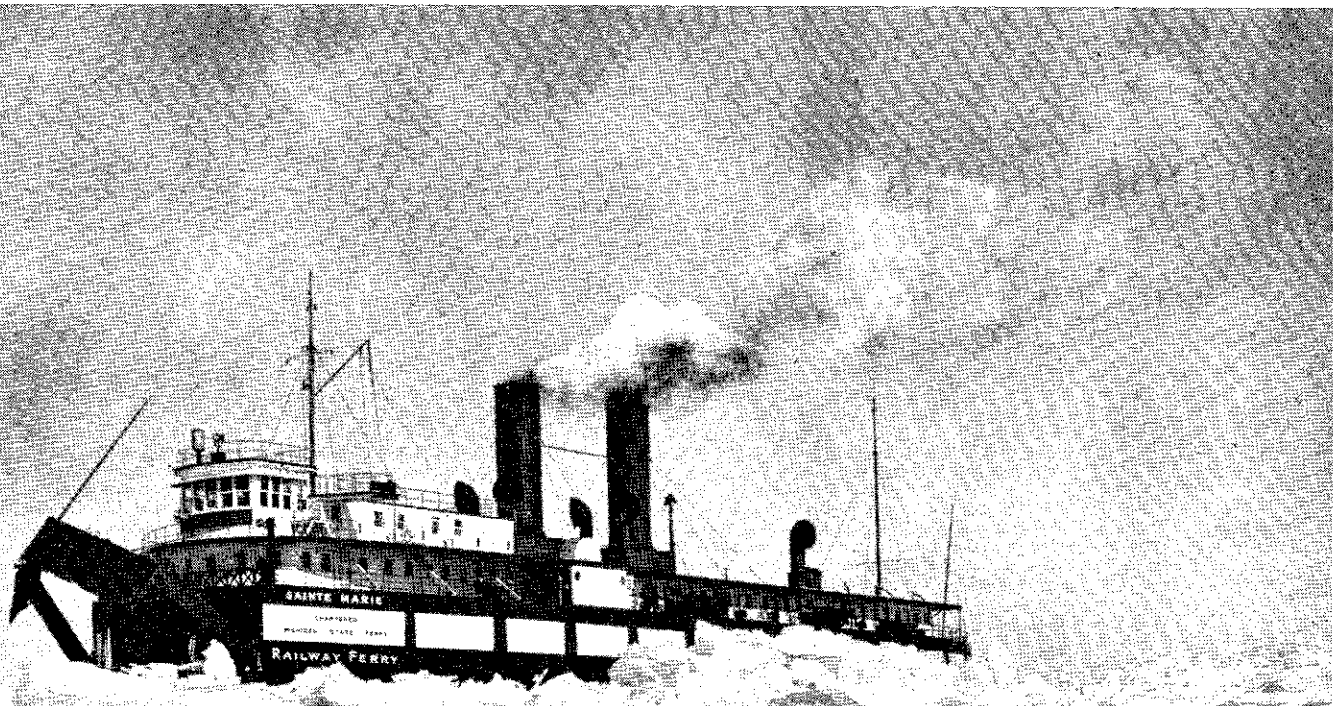
Features

THE MANOEUVRE OF THE LAST SAFE MOMENT

INDICATION OF GROUNDS IN SHIPBOARD AC SYSTEMS



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MERCHANT MARINE COUNCIL

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NOTICES:

The feature "Nautical Queries" will be resumed after all items in the Rules of the Road Exercise have been printed.

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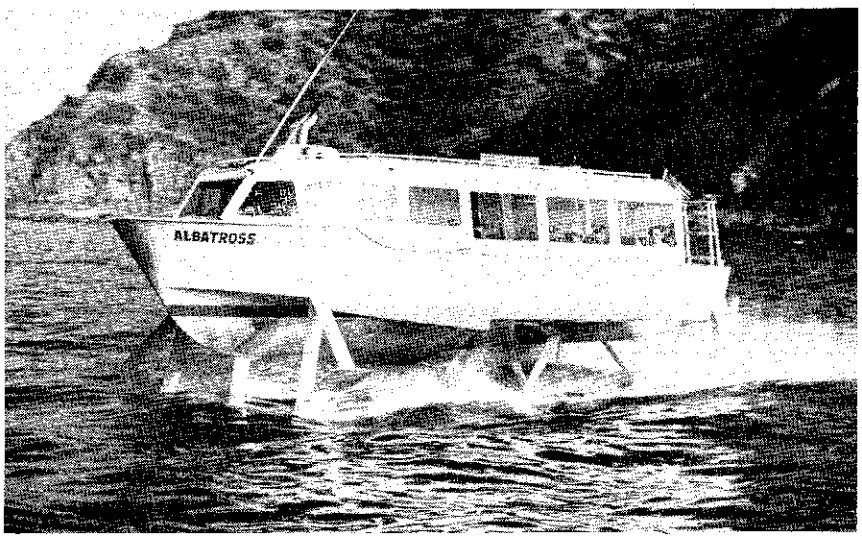
THE ALBATROSS



SHOWN ABOVE is the new hydrofoil vessel *Albatross* built by Wilson Shipyard in Wilmington, Del. The Vessel has been approved by the Coast Guard for the carriage of passengers. Designed for a top speed of 40 mph, the 34-foot vessel is equipped with surface-piercing foils, 181 shp Diesel engine, and an aluminum hull. Present plans call for the construction of 25 other hydrofoils of the same class by Wilson Shipyard.

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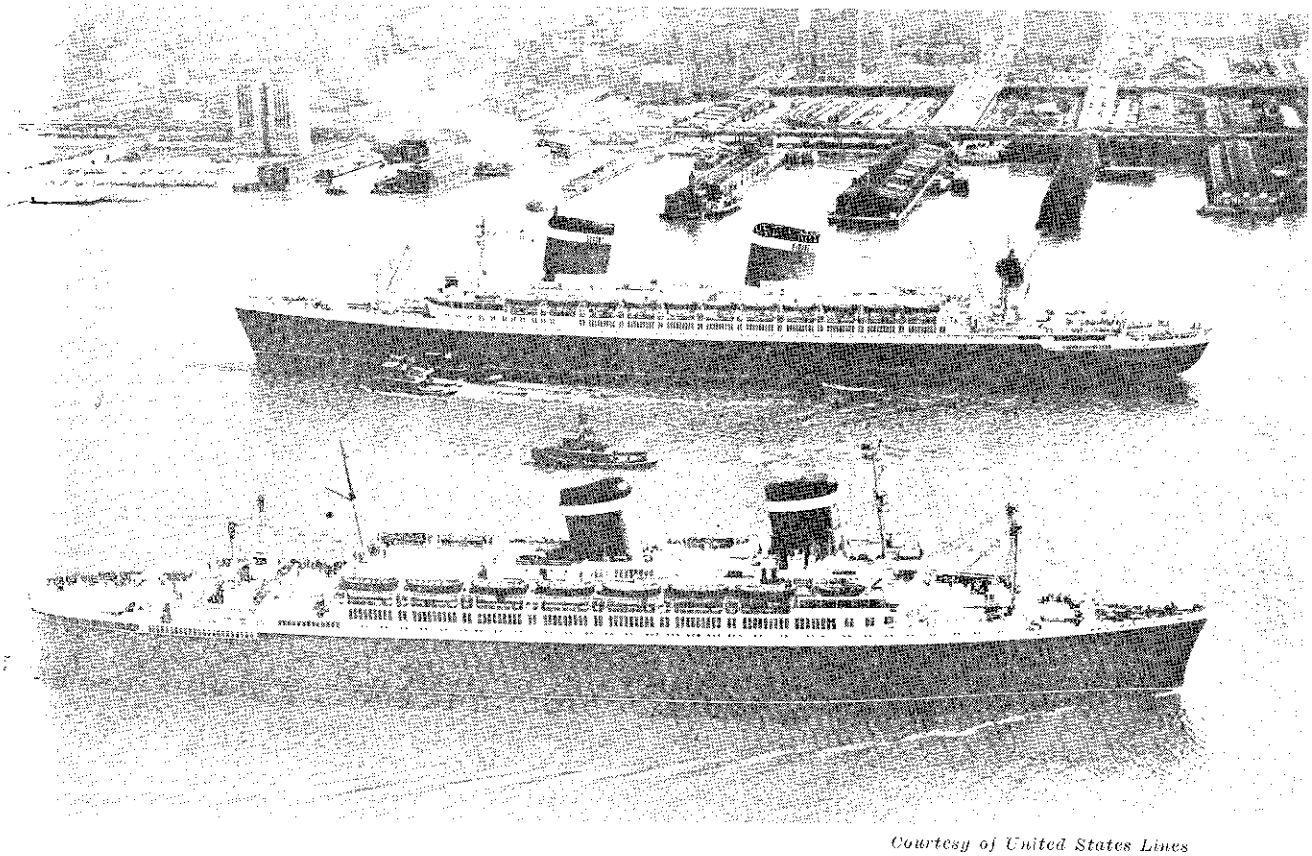

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THE MANOEUVRE OF THE LAST SAFE MOMENT

THE SO-CALLED "manoeuvre of the last safe moment" involves, of course, the conduct of a stand-on vessel in respect to a giving-way or burdened vessel that fails in her duty to make way, or that tries to do so too late. Rule 21, International Regulations for Preventing Collisions at Sea (below cited as "Int. Regulations") is the basis for such conduct:

"Where by any of these Rules one of the vessels is to keep out of the way, the other shall keep her course and speed. When from any cause, the latter vessel finds herself so close that collision cannot be avoided by the action of the giving-way vessel alone, she also shall take such action as will best aid to avert collision" (see Rules 27 and 29).

Occasionally people fail to appreciate that the "giving-way" rules of the Int. Regulations also apply in the presence of poor visibility and in fog. They believe that in fog, because imminent danger is invariably present, the manoeuvre of the last safe moment is always made. However, a vessel who finds herself in a burdened situation in a fog after catching sight of another vessel more or less on a crossing course, must try to comply with the duty to keep out of the way. Since, pursuant to Rule 22, the burdened vessel must avoid crossing ahead of the other vessel she will swing to the right or go Full Astern (indicating this in accordance with Rule 28). The other vessel, to avoid a collision, can only make the manoeuvre of the last safe moment. As a matter of fact, the privileged vessel in the great majority of cases, will be obliged to do this since in fog one cannot wait and see whether the manoeuvre of the giving-way vessel will be successful.

