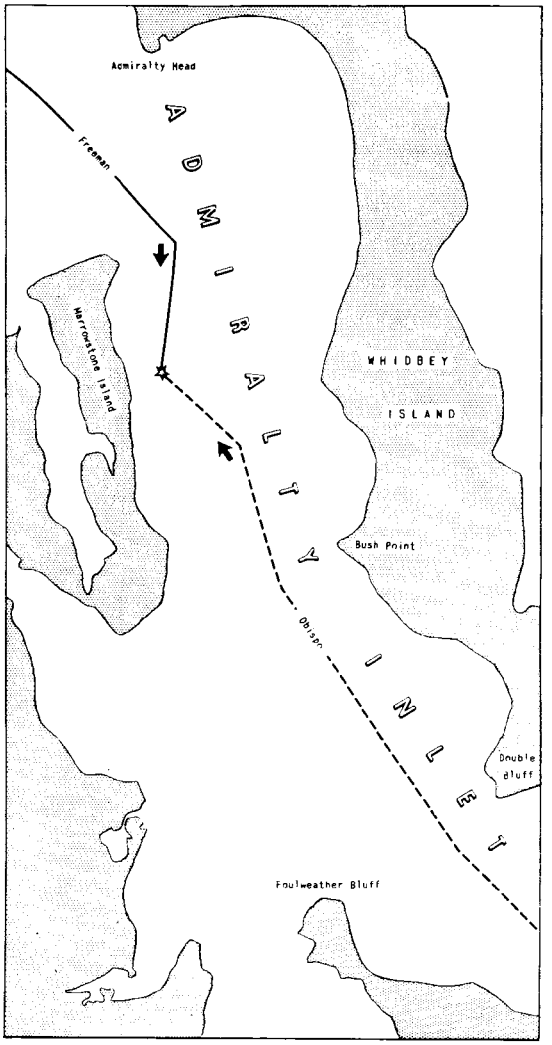

CHART SHOWS FREEMAN AND OBISPO TRACKS TO COLLISION

Section 8.13

CASUALTY REVIEW

USNS *Schuylkill* Boiler Casualty

This is the 13th in a series of case histories of MSTS casualties afloat. Ranging from minor damage to million-dollar losses, they share a single and unenviable status: Each was due to personnel failure and therefore was preventable.

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Occasionally a thirst-crazed desert traveler risks his life to detour in search of distant water that turns out to be only a mirage. All too often engineers also risk their careers, their lives, and the lives of others on the *assumption* that there is water in a boiler gage glass.

The desperate action of the desert traveler is understandable. Incomprehensible, though, is the case of the engineer who needlessly takes a chance on a boiler gage glass that appears to be full. He shows far less logic than his semi-delirious counterpart.

Such an error in judgment by a night relief engineer, who *thought* he saw water in a gage glass, cost the government $58,000.00 in boiler repairs.

Unlike apparitions in the desert, "gage-glass mirages" can be detected quickly by blowing down the glass with steam. For want of the twist of a valve, the expensive innards of USNS *Schuylkill's* port boiler were reduced to a shapeless mass of junk metal.

The 16,500-dwt. T2 tanker, commercially operated under contract to MSTS, bears an Indian name ironically pertinent to the cause of this casualty; "Schuylkill" means "hidden waters."

No competent engineer needs to be told of the danger of low boiler water, hidden behind what appears to be a full gage glass. One of the first things an inexperienced hand in the fireroom learns is that lack of water in the gage glass means that the water level in the boiler is dangerously low.

Without a continuous water supply, boiler tubes cannot long withstand the inferno-like heat rising from the fire box below.

Engineers are aware that the temperatures inside the boiler are high enough to quickly melt "dry" tubes into a misshapen mass, like so much charred macaroni. This happened to the USNS *Schuylkill* on the night of June 11, 1957.

The tanker had just completed an overhaul at Norfolk and was undergoing dock trials at her berth in the yard when the casualty occurred. It is incredible that such a mishap could take place at a time when the ship was not working and all attention was focused on engineering.