Cases where the giving-way vessel fails to comply with her duty to make way unfortunately do occur. Surely many a collision has been avoided by an early action of the unburdened vessel, the stand-on vessel, so that only the cases where a collision has occurred become known. To mention a few cases which involve German ships that were *not* duty-bound to give way:

1. *Trawler "Elbe"* v. *TMV "Havprins"* (Court of Inquiry, Hamburg 10/13/55.
2. *Tanker "Caperata"* v. *Trawler "Que Dieu nous protege"* (CI Hamburg 7/19/60).
3. *TT "Helma Entz"* v. *"Shofuku Maru"* (CI Flensburg 12//17/59).
4. *MV "Harald Ottens"* v. *S.S. "Askold"* (CI Hamburg 8/1/60).
5. *Trawler "Gustav Borgner"* v. *Trawler "Cornelia Maria"* (CI *Bremerhaven* 3/11/59).

The following article is extracted from a complete paper published by Captain Helmers in the German maritime journal "Hansa". In publishing the following extracts, space limitations have dictated the omission of several diagrams, graphs, and explanatory text which describe the thorough tests carried out by the author which form the basis for this article. Captain Helmers' conclusions regarding the efficacy of International Rules of the Road Article 21 do not necessarily represent the official view of the U.S. Coast Guard, but are published here in the interest of furthering discussion, comment, and general knowledge concerning the Rules to Prevent Collisions.
—ED.

In case no. 1 the outward bound "hold-on" vessel *"Elbe"* maintained course and speed with respect to the *"Havprins"* who was crossing *from* port; the *"Havprins"* took no action to avoid a collision. The former tried —quite hopelessly—to cross the bow of the latter vessel, at the last moment, by going emergency full speed ahead. *"Elbe"* was hit and sank. There were 15 killed.

In case no. 2 *"Caperata"* had the trawler (who was not engaged in fishing) crossing on her port side. The trawler turned twice to starboard but then each time returned to her old course. Executing the manoeuvre of the last safe moment *"Caperata"* was just turning to port when the trawler again swung to starboard. The trawler was struck and sank. There were 9 killed.

In case no. 3 the stand-on vessel, in executing the manoeuvre of the last safe moment, turned to port; almost simultaneously the giving-way vessel turning to starboard. Serious damage resulted.

In case no. 4 *"Harald Ottens"* had the *"Askold"* crossing from port; the *"Ottens"* then tried with the wheel hard-astarboard to cross the bow of the other vessel, and at the last moment tried to swing the stern clear by placing the wheel hard-aport. She was struck amidships and sank.

In case no. 5 *"Cornelia Maria"* (not engaged in fishing) failed to give way for the trawler *"Gustav Borgner"* who was engaged in fishing. The former vessel, contrary to the rule, at the last moment turned to port. Up to this moment the stand-on vessel, who had maintained course and speed, went full astern at the last moment; nevertheless, she penetrated the waist of the other vessel. The *"Maria"* sank.

Each of these cases was one involving a very serious collision. It was due only to fortunate circumstances that no lives were lost in the last three cases mentioned.

You cannot get rid of such casualties by condemning the irresponsible conduct of the obligated parties.

Cases where a vessel does not carry out her duty to give way will continue to occur. But collision cases such as those described above need not happen if one is clear in one's mind about the manoeuvring qualities of small and big, fast and slow vessels, and if one will only draw logical conclusions from such knowledge. Again, safety at sea may be further enhanced if every Watch Officer will educate his look-out to cooperate by arousing the latter's sense of responsibility. It would be extremely wrong to repulse a look-out who, since the situation appears critical to him, would report for the second time a vessel already reported.

As a general proposition in collision situations, one's conduct cannot be squeezed into set rules and the action to be taken in a given case of emergency should depend on the circumstances involved. No doubt action must be taken according to practical experience, and no doubt the practicing navigator will react correctly in the majority of cases. Everything depends, however, on also lessening the number of panic actions that still arise.

Let us select from a series of collision hazards one of the most dangerous cases: the situation where the other vessel bears 15 degrees to port, is the burdened vessel, and has failed to give way. The questions emerging from the situation are as follows: What action is to be taken? When should it be taken?

Regarding the first question, what action should be taken—theoretically speaking, there are three possible answers: go full astern, turn hard-aport, turn hard-astarboard.

REVERSING AS MANOEUVRE OF THE LAST SAFE MOMENT

In the preceding paragraphs it has been explained that owing to the high speeds of modern vessels the stopping distances are very long. In the case of fast vessels, they amount to 8–10 and even 12 ships's lengths. Before the engine of a fast, fair-sized vessel starts making reverse revolutions at all the ship has already covered 1000 m. (0.5 nautical miles) or more. A full astern manoeuvre makes sense only if the vessel had been making but little headway to start with; for instance, proceeding in a fog and sighting another vessel.

PORT MANOEUVRE OF THE LAST SAFE MOMENT

The stand-on vessel is under an almost fiendish temptation to follow the second possibility of passing the other vessel (who bears to port) on the starboard hand with the wheel hard-aport. Possibly one or another shipmaster has managed to bring off such a manoeuvre; but, if so, he has not experienced a justification of his decision but, rather, he just happened to be lucky that he did not share the fate of the *"Helma Entz"* (collision case no. 3). If the giving-way vessel does wake up at the last moment and does take action, he very probably will swing to starboard, as a full astern manoeuvre would be absurd for him, too, and he is not allowed to turn to port as he must, if possible, avoid crossing the bow of the other vessel (Rule 22).

Since vessels initiate the turn relatively slowly, even with the rudder hard over, no observer of the other ship can immediately recognize the alteration of course. Signals indicating course are sometimes apt to be forgotten in such situations; or, very often, they are not heard if given. Therefore, one *cannot* argue as follows: "In case the giving-way vessel fails to take any action, whereas the stand-on vessel gives hard-aport in the very last moment indicating this manoeuvre by 2 short blasts, the giving-way vessel must or will keep her course."

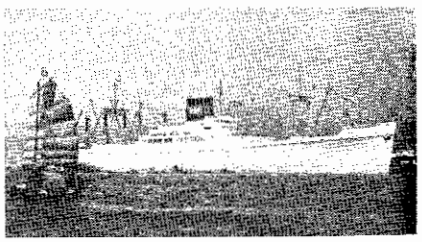
Apart from the findings in the above mentioned five collision cases, the Hamburg Court of Inquiry alone has furnished me with findings of *12 collision cases of recent years in which one vessel headed to port whereas the other vessel "at the same time" headed to starboard.* It is true that not each one of these cases, whose number can be supplemented by findings of other courts of inquiry, fits the assumed conditions (open waters, clear visibility), because some of these collisions occurred in narrow channels and some in fog, but *all cited instances* should caution against a port manoeuvre of the last "safe" moment. (The cautioning against a port manoeuvre also applies to radar navigation in fog.) This warning also applies to the moment of sighting the other vessel in fog, as the natural reaction on the other vessel in the presence of a suddenly arising hazard is "Hard-a-starboard!" or "Full Astern!", either one.

In my opinion a port manoeuvre of the last "safe" moment can only be justified in case one has quite clearly recognized a turning to port *already* initiated (surely often unjustifiably) or in case an overtaking vessel coming up from aft fails to give way.

The inference therefrom can only be: Apart from the two exceptions, in the case of the manoeuvre of the last safe moment one should swing to starboard.

TIME TO ACT

Sometimes navigators, especially of tankers, are heard to say that in the event of the manoeuvre of the last



Courtesy American President Lines

safe moment they would *all the same* turn to port in order to strike the other vessel with the bow rather than be hit broadside themselves and catch fire. Whoever thinks so, or acts accordingly, will quite unnecessarily endanger human lives since he, as stand-on vessel, has missed the point of time where he can still avoid collision. In addition, at a collision hearing it will be difficult for him to prove the sole fault of the other vessel.

Other navigators will say they would, prior to the manoeuvre of the last safe moment, reduce speed in time, in order to act more effectively. At this time we shall not investigate whether in each case one can act more effectively at reduced speed. It is indeed correct to say that at reduced speed one feels safer and that a "Full Astern" manoeuvre promises some success. In any case such a reduction of speed must be carried out timely if it is to be effective. The stand-on vessel, of course, has to maintain her speed up to this moment, namely until the giving-way vessel alone cannot avoid collision. One should not, however, adhere rigidly to the letter of the rule if this be against reason. Therefore, in my opinion, one could not criticize anybody who when threatened by a giving-way vessel in a tense situation timely reduces speed. In the vicinity of a third and/or additional vessels that might later hinder a rudder manoeuvre of one's own from full speed, a timely reduction of speed is to be expressly recommended in spite of an apparent violation of the letter of Rule 21, Int. Regulations. The safety for life and ship must take priority in any case. Uncertainty is caused only by those who fail to discharge timely enough their duty to give way.

In view of the moment contemplated in Rule 21, Int. Regulations, the following inferences can be drawn:

1. If a giving-way vessel in respect to a stand-on vessel of equal size and speed fails to comply with her duty to give way, in most cases a collision will result if in the critical moment *both vessels simultaneously* swing hard-astarboard.

2. If the giving-way vessel of equal size and speed does swing off at a later time, or not at all, the stand-on vessel can no longer avert collision whatever she attempts to do.

3. If a big ship as stand-on vessel in respect to a small giving-way vessel waits so long that the small vessel alone can no longer avoid collision in any case a collision will result whatever may be attempted on either vessel.

4. If a small ship as stand-on vessel in respect of a big giving-way vessel waits until the moment where the big vessel alone can no longer avoid collision the small vessel by "hard-astarboard" still can avoid collision regardless whether the big vessel does or does not take action. (From this it follows, merely as an objective consideration, that a small ship which lets herself be run over by a big giving-way vessel did hesitate too long in taking action pursuant to Rule 21.)

These findings demonstrate that Rule 21, Int. Regulations, for objective reasons, *does not correspond to practical needs.* If the legislator would have analyzed the manoeuvring qualities of sea-going vessels he would have been under the necessity of wording Rule 21 differently. In addition the legislator failed to "provide for" the significant case where the giving-way vessel does *not at all* comply with her duty to give way. If such case occurs—there is indeed evidence that this situation happens—the stand-on vessel, also, can no longer avoid collision if he waits for the moment of appropriate action as contemplated by Rule 21, Int. Regulations, (except for a small vessel in respect to a big one).

Fortunately practical navigators do not adhere to the letter of Rule 21. Practical navigators, rather, let themselves be governed by the latter part of the second sentence of Rule 21, taking such action in respect of another vessel acting irresponsibly, "as will best aid to avert collision." That is to say, practical navigators do not wait so long that the giving-way vessel alone can no longer avoid collision. For nobody can *with any degree of accuracy* assess the manoeuvring qualities of the other vessel. Neither can anybody estimate accurately the distance to the other vessel especially at night. Even if radar happens to be in operation and distances are being measured continuously, waiting for the moment contemplated by Rule 21 would be most dangerous.