Conditions in *Schuylkill's* engineering department were normal except for the fact that the second assistant engineer had gone ashore. (The second assistant usually is in charge of the boilers.) The chief engineer, an oiler, and a fireman-watertender were at their stations. The night relief engineer was still aboard, and he was assigned the duties of the second assistant. Although the chief had no knowledge of the relief engineer's ability, he placed him in charge of the fireroom for the dock trials.

Also aboard was the port engineer of the company which operated the ship for MSTS. It was the port engineer who discovered the cause of the casualty—unfortunately, not in time to save the boiler.

At 6:00 p. m. the dock trials began. The port boiler was on the line. It was backed up by the starboard boiler which had 200 p. s. i. of steam. As the telegraph indicator moved to Slow Ahead and then Half Ahead, *Schuylkill's* screw churned up the murky waters alongside the pier. The stern line grew taut.

In the fireroom the boiler's steam pressure gage needle, instead of moving clockwise, began turning counterclockwise, signaling a loss in steam pressure. The relief engineer went up to the chief, who was on the operating platform, and reported that the single boiler on the

line would not supply enough steam for the remainder of the trials. The relief engineer was ordered to cut in the starboard boiler whenever necessary.

The starboard boiler was cut in and the throttle opened. In a few minutes steam pressure again began dropping. The port engineer went to the fireroom to investigate. He asked the relief engineer why there was not enough steam pressure.

"I don't know," replied the relief engineer as he tended water.

The port engineer departed, leaving the relief engineer to locate the trouble.

The first assistant engineer came to the fireroom to see what was wrong. He reasoned that more fuel would raise the steam pressure. He began working with the fireman to install larger burner tips.

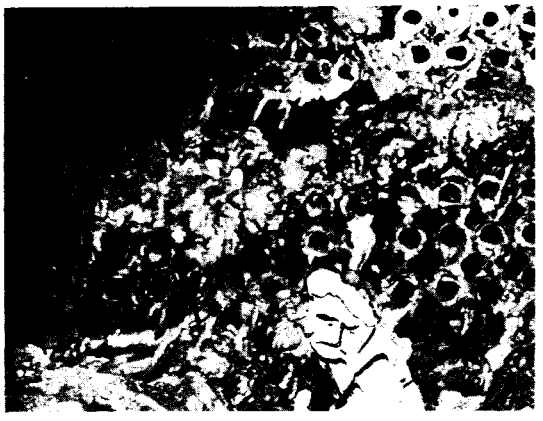
The relief engineer continued to observe the gage glass, as the first assistant and the fireman labored to bring up the port boiler steam pressure. The relief engineer stood ready to kick in the feed pump the instant he noticed any indication of a lowered water level. Convinced that the glass he was staring at was full, he did not blow down the glass to verify the water level.

Although more and more BTUs were added into the firebox, steam pressure continued to drop. The relief engineer saw no change in the glass. Pressure dropped until, finally, the engines had to be stopped. The port engineer burst into the fireroom. He took one look at the gage glass and cried, "There is NO WATER in that boiler!"

"It's FULL," retorted the relief engineer.

The first assistant, who had worked so hard to get more fire, immediately began cutting out the fires. He knew now that more heat was not the answer.

The port engineer reached up to blow the glass. Too late—the boiler let go. The melted remains of *Schuylkill's* port boiler plummeted to the firebox floor. Steam engulfed the room. Fortunately, no one was injured. The dock trials were over.



OVERHEATED BOILER tubes, ruined by the lack of water, are convincing evidence of the high cost of careless engineering.

The Investigation Determined:

- Dry firing caused the destruction of the tubes in *Schuylkill's* port boiler.
- The dry firing resulted from the night relief engineer's ignorance.
- An indirect cause of the casualty was determined to be the chief engineer's reliance on a relief engineer who was not qualified to take charge of a fireroom during an important event such as a ship's dock trial following an overhaul.

Lessons To Be Learned:

USNS *Schuylkill's* gutted boiler was expensive proof of the price of not observing the well-known admonition, "DON'T FIRE A DRY BOILER."

It was poor judgment on the part of the relief engineer to permit the boiler to be fired with no water showing in the gage glass. Mistaking a completely empty gage glass for a full one is inexcusable. It only takes a moment to blow down a gage glass.

When personnel responsible for a ship's boilers have any doubt about the water level, the gage should be blown immediately, and the glass should be watched carefully as it fills. This is elementary good engineering and is of prime importance. Lack of attention to such "minor details" causes major casualties.

Engineers must not only remember and practice the tenets of good engineering, but they also must be sure that their subordinates understand and practice sound engineering principles.

A casualty with a similar result was discussed in *MSTS Magazine*, December 1957 (Case VIII: Boiler Fire in *Marine Fiddler*).

CASUALTY REVIEW

This is the 14th in a series of case histories of MSTS casualties afloat. Ranging from minor damage to million-dollar losses, they share a single and unenviable status: Each was due to personnel failure and therefore was preventable.

At times, tragedy and loss can result in benefit. If the cases presented in this "lessons-from-casualties series" serve to prevent recurrence of similar losses, the original loss may be ameliorated to some extent, and the series will be worthwhile.

The facts in each case are taken from official investigation reports.

USNS *Shanks*—Pier Damage

San Francisco Bay is one of the world's finest harbors. Largest on the U. S. Pacific coast, it also is one of the trickiest. From the headquarters of MSTS Pacific Area at Fort Mason, observers can pick up a lesson from experts each time a ship is warped to her mooring at the three-fingered pier complex of the historic embarkation center. It's a shiphandling show. There is no margin for error. The slightest miscalculation places a ship in danger.

The column of water between Alcatraz Island and San Francisco has a host of handicaps: capricious currents of variable direction and velocity, tide rips, wind, and fog.

Normally, an MSTS ship mooring at Fort Mason on the flood tide makes an angular approach to the face of the pier, drifting slowly in until the ship's waist rests against the pier corner's pudding fender. At this point, the ship's bow is well into the water dock between piers and may nearly nuzzle the adjacent pier.

With a tug pushing the bow toward the mooring pier, the ship warps around the pier corner and glides down the pier. It's a sight to see, particularly when the pilot and C. O. or master must contend with wind or fog.

But the weather was fine the morning of June 26, 1957, as USNS *Shanks* made her landfall, steamed past the Farallon Islands, took on her pilot, and lined up for the slot through Golden Gate. Passing under the bridge, USNS *Shanks* turned off Alcatraz and prepared for a portside mooring to Pier 2, west side. Passengers caught the strains of the band on the pier apron. The flood tide was running at less than 4 knots across the face of the pier. Wind velocity was about 5 knots. Two tugs took their stations; one at the starboard bow with a headline, the other off the port quarter but not made fast. The master and pilot were on *Shanks*' bridge.

Also on the bridge was the second mate who moved to the starboard wing to pass on the pilot's orders to the tug alongside. The tug acknowledged each hand signal with a whistle.

At the engine order telegraph, the junior deck officer moved the handles according to the pilot's requests for speed changes. A quartermaster manned the phones to the engineroom as a doublecheck on the telegraph. After giving each order, he listened for the engineroom talker's response. If it was accurate, he replied, "Log it."

The fourth assistant engineer was at the throttle answering orders for various speed settings as relayed from the bridge via the telegraph and verified by the telephone talkers.

The special sea detail also was set at other stations. On the foc'sle, the third officer and carpenter stood by, ready to let go the anchors if needed.

Shanks made a normal approach. About 50 yards off the pier face, there was still slight steerageway although the telegraph was on "Stop," and the bridge tachometer indicated the propeller shaft was not turning. The rudder was amidships. As USNS *Shanks* drifted slowly to the pier, the pilot made his decisions calmly.

There was no hurry. The ship was slightly ahead of schedule. At the conn, the pilot automatically planned the sequence of his approach. To put the ship's waist, in the area under the bridge, gently against the corner of the pier, he would slow *Shanks*' steerageway by backing the engine. First he would order "Slow Astern" then "Half" and finally, "Full Astern." He knew turbines take time.

Conditions were ideal for the mooring. All was set. The pilot ordered "Slow Astern." The annunciator handles moved to "Slow

Astern." Quickly, the engineroom acknowledged, and their pointer moved to match up with the bridge handles. In answer to the bridge telephone talker's "Slow Astern," the engineroom talker responded with "Slow Astern," and received the expected, "Log it." The doublecheck system was working.