In the open sea many navigators give way at relatively great distances. There is hardly an officer of the watch who, when on the open sea, has not already initiated his giving way manoeuvre by the time the range has closed to 2 nautical miles. If the distance decreases further than this in cases where the other vessel is obliged to keep out of the way the conning officer will become increasingly nervous. The first doubts make themselves felt regarding compliance with the duty of giving way on the part of the other vessel. If the distance decreases to 1 nautical mile or possibly less, one feels under considerable pressure, as no reason can be seen for the irresponsible conduct of the other vessel. If the sound signals required by Article 28 are made repeatedly—accompanied at night by flashing light signals—without evoking any response, one can only conclude that there is a lack of vigilance or some other extraordinary circumstance existing on board the other vessel. Thus, the other vessel has already violated the Preliminary Note to the "Steering and Sailing Rules" which requires a giving way action to be carried out "in ample time, and with due regard to the observance of good seamanship."

The purpose of the foregoing remarks is not only to increase the general knowledge of some important manoeuvring qualities, but to suggest to the conning officer how the correct conclusions may be drawn from this knowledge so that safe action can be taken in hazardous situations. If the above discussion assists in reducing panic actions, even though rarely, it will have served its primary purpose.

INTRACOASTAL WATERWAY CHARTS

Plans to produce a "compact series" of Intracoastal Waterway Charts have been announced by the Coast and Geodetic Survey.

New Intracoastal Charts will be accordian folded, measuring only 7⅜ by 15 inches and easy to handle even in the smallest skiff or dinghy.

The Intracoastal Waterway is a protected route, with some exceptions, for vessels between Boston, Mass., and the Rio Grande, a distance of approximately 2,900 miles. Navigation is restricted, however, by the limiting depths which in some places is only 5 feet. Generally the project depth is 12 feet or more. Long canals have been cut through dry land in several areas such as the canals between Norfolk, Va., and Albemarle Sound, N.C.

More than 60 Intracoastal Waterway Charts rim the Atlantic and Gulf Coasts of the United States from Norfolk, Va., to Brownsville, Tex.

The first remodeled charts are scheduled for issue early in 1963. These are No. 824, Sandy Hook to Little Egg Inlet, N.J., and No. 829, Norfolk, Va., to Albemarle Sound, N.C.

With the exception of the New Jersey chart, reconstruction will begin at Norfolk and generally progress southward to Florida and into the Gulf of Mexico area.

INDICATION AND LOCATION OF GROUNDS IN SHIPBOARD AC ELECTRICAL SYSTEMS

ONE OF THE MOST annoying problems in the operation and maintenance of shipboard electrical equipment is perhaps that of keeping all circuits clear of ground faults. In spite of the many precautions required and ordinarily taken in the selection, location and installation of the various items of electrical equipment used in ships, the presence of water, moisture-laden air and the inescapable vibration and motions of the vessel result in the ultimate failure of some portion of the insulation, and a ground.

Ground faults in shipboard a.c. systems are indicated by ground detectors which measure the circuit impedance to ground. Ground faults may be located by a systematic process of opening switches or circuit breakers and observing which switch, when open, eliminates the ground. Proper use of ground detectors can lead to improved service and decrease in maintenance cost.

INDICATING EQUIPMENT

Ground detection equipment of various forms has been and is employed. Probably the best known scheme is that in which incandescent lamps are used. Ground detector lamps are in common use in conjunction with ungrounded systems. Ungrounded systems are those having no intentional connection between the system conductors and ground. Such detectors consist of a lamp rated at system voltage connected between each phase or line conductor and ground with a test switch inserted in the common ground connection. (See figures 1, and 2.)

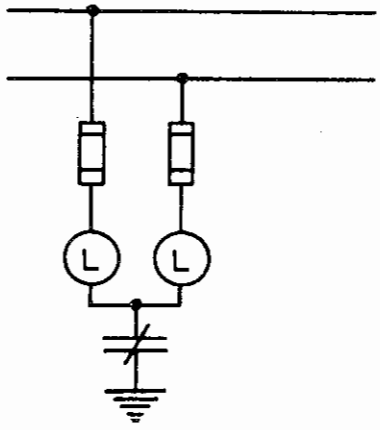


Figure 1. Single-phase, ungrounded

The following article on shipboard electrical grounds is excerpted from a paper prepared by Capt. O. T. Estes, USCG (Ret.), and Cmdr. R. E. Rountree, USCG (Ret.), which was presented at the Marine Transportation Committee meeting of the American Institute of Electrical Engineers held last year. Ed.

It has been found most effective to operate ground detector lamps at about one-half system voltage. Should a solid ground fault occur the potential on lamps will still be within their rating and they will not be damaged. For lesser grounds the lumen output of the lamps will be approximately proportional to the cube of the voltage. This exponential change in brilliancy increasing in one lamp and decreasing in another, coupled with the test switch to afford comparison with "no ground" condition, leads to a sensitive detector. Our laboratory experiments show that when 25 watt lamps are used grounds having an impedance of 3,000 ohms are easily detected in a 120 volt circuit; and correspondingly when 6 watt lamps are used grounds with impedances up to 10,000 ohms are easily detected. This easily detected point was picked at a reduction to two-thirds brilliancy of the darkening lamp as determined by an illumination meter; this point is one at which the practical shipboard engineer can readily recognize a ground condition and take remedial action. The laboratory results were confirmed by shipboard test aboard the *Cook Inlet* and *E. H. Blum*. The ground test switch or pushbutton should be of a normally closed type with spring-return to the closed position. Pushing to test will then open the lamp ground connection and the presence of ground conditions heretofore unnoticed may be noted due to contrast in lamp filament brightness before and after testing. Release of the test switch should restore the lamp ground connection and any appreciable ground that may subsequently develop on the system may be noted by personnel in the area without the need of operating the test switch.

Voltmeters are also used as ground detectors by employing arrangements such as shown by figures 5, and 6 which permit comparison of line to ground voltages of the system. While voltmeter ground detection may be more sensitive than the lamp method it does not have the advantage of indicating to someone at a distance from the switchboard. Ground detector voltmeters are quite often provided on a.c. ship's service switchboards in addition to ground detector lamps. In order to prevent simultaneous connection which might affect sensitivity, the ground detector voltmeter may be connected so that the

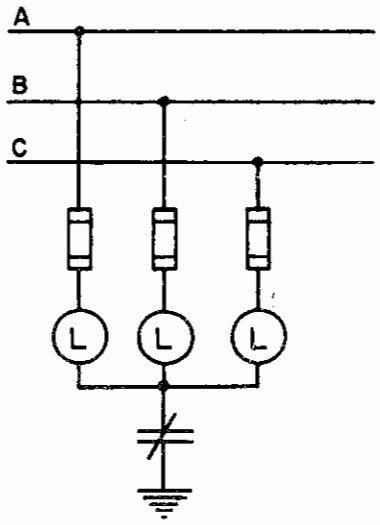


Figure 2. Three-phase, ungrounded

ground detector lamp ground connection must be opened to connect the voltmeter to ground.

Another method of ground detection employs an ohmmeter and a selector switch enabling it to be connected in turn to each line. The insulation resistance to ground can be read directly in ohms.

A variation of the ohmmeter detector is shown in figure 3. This method is used in ships built in certain foreign countries. The instrument can be supplemented by a relay to cause a signal immediately on reduction of the insulation resistance below a predetermined value.

In systems having a grounded neutral, ground detection is provided by an ammeter in the ground connection. (See figure 4.) The meter then indicates any current leaking to ground and returning through the ground connection. A problem in this method of ground detection is obtaining a meter that will not be damaged by full line-to-ground fault current

and at the same time indicate with some accuracy ground current of low value. To have comparable sensitivity to the 25 watt lamp detectors used in ungrounded systems the ammeter must have a noticeable meter movement for ground current changes in the order of 0.1 ampere. AIEE Standard 45 specifies a 0 to 10 ampere meter scale. Recent developments using a saturable core type current transformer have produced a meter for use on a.c. grounded systems that is not subject to damage from high current yet permits the observation of very low ground current.

From the typical types discussed above it is seen that ground detectors in general boil down to measuring by metering, lamps, relays, etc. a circuit impedance (or resistance when d.c. is employed) to ground. The energy source for this testing may be from the system itself or from a superimposed source. A switch is generally employed to increase sensitivity by comparison of the measurement with the "no ground" reading.

LOCATION OF GROUNDS

When the ground detection equipment shows that there is a ground on the distribution system the proper procedure is to take steps immediately to locate, isolate and eliminate the fault. Failure to act promptly to clear ground faults may result in loss of continuity of service in defective circuits. Also, the damage to insulation and equipment and the possibility of fire will be minimized if the fault is eliminated without delay thereby limiting any arcing or local heating incidental to the fault. Failure to act to clear the first ground indicated may also cause nuisance conditions to develop. It is much simpler to locate a single fault on a given circuit than a multiple fault and too, the trouble from interrupted circuits and services will be minimized if each and every ground is cleared without delay.

A lot of time, effort and frustration can be saved by an organized or systematic approach to the problem of locating a ground. The normal approach to clearing a ground fault is referred to as the "pull the switch" method of isolating the ground. The problem is actually not so awesome as it may sound to the uninitiated. This is due primarily to the fact that the great majority of grounds occur on circuits that can be interrupted with no great inconvenience; i.e., the lighting system. Instead of trying to guess where the fault is and spending a lot of time examining suspect units, it is more expedient to start at the switchboard and determine which feeder, when open, clears the ground. Knowing the feeder involved, the next step is to proceed to the next point of distribution. This is usually a lighting distribution panel. By using a megger or a magneto ringer and exploring the various branch circuits one at a time, the branch circuit involved may readily be determined. Once the trouble is narrowed down to a branch circuit, determine from the panelboard directory or otherwise the area served by that branch circuit and then look for portable equipment that may be plugged in. Portable equipment is subjected to considerable abuse from rough handling and factors involving the motions of the vessel often result in damage to the equipment or the supply cord. This makes this type of equipment a prime suspect for sources of ground faults. Assuming that the fault is not cleared by unplugging all portable equipment, the next orderly step is to open a branch or connection box at or near the center of the branch circuit and, again using the continuity test instrument, check in each direction to determine which half of the circuit embraces the fault. Continue this method of eliminating portions of the circuit until it is narrowed down to a small section or a few outlets where the fault can be pinpointed by observation or further testing.

In those rare cases where the ground is in the power distribution, the circuit involved is identified in the same manner, by opening the switches momentarily one at a time while watching the ground detector to see which switch, when open, clears the ground. In this case it is important that the operator know which motors have LVR or LVP type controllers in order that no vital machinery be stopped by the search for grounds. The majority of the circuits in the power distribution system can be interrupted momentarily without danger or causing any undue operational difficulty. Units in this category would be galley equipment, deck machinery, steering gear, and other LVR type controllers. LVP type circuits, such as the fuel oil service pump motor circuits, can be checked either by shifting operations to the duplicate unit or by having the personnel on watch maintain the start pushbutton depressed for the period the circuit is interrupted for test.