After waiting a moment for the turbine to come up to slow speed astern, the pilot ordered "Full Astern" to both the engineroom and the tug alongside the starboard bow. The telegraph and talker passed the word to the engineroom. Proper acknowledgment came back. The second officer gave a hand signal to the tug that was met almost immediately with the whistle reply indicating the order was understood.

Bridge personnel suddenly were aware of a strange sensation. For a moment they couldn't identify it. Then they knew. The expected quivering, usually caused by a sternward-digging propeller, hadn't shown up. No vibration. Eyes flashed to the bridge tachometer to verify if the worst were true. It was.

The tachometer pointer indicated the propeller shaft was revolving in the AHEAD direction. Eyes snapped to the telegraph handles. They were firmly in the "Full Astern" notch. USNS *Shanks*' slight forward drift was not being checked. The transport was gaining momentum ahead. The calm of a well-planned approach shattered. Excitedly, the pilot grasped the annunciator handles and flipped them back and forth before returning them to "Full Astern." This signified "Emergency Full Astern." The first officer shouted to the bridge talker to pass on the word to the engineroom, "Emergency Full Astern." He did, and received a response that matched the order.

In a horrified cry someone exclaimed, "She's going 40 turns AHEAD!"

The bridge tachometer verified this. The propeller shaft was turning in the ahead direction at 40 revolutions per minute.

Telegraph bells jangled again as the pilot shook the handles back and forth. He ordered "Hard Left Rudder" in an attempt to swing the stern from the pier corner and keep the runaway ship's bow from knifing into the adjacent pier.

At the starboard bow, the tug was pulled forward despite its desperate attempts sternward. It was an unfair contest. The horsepower of the tug was no match for the USNS *Shanks*' propulsion plant. Missing the corner of Pier 2, *Shanks* plowed across the short water dock between piers. It was too late to let go the anchors. At least 30 fathoms were necessary to take effect and snub the ship around.

Bridge personnel watching the tachometer noticed the needle taking a change of direction. The forward spinning wheel was slowing. Perhaps it would finally move to the setting ordered by the pilot. But time had run out. Even from the confines of the engineroom, the chief engineer knew what was about to happen. "We are going to hit," he said. The prow of *Shanks* cut into the east side of Pier 1. And the pier gave as good as it got by knocking a notch in the ship's stem.

"I will take over," said the first assistant engineer as he relieved the fourth assistant at the throttles in the engineroom.

On the bridge the pilot, surely with concern over what sort of performance he would receive, requested "Slow Astern" in order to keep the stern and rudder from fouling at the pier corner. The screw moved properly, and the mooring was completed without further incident.

No personnel were injured. Repair costs for ship and pier amounted to more than $20,000.

The official investigation of the casualty had many questions to ask. Two were highly significant:

Question to the fourth assistant—"Do you think it possible that you could have opened the ahead throttle instead of the astern throttle when you got an astern bell?"

Answer—"I would say no, because if that did happen; well, immediately you are going to see it on your tachometer it is going in the wrong direction."

Question to the fourth assistant—"Do you think there could be a misunderstanding? In other words; the signal comes on the telegraph, we will say, 'Astern.' If you think of that in your mind as 'Half Ahead' or 'Slow Ahead,' you would open the ahead throttle, not realizing that you had turned the wrong throttle."

Answer—"If I got an astern bell, why would I think of it as an ahead bell?"

Results of the Investigation:

- The fourth assistant engineer received a letter of reprimand and warning.
- The chief engineer received a 10-day suspension for improperly altering an entry in the June 26, 1957, Engineer's Bell Book.

Lessons To Be Learned:

Don't let responsibility become so routine that it loses its identity. This happened in the case of the *Shanks* where a combination of a veteran chief engineer and a new fourth assistant engineer resulted in complacency on the part of one officer and a serious throttle error by the other.

The "Special Sea Detail" is appropriately named. As this word implies, the master is asking for a special effort to insure that his commands are carried out quickly and accurately by the ship's company in a manner that will insure the ship being safely brought to its destination. One man cannot supervise individually the many operations necessary to bring a ship to anchor or moor to a pier. The delegation of this authority to department heads is self-explanatory and well known. The degree of carrying out this responsibility by the cognizant officer assigned is up to the individual. He must supervise, indoctrinate, and train his personnel. But paramount to all of this, he must be responsible and insure that the orders given by the master are carried out properly.

Establish a check system which will insure that the transmission and execution of orders from one man to another is done correctly. Everyone regardless of qualification is subject to error. The chief or first assistant engineer should have made a visual followup on every maneuver. This would have immediately spotted the slow astern bell being incorrectly answered.

The importance of minor as well as major items is brought out in this case. The proper attention and strict observation of smaller details such as the correction of the log, scheduling of practice drills, and the watching of the tachometer all become cogs of a pattern which guarantees the proper execution of command. **Highlighted above all, however, is the fact that routine should not breed carelessness.**

CASUALTY REVIEW

USNS *Johnson* Grounding

It is to be hoped that international maritime authorities some day will be in accord concerning what role radar should play in preventing collisions and marine disasters. In attempting to define how much reliance should be placed upon radar-supplied data, legislative and judicial groups of various nations have come up with conflicting decisions. But shiphandlers the world over are of singular opinion that prudent seamanship demands utilization of all available information—including radar—to form proper decisions. They know radar is of immense aid, but certainly no cure-all. Last year, 26 radar-equipped ships, representing a total of more than a quarter of a million gross tons, were involved in collisions. Some of the ships were lost.

The radar-equipped USNS *Johnson*, an MSTS C3 transport, was not involved in a collision nor did she suffer damage nor injuries to personnel in an accident resulting in part from failure to utilize her radar fully. But the *Johnson* did go aground and nearly was struck by a ship as she blocked a heavily traveled channel during foggy weather. Enroute from New York to Norfolk, the *Johnson* made a routine trip down the U. S. east coast, turned westward toward the mouth of Chesapeake Bay, and arrived at the Navy stake buoy off Cape Henry at 6:00 a. m. March 14, 1956. Visibility was about ¼ mile as the carpenter reported to the fo'c'sle, readied the anchors, and stood by. The *Johnson* passed between the capes guarding the approaches to one of the world's finest harbors. Visibility began to fluctuate. At times it closed, and the *Johnson* sounded fog signals until it lifted.

Both the master and a coastal pilot were on the bridge as the ship lined up for Thimble Shoal Channel. They knew the Hampton Roads area. The master had been there many times during his 8 years with MSTS. He had brought the *Johnson* into Norfolk about 3 months earlier. The pilot, who had first gone to sea over 50 years previously and had been piloting for 20 years, had piloted another ship into Hampton Roads within the week. He was cautious. He recalled that on his last trip a dredge was working in the channel between Old Point Comfort and Fort Wool. The dredge, at that time, obstructed part of the channel toward Old Point Comfort so that, including the dredge's anchor cables and float, more than one-half of the channel was open. The pilot therefore on this trip foresaw no undue difficulty in maneuvering the *Johnson* between Fort Wool and the outermost extension of the dredge.

Situations sometimes change rapidly. In the few days since the pilot had taken a ship into Norfolk, the dredge had been moved. Unknown to personnel aboard the *Johnson*, the dredge was now obstructing about two-thirds of the channel south from Old Point Comfort. No *Notice to Mariners* had been issued defining the navigable section of the channel nor had the pilot, in discussions with other pilots, obtained any information apprising him of changes in the dredge's position.

With the pilot at the conn and with the *Johnson's* second officer acting as navigator, the ship passed into Thimble Shoal Channel. The two entrance buoys were easily seen. The second officer visually took cross bearings on known objects, such as Thimble Shoal light, until the ceiling lowered and the fog thickened. Radar was used to obtain the range and bearing of Old Point Comfort. Fort Wool also showed on the radar scope, but its range and bearing were not taken.

Visibility wasn't very good at 7:30 a. m. The ship sounded fog signals and moved ahead slowly. The propeller turned at about 20 r. p. m., giving a speed of about 4 knots. The current of some 2 knots was with the ship. Maximum flood tide would occur in an hour. Old Point Comfort was dimly visible. The outline of Fort Wool could barely be made out. Then it happened.

The dredge was sighted about 1 or 1½ ship