An observant operator can sometimes identify a grounded power circuit during normal operating procedure by noting a significant ground detector change when a certain switch is operated or a given motor is started or stopped.

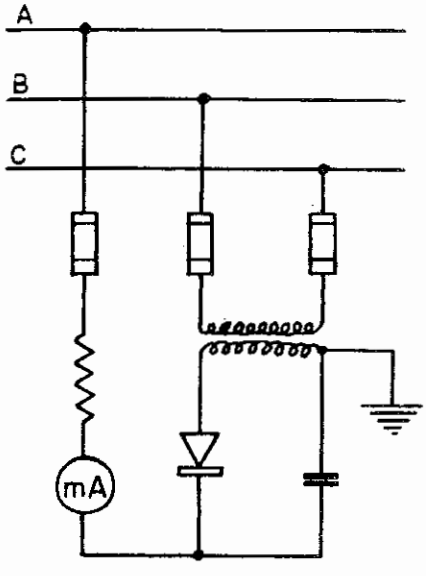


Figure 3. Three-phase, ungrounded

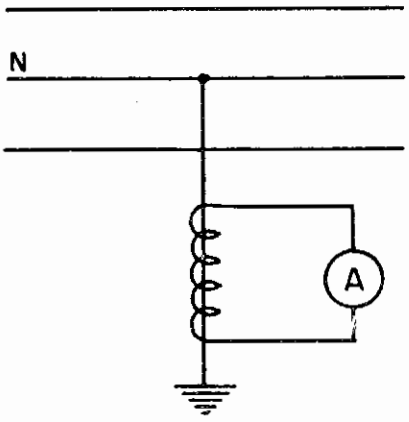


Figure 4. Single-phase, grounded neutral

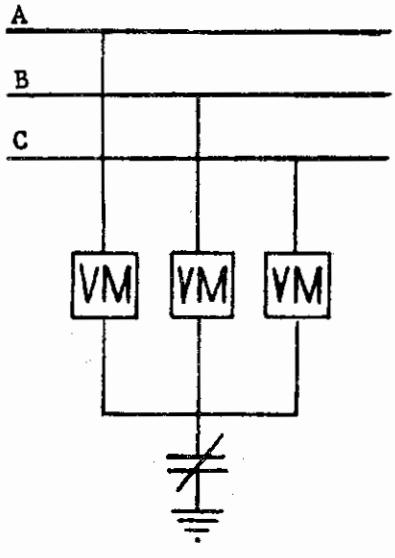


Figure 5. Three-phase, ungrounded

Once the power circuit having the fault is identified the usual procedure should be followed to determine the location of the fault in that circuit. This is somewhat easier in the case of motor branch circuits because the motor controller or starter provides a convenient place for isolating various portions of the motor and control circuitry.

Probably the most perplexing ground to locate and eliminate is one occurring on the generator or distribution bus. Obviously such a ground cannot be located by methods heretofore described. Such grounds are quite rare on installations where good housekeeping is practiced; however, they do sometimes occur. Ground indications caused by faults on switchboard instrument circuits will be exceptionally rare on most modern vessels because nearly all instruments are supplied through potential transformers that serve to isolate the instrument circuitry from the generator and distribution bus. In most cases any ground on any instrument circuit can be uncovered by checking into the reasons for erratic instrument functioning that generally accompany such fault conditions. When switchboards are deenergized and given a thorough inspection, cleaning, tightening of connections, meggering, etc., at least once a year there is very little likelihood of any appreciable difficulty from grounds in this area.

CONCLUSION

We conclude that lamps and meters usually provided for ground detection purposes are in fact more sensitive than generally accepted to be. A considerable amount of information may be gained by consistent regular studied use of such devices. This information is not difficult to obtain or interpret. Regular use of ground detectors with an understanding of the meaning of the varying indications together with proper follow-up can lead to improved continuity of service and a decrease in maintenance costs.

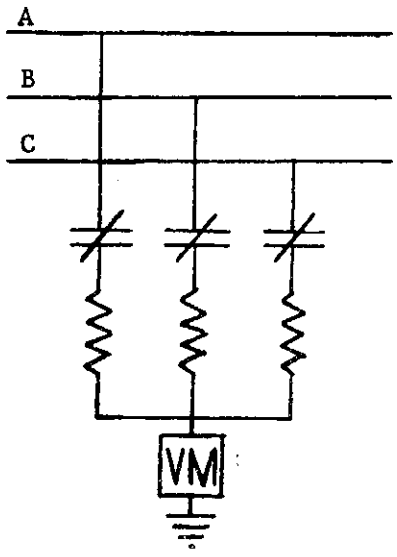


Figure 6. Three-phase, ungrounded

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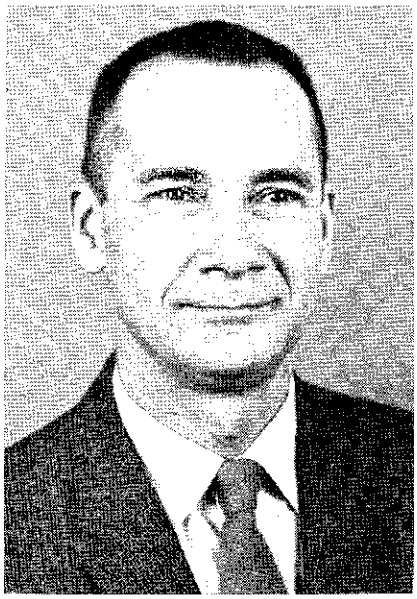
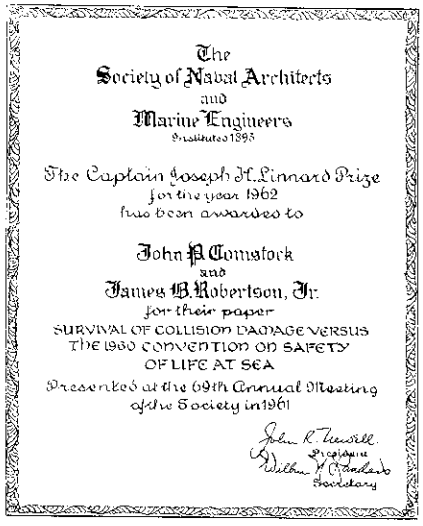
COAST GUARD NAVAL ARCHITECT HONORED



Mr. James B. Robertson, Jr., Technical Assistant to the Chief, Merchant Marine Technical Division of Coast Guard Headquarters, was among those honored by the Society of Naval Architects and Marine Engineers. Mr. Robertson and Mr. John P. Comstock, retired Naval Architect for Newport News Shipbuilding and Dry Dock Company, received the Captain J. H. Linnard Award for 1962.

This award is presented annually by the Society for the best paper contributed to the "Proceedings" of the Society. Mr. Robertson and Mr. Comstock were co-authors of "Survival of Collision Damage Versus the 1960 Convention on Safety of Life at Sea."

In their paper the authors outlined their belief that the Convention's assumption that a closer spacing of bulkheads will increase the probability of surviving collision damage is in error. The authors discuss in detail their contention that, in many cases, a closer spacing of bulkheads will reduce the probability of survival, and that what is required is an objective assessment of all the factors involved.


The Society of Naval Architects and Marine Engineers
Incorporated 1893

The Captain Joseph H. Linnard Prize
for the year 1962
has been awarded to

John P. Comstock
and
James B. Robertson, Jr.
for their paper
SURVIVAL OF COLLISION DAMAGE VERSUS THE 1960 CONVENTION ON SAFETY OF LIFE AT SEA
Presented at the 69th Annual Meeting of the Society in 1961

John R. Townsend
President
William H. Standard
Secretary

MARITIME SIDELIGHTS

The 132-year-old Navy Hydrographic Office has been renamed the Naval Oceanographic Office. The change was authorized on 10 July 1962 by Public Law 87–533.

⚓ ⚓ ⚓

The SS *Shirley Lykes* constructed at the Sparrows Point Shipyard of Bethlehem Steel has been delivered to Lykes Brothers Steamship Co. The 11,000-deadweight-ton vessel, the sixth of 12 freighters under construction for Lykes Brothers, will have a 21-knot-plus speed and will serve on trade routes out of gulf ports.

The *American Challenger,* newest cargo liner for United States Lines, recently set a new transatlantic speed record for vessels of her class. She crossed the Atlantic in 4 days 20 hours and 50 minutes. The time difference between the traditional departure and arrival points (Ambrose Lightship and Bishop's Rock) was only a day and a half behind the record time set by the SS *United States,* which holds a record for an Atlantic crossing. The *Challenger* set a top speed of 24.42 knots, which is exceeded only by liners such as the *United States,* the *Two Queens,* and the *France.*

⚓ ⚓ ⚓

Oceangoing vessels moving through the 11 major U.S. seaports during the first 6 months of 1962 amounted to 56,627. New York's share of the traffic was 23 percent (23.7 percent in 1961). Philadelphia ranked second with 12.3 percent (12 percent in 1961). Hampton Roads came third, followed in order by Baltimore, Los Angeles-Long Beach, New Orleans, San Francisco, Houston, Boston, Seattle, and Portland, Oreg.

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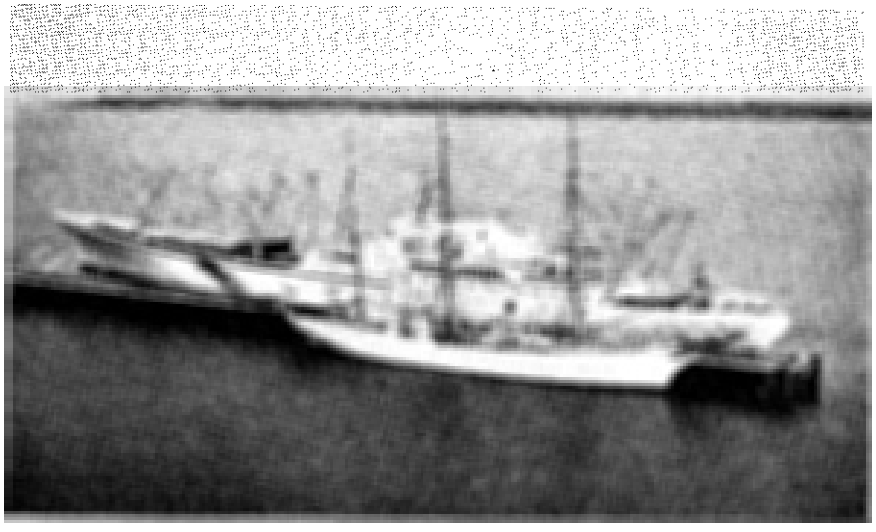
Six new oceanographic research vessels are being constructed for the U.S. Navy. By use of a new "bow propulsion" unit, it is planned that each of the vessels will be able to stay in an exact spot in the ocean without being required to anchor. The novel propulsion unit, designed and built by Western Gear Corp., consists of a propeller plus a Kort nozzle located beneath the bow area of each vessel. The unit can be swiveled through 360 degrees, and will be capable of being hydraulically raised or lowered.

STUDY IN CONTRAST



THE SQUARE-RIGGED sailing vessel *Eagle* shown alongside the *NS Savannah* docked at Yorktown, Va. The Coast Guard has issued certificates of inspection and safety to the world's first atom-powered merchant vessel.

The St. Lawrence Seaway Authority reports that the tonnage of cargo carried on the international waterway up to August 31, 1962, was greater than that for the corresponding period in 1961.

The authority, which operates the Canadian section of the seaway, said that 21,000,000 tons of cargo had passed through the Welland Canal since it opened this season in April, an increase of 12.1 percent over last year's total up to August 31.

Total tonnage for the period for the Montreal-Lake Ontario section was 15,000,000 tons this year, an increase of 8.4 percent.

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Work has commenced on the construction of the United States Lines' new pier 76 in the New York Harbor. The new pier, replacing two other piers which are more than 75 years old, will be 635 feet long, 300 feet wide, and will have a 20-foot apron on all water sides. The pier will be supported by approximately 6,200 piles.

The third of four new combination cargo-passenger liners, the *Santa Maria,* was launched at Bethlehem Steel Co.'s Sparrows Point yard for Grace Line recently.

The 547-foot ship, and her two sisterships, the *Santa Magdalena* and the *Santa Mariana* which are nearing completion at the yard, and a fourth as yet unnamed vessel, will operate from New York to Caribbean ports, Panama, the Canal Zone, Colombia and Ecuador on the South American West Coast.

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The newly created Texas Maritime Academy is now in operation with approximately 50 cadets undergoing instruction. The roster is expected to increase each term until the full complement of 200 students is obtained.

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The Coast and Geodetic Survey ship *Whiting* was launched recently at the shipyards of the Marietta Manufacturing Company, Point Pleasant, West Virginia.

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RENEWAL OF DECK OFFICERS' LICENSES

RULES OF THE ROAD EXERCISE
INLAND—INTERNATIONAL

Navigation and Vessel Inspection Circular 3–62 contains additional Rules of the Road questions to be answered by deck officers renewing their licenses. Questions from 3–62 will be reprinted in the PROCEEDINGS until all of them have been published.

RULES OF THE ROAD—INTERNATIONAL

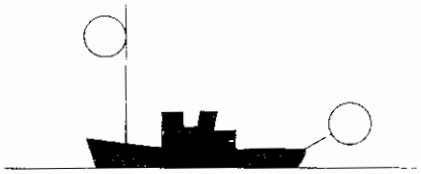
1. Vessels are deemed to be in sight of one another only when—
(a) one is observed from the other either visually or with radar
(b) one can be observed visually from the other
(c) there is no fog
(d) they can be observed on radar screens
(e) all of the above

2. The proposed annex of eight principles to the International Rules contains—
(a) recommendations to assist in the use of radar
(b) amendments to the steering and sailing rules
(c) preliminary definitions

3. If a close quarters situation is imminent, the most prudent action may be to take all the way off the vessel.
(a) true
(b) false

4. The two white lights displayed as sketched would indicate at night that the vessel is—
(a) not under command
(b) over 150 feet in length and is at anchor
(c) under 150 feet in length and is at anchor
(d) aground

(See Rule 11)



NOTE.—The correct answers to the first three questions can be ascertained by reading the proposed changes and annex to the Rules which were adopted at the 1960 International Convention for the Safety of Life at Sea. Such changes and annex are contained in U.S. Notice to Mariners No. 27, dated 8 July 1961, and in the enclosures to Navigation and Vessel Inspection Circular No. 5–61.

5. Vessels not under command shall display their side lights at all times while underway.
(a) true
(b) false

(See Rule 1 and Rule 4)

6. The term "short blast" means a blast having a duration of about—
(a) 1 second
(b) 2 seconds
(c) 3 seconds
(d) 4 seconds

(See Rule 1)

7. If you should hear while underway in fog three blasts in succession, namely a short blast, a prolonged blast, and a short blast, it should indicate to you a _____.
(a) vessel towing
(b) vessel not under command
(c) vessel towed
(d) vessel at anchor
(e) fishing vessel

(See Rule 15)

8. A vessel propelled by both sail and power is considered by the International Rules of the Road to be a sailing vessel.
(a) true
(b) false

(See Rule 1)

9. Which of the following signals would a vessel give simply to attract the attention of another vessel?
(a) three short blasts of the whistle
(b) a flareup light shown at intervals
(c) flames on the vessel
(d) two red lights in a vertical line
(e) a continuous sounding of the whistle

(See Rules 4, 12, 28, and 31)

10. When in sight of another vessel, a power-driven vessel should sound one short blast of the whistle when altering course to starboard.
(a) true
(b) false

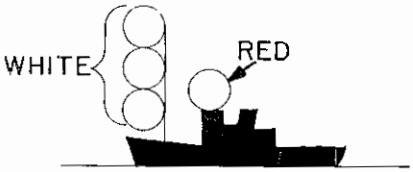
(See Rule 28)

11. Every vessel which is directed by the Rules to keep out of the way of another vessel shall, if the circumstances of the case admit, avoid crossing ahead of the other.
(a) true
(b) false

(See Rule 22)

12. If you should sight the lights of a towing vessel as sketched below, you would know she is towing—
(a) one vessel astern, length of tow over 600 feet
(b) more than one vessel alongside
(c) by pushing a vessel ahead
(d) more than one vessel astern, length of tow exceeds 600 feet
(e) two vessels astern, length of tow less than 600 feet

(See Rule 3)



13. At night you sight a vessel displaying a green light over a white light three points on your port bow. Seconds later you observe another vessel showing a red light over a white light three points on your starboard bow. You should ————.
(a) maintain course and speed as these vessels are not under command and therefore stopped
(b) keep clear since they are both power driven vessels engaged in trawling
(c) keep clear since they are both sailing vessels on opposite tacks

(See Rules 9 and 26)

14. The International Rules of the Road shall be followed by all vessels and seaplanes:
(a) upon international waters only
(b) upon the high seas and all inland waters

(c) upon the high seas and in all waters connected therewith navigable by seagoing vessels, except as provided in Rule 30

(d) upon the high seas and all waters connected therewith navigable by seagoing vessels, except the Great Lakes

(See Rule 1)

15. If you should sight the vessel displaying the lights as shown you would expect it to be—

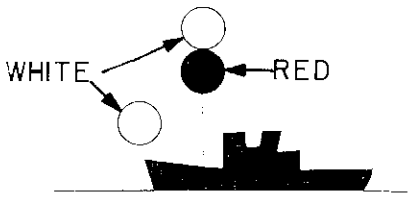
(a) a vessel fishing with her gear fast to a rock

(b) a vessel aground

(c) an anchored vessel laying cable

(d) a power-driven pilot vessel at anchor

(See Rules 4, 8, 9, and 11)



16. If you should sight the vessel displaying the lights as shown, you would expect it to be a—

(a) a fishing vessel anchored

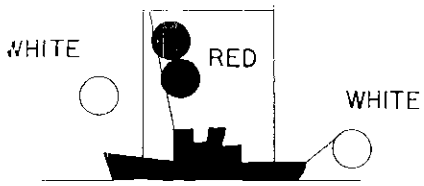
(b) a vessel over 150 feet in length aground

(c) a pilot vessel anchored

(d) an anchored vessel laying cable

(e) a vessel underway but not under command

(See Rules 4, 8, 9, and 11)



17. When a power-driven vessel and a sailing vessel are proceeding so as to involve risk of collision, the power-driven vessel shall keep out of the way except when—

(a) the sailing vessel is crossing from starboard to port

(b) the sailing vessel is crossing from port to starboard

(c) meeting head and head

(d) being overtaken by the sailing vessel

(e) the sailing vessel is running free

(See Rule 20)

18. If a power-driven vessel sounds two short blasts of the whistle, it signifies—

(a) her intention to alter course to port

(b) that she is altering course to port

(c) that she intends to overtake and pass a vessel on its starboard side

(d) a starboard to starboard passage in a meeting situation

(See Rule 28)

19. Whenever a power-driven vessel which, under the Rules, is to keep her course and speed, is in sight of another vessel and is in doubt whether sufficient action is being taken by the other vessel to avert collision, she may indicate such doubt by giving at least —— short and rapid blasts of the whistle.

(a) 2
(b) 3
(c) 4
(d) 5

(See Rule 28)

20. At sea through binoculars you sight a vessel ahead displaying the signal sketched from the triatic stay. You should ————.

(a) stay clear as the vessel is not under command

(b) stay clear as it is a cable layer

(c) render assistance, for the vessel is in distress

(d) dip your ensign when passing, for it is a man-of-war

(See Rule 31)

21. The General Prudential Rule would apply when meeting *all but one* of the following. To which one would it *not* apply?

(a) when more than one vessel is crossing your course on opposite headings

(b) when meeting a tug with a tow navigating in a strong current

(c) when meeting a vessel that is unable to maneuver in accordance with the rules

(d) when encountering a vessel engaged in laying a cable

(e) when a course change does not appear necessary in meeting a vessel starboard to starboard

(See Rule 27)

22. At sea you are on a power-driven vessel underway and making way in dense fog. The visibility is approximately one-third of a mile. You hear a fog signal of another vessel apparently forward of your beam and observe her in the radar screen three points on the port bow 1 mile distant. You put your engines full speed astern and simultaneously sound the whistle. Which of the following would be the correct signal?

(a) five or more short and rapid blasts

(b) a prolonged blast

(c) two prolonged blasts

(d) three short blasts to indicate the engines are going astern

(e) a prolonged blast and three short blasts with an interval between

(See Rules 15 and 28)

23. A long line of court decisions has established that a lookout is properly stationed when he is—

(a) in the crows nest

(b) as low down and as far forward as conditions will permit

(c) on the opposite wing of the bridge to the watch officer

(d) at the highest practicable point on the ship

(See Rule 29)

24. A power-driven vessel that is fishing with trolling (towing) lines shall show:

(a) only the lights prescribed for a power-driven vessel underway

(b) a white light at the masthead and a second light in the direction of the troll

(c) a tri-colored lantern over a white light

(d) three white lights in a vertical triangle

(See Rule 9)

25. Vessels less than 65 feet in length when engaged in trawling, by which is meant the dragging of a dredge net or other apparatus along or near the bottom of the sea, shall show in the daytime:

(a) a black ball forward

(b) a black conical shape apex upward

(c) a basket

(d) two black balls

(e) a square flag with a ball either above or below it

(See Rule 9)

RULES OF THE ROAD—INLAND

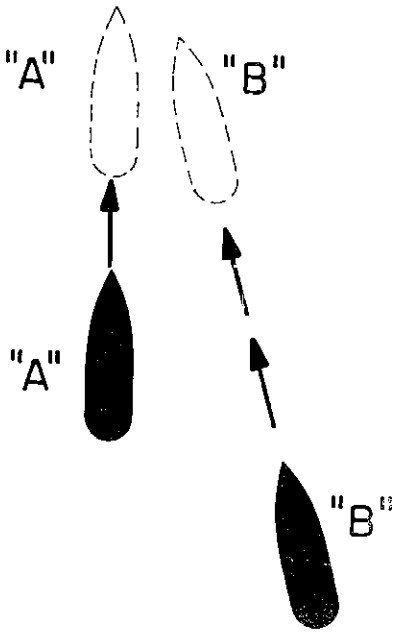
1. You are on vessel "A" and observe vessel "B" four points abaft your starboard beam. The bearing between the two subsequently alters as shown. You are ————.

(a) now the burdened vessel in a crossing situation

(b) now the privileged vessel in a crossing situation

(c) still privileged as in the original overtaking situation
(d) still burdened as in the original overtaking situation

(See Art. 24 and Pilot Rule 80.6)



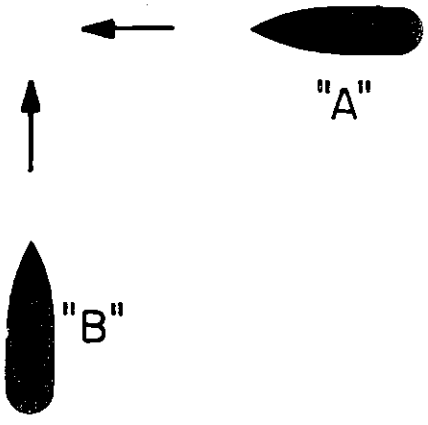
2. A horizontal line of amber lights crossing a channel a short distance above the water often indicates a pipeline
(a) true
(b) false

(See Pilot Rule 80.23)

3. Incorrectly answering a two blast signal with one blast, or incorrectly answering a one blast signal with two is known as—
(a) reverse signals
(b) turned signals
(c) danger signals
(d) cross signals

(See Pilot Rule 80.2)

4. In the situation sketched, one short blast by "A" indicates she is holding course and speed.

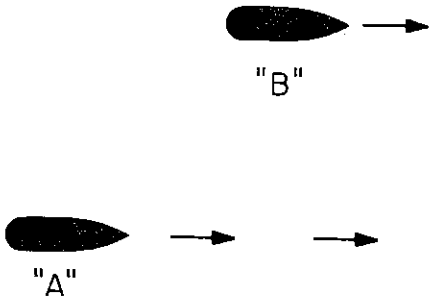


(a) true
(b) false

(See Pilot Rule 20.03)

5. You are on vessel "A" which is overtaking vessel "B." You must blow one short blast, and be answered by one short blast before attempting to pass.
(a) true
(b) false

(See Art. 18 and Pilot Rule 80.6)



6. At night you see a vessel outside the channel ahead showing a red light over a white light. You next see this vessel extinguish these lights and in lieu thereof, show a single white light. The vessel is probably a—
(a) fishing vessel observed from aft and no longer engaged in fishing
(b) vessel that was not under command and once again underway
(c) steam pilot vessel that has anchored
(d) sail vessel that was close hauled on the port tack and now running free

(See Arts. 2, 5, 8, and 9)

7. If you should observe from the bridge of your vessel two amber lights in a vertical line with or without a white light above it, you should identify it as _____.
(a) a Coast Guard vessel servicing an aid to navigation
(b) an opening in a pipeline
(c) a vessel towing by pushing ahead
(d) a dredge held stationary by spuds
(e) a pilot vessel at anchor

(See Arts. 3 and 8, also Pilot Rules 80.20, 80.23, and 80.33)

8. When passing a Coast Guard vessel servicing an aid to navigation, speed shall be sufficiently reduced to insure the safety of both vessels, and when passing within 200 feet of the Coast Guard vessel speed shall not exceed—
(a) 3 miles per hour
(b) 4 miles per hour
(c) 5 miles per hour
(d) 6 miles per hour

(See Pilot Rule 80.33a)

9. A vessel which should hold her course and speed in a crossing or overtaking situation is no longer privileged when action by both vessels is necessary to avoid collision.
(a) true
(b) false

(See Art. 27)

10. Failure to understand the course or intention of an approaching vessel should be indicated by—
(a) one short blast
(b) three short blasts
(c) not less than four short and rapid blasts
(d) one long blast

(See Art. 18 and Pilot Rule 80.1)

11. If your one blast signal is answered with two blasts, your next whistle signal should be—
(a) one blast
(b) two blasts
(c) the danger signal

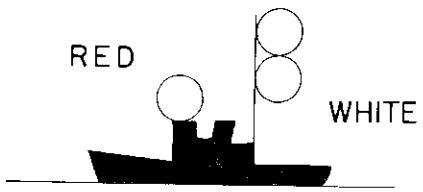
(See Pilot Rules 80.1 and 80.2; also Art. 18, rule iii)

12. In a narrow channel, power-driven vessels shall whenever safe and practicable stay in the middle.
(a) true
(b) false

(See Art. 25 and Pilot Rule 80.10)

13. The vessel sketched below is underway at night. From the lights displayed you would know she is:
(a) engaged in laying cable
(b) towing a vessel alongside or pushing ahead
(c) towing one or more vessels astern
(d) a pilot vessel underway on station

(See Art. 3)



14. If you heard a prolonged blast followed by two short blasts given on a *fog horn,* you should identify it as _____.
(a) a steam vessel towing
(b) a sailing vessel running free
(c) a vessel not under command
(d) a steam vessel underway but stopped
(e) a vessel being towed

(See Art. 15)

15. In fog, another vessel sounds two prolonged blasts of the whistle. You would identify this vessel as—
(a) a towing vessel
(b) a steam vessel underway with way on

(c) a steam vessel underway but stopped with no way on
(d) being at anchor
(e) none of the above as such a signal is not prescribed by the Inland Rules

(See Art. 15)

16. A steam vessel about to enter a fog bank hears, apparently forward of her port beam, the fog signal of another vessel the position of which is not ascertained. She shall—
(a) navigate with caution
(b) alter course to the left and pass astern of the other vessel
(c) Stop her engines and then navigate with caution
(d) sound whistle and maintain course and speed
(e) slow her engines to moderate speed and then navigate with caution

(See Art. 16)

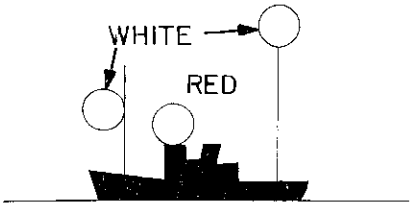
17. While passing over the lines of a floating plant working in a channel, a vessel's propelling machinery must be stopped.
(a) true
(b) false

(See Pilot Rule 80.27)

18. If the compass bearing of an approaching vessel on your starboard bow changes appreciably to the left, she will pass astern of you.
(a) true
(b) false

19. What change should the steam vessel sketched below make to her lights if she is broken down and underway at night in inland waters?
(a) turn off the range lights and hoist two all-around red lights
(b) hoist two red lights in addition to the lights shown
(c) put up two additional white lights on the foremast
(d) make no change as there is none prescribed

(See Art. 2)



20. Which two of the types of vessels listed would display the black signal sketched during the daytime?
(a) Coast and Geodetic Survey vessel at anchor in a fairway engaged in surveying
(b) self-propelled suction dredge underway and dredging
(c) a steamer towing a submerged object
(d) a vessel anchored and laying a cable
(e) a dredge held in stationary position by moorings or spuds
(1) both (a) and (b)
(2) both (a) and (c)
(3) both (c) and (e)
(4) both (b) and (d)

(See Pilot Rules 80.18, 80.20, 80.21, 80.22, and 80.33)

21. A vessel overtaking you blows two short blasts. You think it dangerous for her to pass. You should—
(a) blow one prolonged blast followed by two short blasts
(b) blow two short blasts
(c) blow three short blasts
(d) blow four or more short and rapid blasts
(e) ignore the signal until you deem it safe for the other vessel to pass

(see Art. 18, Rule viii, and Pilot Rule 80.6)

22. A vessel's engines are put full speed astern while backing from a dock into the channel. If, due to the height of the pier structure, she cannot observe a vessel approaching, she should give as a signal _____ of the whistle.
(a) one long blast
(b) three short blasts
(c) one long blast and three short blasts
(d) three short blasts and a prolonged blast

(See Arts. 18 and 28 and Pilot Rule 80.5)

23. A class "2" motorboat equipped with lights in accordance with section 3(b) of the motorboat Act of 1940 as amended would carry _____.
(a) 32 point white lights forward and aft, and fixed red and green side lights
(b) a combined lantern forward showing red and green and a 32 point white light
(c) a 20 point white light forward, 32 point white light aft, and fixed red and green side lights
(d) a 32 point white light aft and fixed side lights

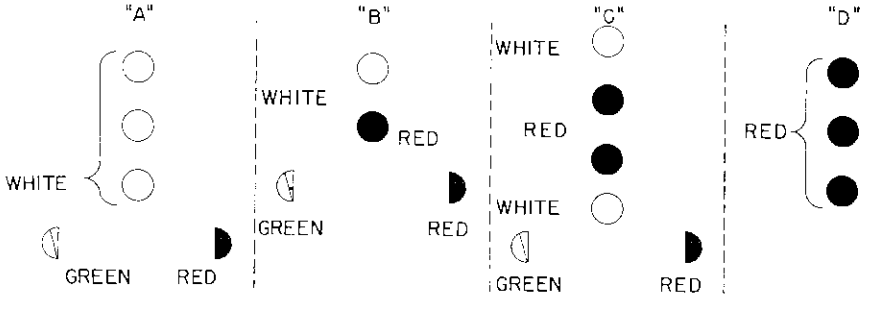
(See excerpts from act of April 25, 1940)

24. At night your vessel is being moved as a dead ship from one berth to another with the aid of three tugs. What navigation lights shall be displayed on your vessel?
(a) masthead, range, side lights and stern light
(b) masthead, range, side lights, two red lights in a vertical line and stern light
(c) two red lights in a vertical line, side lights and stern light
(d) side lights and stern light
(e) two red lights in a vertical line

(See Arts. 5 and 10)

25. Match the lights sketched with the class of vessel denoted.
__ (a) vessel towing a submerged object with no signal on tow
__ (b) steam pilot vessel underway on station
__ (c) vessel anchored and engaged in laying cable
__ (d) vessel towing one or more vessels astern

(See Arts. 3 and 8; also Pilot Rules 80.18 and 80.22)



TREASURY DEPARTMENT

UNITED STATES COAST GUARD

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

MVI
4 JUNE 1962

Commandant's Action
on
Marine Board of Investigation; structural failure and sinking of SS *Marine Merchant* on 14 April 1961, Gulf of Maine

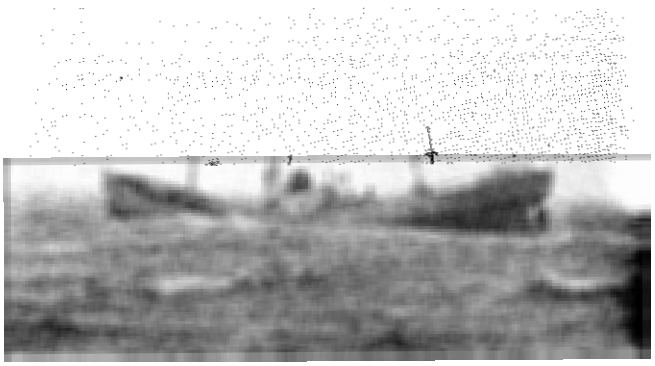
The record of the Marine Board of Investigation convened to investigate subject casualty, including its Findings of Fact, Opinions, Conclusions and Recommendations, has been reviewed.

At 2230, 13 April 1961, during heavy weather, the SS *Marine Merchant,* a Liberty-type freight vessel, while approximately 55 miles east of Portsmouth, N.H., suffered a transverse fracture of the hull amidships from sheer strake to sheer strake through the keel and ultimately foundered 11½ hours later. There was no loss of life or serious injury to any of the crew members.

The *Marine Merchant* was en route from Port Sulphur, La., to Portland, Maine, with 8,125 long tons of sulfur cargo loaded in numbers 2, 3, and 4 holds. Numbers 1 and 5 were empty. During the early hours of 13 April 1961, while proceeding on a northerly heading off Nantucket Shoals, weather and sea conditions progressively worsened and by 0800 heavy seas were beginning to break over the starboard side, main deck. Speed was gradually reduced to prevent pounding. The storm reached gale proportions at about noon and the vessel was rolling heavily in an easterly swell. At about 1700 the vessel hove to in an effort to ease the force of breaking seas and shaft revolutions were maintained at the minimum necessary to hold the desired headings. By 2000 on 13 April, major storm conditions prevailed. Seas had become extremely adverse; the wind was logged at force 10 and was accompanied by rain, snow, sleet and fog.

At about 2230, while the vessel was still hove to approximately 40 miles southeast of Portland Lightship, with the engine turning 32 RPM, a loud report was heard followed by an appreciable settling of the vessel amidships. Realizing that the vessel had suffered a major structural failure the engine was stopped, the general alarm was sounded, the radio officer was instructed to send an S O S and the crew was directed to prepare and swing out the boats. The sending of the S O S was delayed when it was learned that the sagging condition of the vessel had caused the antenna to slacken and ground out on the radar scanner. After rigging an emergency antenna, an auto-alarm signal was transmitted on the distress frequency. The Coast Guard Radio Station, Boston, Mass., and several merchant vessels responded but the closest vessel was at least 5 or 6 hours away. In the meantime it was determined that the vessel had sustained a complete fracture of the sides and underbody just forward of the forward part of number 3 hatch coaming at about frame 73. The two halves were joined solely by the main deck plating which, though working with the seas, appeared to be holding. Due to the severe weather and sea conditions then prevailing the master elected to delay abandonment of the vessel as long as possible with the hope the halves would remain joined until daylight.

With the coming of daylight wind and sea conditions moderated somewhat. At about 0430, 14 April, the SS *Daru* and the SS *Esso Raleigh* were in the area and since the vessel's sagging condition had increased dangerously



during the previous hour, the master ordered the vessel abandoned. Fires to the boilers were secured. Life nets, Jacob's ladders, and mattresses had previously been rigged over the side and since the vessel was nearly on an even keel, no difficulty was encountered in lowering away the two lifeboats. Number 2 boat was on the lee side and was lowered away first and held alongside with 8 or 10 men aboard. The number 1 boat was then lowered with 9 men aboard, but because she was on the weather side she had to be cast off to keep from being stove in. The remaining crew then disembarked into number 2 boat. Before departing the vessel, the Radio Operator locked the radio transmitter key in the "on" position on the distress frequency.

The crew members in the number 1 boat were picked up by the SS *Daru* and those in number 2 were picked up by the *Esso Raleigh.*

At 0910, 14 April, the vessel sank in 115 fathoms of water.

The Board took notice of the courage and unselfish regard for others displayed by Jose Aragao, Z–673131–D1, Fireman/Watertender, who, because he had no dependents, remained on watch in the engineering spaces from the time the vessel fractured until ordered abandoned rather than let some other crew member risk his life.

REMARKS

The Board concluded that the vessel broke in two primarily due to the coincidence of three factors:

1. The inherent weakness incident to structural notch sensitivity common to welded vessels of this class;

2. Stresses occasioned by extremely adverse sea conditions; and

3. The sagging strain developed by the stress of cargo concentrated in the midbody of the vessel.

The reported air temperature of 37° was lower than the reported sea temperature of 44° yet the deck behaved very ductilely and acted as a plastic hinge for some time

after the fracture of the rest of the hull. Although the main hull fracture obviously proceeded very rapidly, i.e., suddenly, it appears from these facts that the fracture may have been predominantly ductile. Accordingly, the opinion by the Board that an inherent weakness incident to structural notch sensitivity was a factor does not appear to be supported. Sea conditions unquestionably contributed to the casualty to some degree but it is considered that the third factor, that is, the extremely unfavorable loading distribution was actually the principal cause of the fracture. Calculations indicate this was such as to result in a probable maximum wave sagging bending moment about 4 times that which would have been developed with homogeneous loading. The concentration of cargo in holds 2, 3, and 4 also resulted in an excessive unit loading on the tank tops. In the number 3 hold, where the fracture occurred, the average unit loading on the tank top was almost 1 ton per square foot, about 1.8 times that corresponding to full homogeneous loading and in excess of the maximum loading recommended by the Manual on the "Stowage of Bulk Cargoes Such as Ore, Ore Concentrates, and Similar Cargoes When Carried in General Cargo Vessels," issued by the National Cargo Bureau and referred to in 46 CFR 97.12, which in turn, requires that the owners of such vessels carrying bulk cargoes shall furnish their masters with guidance information pertaining to the safe stowage of these cargoes. The testimony indicates that the vessel apparently did have loading instructions but that these may have dealt with cargo distribution only from the viewpoint of efficient stevedoring, and of providing for possible taking on of another cargo at an intermediate port.

The Board also concluded that the vessel's prior history of groundings, her age, and the sea water temperature may have contributed to the fracture, and further, that the previous groundings and storms encountered during her career could conceivably have resulted in a structural weakness which was not evident prior to sailing. While these opinions are speculative and not specifically supported by any evidence in the record, it is agreed that they do present possibilities and to that extent are generally concurred in subject to some reservation as to the part played by the sea water temperature which was discussed in paragraph 1 above.

The Board's conclusion that the fracture started at or near the turn of the bilge is not particularly supported by the data; however, it is obvious that it started somewhere in the bottom.

The Board's opinion that the omission of cargo in numbers 1 and 5 holds though commonly practiced in the interests of efficiency is not deemed advisable, is considered correct. This principle applies generally to all vessels, not just welded vessels of this class. However, it should be noted that such loadings, at sufficiently less than full cargo dead weight, can be safely carried if the end tanks are ballasted.

The Board was of the further opinion that there was no evidence of imprudent seamanship, negligence, or other personnel failure having caused or contributed to this casualty. To the extent that the reason for proceeding to sea with no cargo in holds 1 and 5 was not clearly established in the record, it is agreed that no charge of negligence or lack of knowledge is assertible in this case; however, it is considered that this casualty clearly establishes the need for understanding the principles relating to safe distribution of bulk cargo in general cargo carriers. Acting on the report of the Marine Board of Investigation into the foundering of the barge *Arizona Sword* on 13 January 1961, with a cargo of sulfur, the Merchant Marine Council was requested to initiate a study to determine the sufficiency of present regulations as they apply to vessels carrying cargoes of a corrosive nature, taking into account also the effect of cargo density and distribution, and to make appropriate recommendations in the premises. Since the same factors appear to have been present in this case, this report will also be referred to the Merchant Marine Council for consideration as a part of that study.

The commendatory conduct on the part of Mr. Jose Aragao, Fireman/Watertender, will be referred to the Maritime Administration for possible consideration by the Merchant Marine Board of Awards.

Action with respect to the Board's recommendation for letters of appreciation to the SS *Daru* and SS *Esso Raleigh* for the assistance they rendered in this case will be taken.

With respect to the Board's recommendation that consideration be given to the advisability of requiring all welded vessels to be equipped with an auxiliary radio transmitter antenna, since radio installations are required by statutes and regulations under the cognizance of the Federal Communications Commission, a copy of this report will be referred to that agency for information and such action as they may deem appropriate. It would appear however that if the recommendation is valid for welded vessels, it would be equally justified for vessels of other construction.

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

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

ACCEPTABLE HYDRAULIC CAST ALUMINUM VALVES

Hydraulic cast aluminum valves which have passed high impact shock test and have been accepted under the provisions of 46 CFR 55.07–1(e)(3).

Manufacturer	Type	Identity	Maximum allowable pressure (p.s.i.)
Gabrial Valve Div., The Gabrial Co., 1115 E. 152d St., Cleveland 10, Ohio	3-way valve	100407	300
	do	100166	1,500
	4-way valve	100128	150
	do	100173	1,500
	do	100418	300
	do	100487	2,000
Republic Mfg. Co., 15655 Brookpark Rd., Cleveland 35, Ohio	2-way selector valve	*8611-3/8HD*****	3,000
	4-way selector valve	*8611-1/2HD*****	3,000
		*8641-3/8HD*****	3,000
		*8641-1/2HD*****	3,000
		*8651-3/8HD*****	3,000
		*8651-1/2HD*****	3,000

Note the asterisks (*) in the valve model number indicate letter and/or number combinations which may be added to indicate variances in the valves which do not affect the accepted aluminum body.

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 9–62

OCTOBER 31, 1962

SUBJ: LIQUEFIED COMPRESSED GAS CARGO HOSE

PURPOSE

To establish the administrative procedures for determining that a liquefied compressed gas cargo hose is in compliance with the applicable Coast Guard regulations.

DEFINITIONS

For the purpose of this circular, liquefied compressed gas is meant to include liquefied inflammable gas (including liquefied petroleum gas), anhydrous ammonia, and chlorine.

DISCUSSION

46 CFR 38.15–5, 98.20–65, and 98.25–80 establish requirements for cargo hose carried aboard vessels subject to Coast Guard inspection for handling liquefied inflammable gas, chlorine, and anhydrous ammonia respectively. Acceptance of cargo hose is made by the Officer in Charge, Marine Inspection, having cognizance of the vessel, when he determines that the regulations have been complied with. To aid in this acceptance, the Commandant will issue a letter to a manufacturer indicating that his cargo hose complies with the design requirements established by applicable regulations.

ACTION

a. To obtain a letter of acceptance from the Commandant, the manufacturer shall submit,

(1) Details of the hose carcass, the method of connecting the end fittings, and a list of materials used.

(2) A certified test report indicating that a prototype sample of each size hose intended for marine service has been subjected to a hydrostatic pressure test of not less than five times the maximum allowable pressure.

(3) A list of the cargoes the hose is designed to handle.

b. In lieu of obtaining a letter of acceptance, the manufacturer may furnish the Officer in Charge, Marine Inspection having cognizance of the vessel such information as he may require to ascertain that the cargo hose complies with the applicable regulations.

c. Regardless of which procedure is followed, each completed hose assembly, with all the necessary fittings attached, shall be hydrostatically tested by the manufacturer to not less than twice the design pressure and marked with the maximum pressure guaranteed by him (46 CFR 38.15–5(d), 98.20–65(c), and 98.25–80(c)). It is to be noted the following design pressures are prescribed for the indicated commodities:

(1) L.P.G. (propane)_____ 250 p.s.i.
(2) Chlorine_____ 300 p.s.i.
(3) Anhydrous Ammonia_____ 250 p.s.i.

(4) For other liquefied compressed gas, either the maximum setting of the safety relief valve protecting the tank, or the maximum setting of the vapor compressor or discharge pump relief valve, whichever is greater.

d. Final acceptance of cargo hose is made by the Officer in Charge, Marine Inspection having cognizance of the vessel, when he determines that:

(1) The cargo hose complies with the applicable regulations,

(2) The pressure rating is correct for the service, and

(3) The installation is satisfactory.

Effective Date. Upon receipt.

AMENDMENTS TO REGULATIONS

[EDITOR'S NOTE.—The following regulations have been promulgated or amended since the last issue of the PROCEEDINGS. A complete text of the regulations may be found in the Federal Register indicated at the end of each article. Copies of the Federal Register containing the material referred to may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.]

Title 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

SUBCHAPTER E—LOAD LINES

[CGFR 62-35]

ESTABLISHING COASTWISE LOAD LINES, PENALTY PROCEDURES, LIABILITY FOR SURVEYS, AND CONTROLS

The Act of August 31, 1962 (Public Law 87–620, 70 Stat. 415, 416), further amended the load line act of March 2, 1929 (46 U.S.C. 85–85g), and the Coastwise Load Line Act, 1935, (46 U.S.C. 88–88i), relating to the load lines. This act amended the laws governing load lines for merchant vessels of 150 gross tons or over to:

1. Prohibit the operation of all such vessels in an overloaded condition on the United States coastal waters or on the Great Lakes, coming within the jurisdiction of the United States, which is in addition to previous prohibitions.

2. Prohibit the operation of United States vessels in an overloaded condition on the high seas.

3. Extend the application of all fines and penalties to foreign vessels which arrive within the jurisdiction of the United States and violate either load line act or regulations prescribed thereunder, which is in addition to those applicable to such vessels which depart from a port or place within the United States or her possessions for violations of the load line acts or regulations prescribed thereunder.

4. Increase the monetary penalties from $100 to $500 for failure to make correct log entries; from $500 to $1,000 whenever the vessel is operated, navigated or otherwise used in violations of the load line acts; from $500 to $1,000 for overloading plus an additional penalty of $500 for each inch of draft overloaded; and the fines from $500 to $1,000 for violating an order of detention, and from $1,000 to $2,000 for knowingly permitting or causing a change in the load line markings in violations of the load line acts; as well as to state that each day a vessel is in violation shall constitute a separate offense.

5. Specify that Coast Guard District Commanders, as well as Collectors of Customs, are authorized to detain merchant vessels if they believe such vessels are overloaded and to

have such vessels submitted to survey and examination by independent surveyors with respect to their loading; and if a vessel is found to be in violation of the applicable load line act and regulations prescribed thereunder then the costs of the survey shall be borne by the owners and agents.

6. Strike from the Coastwise Load Line Act, 1935, the reference to the International Load Line Convention, 1930, and thus permit deeper loadings for vessels in the coastwise trade than those permitted by the Convention so long as the increases do not render the vessels unsafe or the voyages are not subject to the provisions of the International Load Line Convention, 1930.

7. Provide for administrative assessment, collection, remission and mitigation of any monetary penalties imposed under either load line act.

The changes made in the load line acts by the Act of August 31, 1962 Public Law 87-620) became effective on the date of approval, i.e., August 31, 1962. However, the permission for deeper loadings for vessels in the Coastwise or intercoastal trade and subject only to the Coastwise Load Line Act, 1935, as amended, must be in accordance with the load line rules and regulations.

With respect to permitting domestic vessels to avail themselves of the changes which would let them load deeper in the winter seasons, it was pointed out at the April 19, 1962, hearings conducted by the Committee on Commerce of the United States Senate that the legislative changes are based on information that the United States Load Line Committee approved in December 1959 after considering supporting data furnished by Government agencies and the shipping industry. This information is a part of the official position of the United States Government looking towards a new conference on load lines. As the winter season in some areas commences on November 1 each year, the American Merchant Marine Institute and the Pacific American Steamship Association, representing between them a major portion of shipping under the United States flag, urged adoption of the amendments to section 2 of the Coastwise Load Line Act, 1935 (46 U.S.C. 88a), as promptly as possible because these changes have been long overdue.

The amendments in this document revise the load line regulations to reflect changes necessary to carry out the provisions of the Act of August 31, 1962 (Public Law 87-620). The changes in 46 CFR 43.01-1, 43.01-5, 43.01-10, 44.01-1, 45.01-1, 45.01-5, 45.01-10, 46.01-5, 46.01-10, and 46.01-15 bring up to date descriptions of the authority for load lines, application, and administration. Included in these changes are also several interpretations or statements of policy concerning requirements for load lines. The penalty provisions as amended in Title 46, U.S. Code, sections 85g(a) and 88g(a), state in part "The owner and/or master of any vessel subject to this Act and the regulations established thereunder shall be liable to the United States in a penalty not to exceed $1,000 whenever the vessel is found operating, navigating, or otherwise in use upon the navigable waters of the United States in violation of the provisions of this Act or regulations established thereunder, or whenever the vessel, if a vessel of the United States, is found operating, navigating, or otherwise in use upon the high seas in violation of the provisions of this Act or the regulations established thereunder." These provisions when read in conjunction with Title 46, U.S. Code, section 85, 88, or 88a, describing vessels applicable to these laws, in effect prohibit the operation of all merchant vessels of 150 gross tons or over in an overloaded condition on the United States' coastal waters or on the Great Lakes, and coming within the jurisdiction of the United States, and the operation of such United States' vessels in an overloaded condition on the high seas. For the purpose of the load line regulations in 46 CFR Parts 43 to 46, inclusive, the following rulings, applicable to merchant vessels of 150 gross tons or over, are made or reaffirmed:

a. Vessels which engage in voyages from a port or place in the United States (including Alaska and Hawaii) to another port or place in the United States, or between ports or places in the same U.S. possession, and during such voyages pass outside the line dividing inland waters from the high seas are subject to the Coastwise Load Line Act.

b. Vessels which engage in voyages from a port or place in the United States on the Atlantic Coast or Coast of Gulf of Mexico to a port or place in the United States on the Pacific Coast (including Alaska and Hawaii), or vice versa (intercoastal voyages), are subject to the Coastwise Load Line Act.

c. Vessels which engage in voyages from one port or place in the United States to a port or place in a possession, or vice versa, or between ports or places in two different U.S. possessions, and pass outside the line dividing inland waters from the high seas are subject to the Coastwise Load Line Act, and the International Load Line Convention 1930, and on such voyages shall be in compliance with requirements for foreign voyages.

d. Vessels which engage in voyages from a port or place in the United States or her possessions which pass outside the line dividing inland waters from the high seas, and navigates on the high seas, and then returns to the same port or place are subject to the Coastwise Load Line Act.

e. Vessels which engage in foreign voyages and pass outside the line dividing inland waters from the high

ACCEPTABLE COVERED STEEL ARC WELDING ELECTRODES

The following are additions to the list of electrodes which are acceptable to United States Coast Guard for use in welded fabrications.

Distributors and/or manufacturers	Brand	AWS Class	Operating positions and electrode sizes (inches)				
			3/32 and smaller	1/8	5/32	3/16	5/16
Hobart Brothers Co., Troy, Ohio	Rocket LH718	E6018, E7018	1	1	1	1	

seas are subject to the Act of March 2, 1929, and the International Load Line Convention, 1930, and on such voyages shall be in compliance with requirements for foreign voyages.

f. Vessels which engage in voyages from a port or place in the United States to another port or place in the United States but during such voyages stop at a foreign port or place (the Canal Zone excluded) are considered to be on foreign voyages and subject to the requirements for such voyages.

New sections designated 46 CFR 43.01–13, 45.01–13, and 46.01–20 describe the penalties for violations of the load line acts as amended by the Act of August 31, 1962 or regulations prescribed thereunder.

The changes to the load line regulations designated 46 CFR 43.05–15, 43.15–87, 43.30–1, 43.30–75, and 43.40–10, as set forth in this document, are to permit:

i. Domestic vessels to display coastwise load line marks abaft the disk when authorized to load deeper than permitted by the marks assigned under International Load Line Convention, 1930.

ii. Domestic vessels to carry an additional coastwise load line certificate, Form C4, when authorized to display load line marks abaft the disk.

These changes give effect to the load line proposals adopted by the United States Load Lines Committee. For vessels 400 feet in length and over, the revised regulations are in complete agreement with such proposals. For vessels between 300 feet and 400 feet in length, the revised regulations are in partial agreement with such proposals. For vessels 300 feet and under in length, no change was made in the regulations based on such proposals. These changes are limited in scope and may be applied only to certain vessels which may be engaged in voyages between the ports of the continental United States and/or Alaska and/or Hawaii, and do not call at foreign ports or at the ports of United States possessions during such voyages.

These changes are made effective on the date of publication and without compliance with the rule-making procedures because (A) they give effect to proposals which had been previously adopted as an official United States position for international negotiations after consideration of supporting data furnished by the shipping industry and Government agencies; and (B) the date for the change from summer marks to the winter marks in the North Atlantic Ocean is November 1st; therefore, there is little time for accomplishment of the review of vessels, remarking and re-certificating, which are necessary before qualified vessels may be assigned coastwise load lines, if such vessels are to obtain any benefit from the passage of Public Law 87–620 during the current winter season.

The changes designated 46 CFR 43.01–40, 43.01–45, 43.01–75, 43.01–80, 43.01–90, 43.01–95, 45.01–80 and 46.01–20 are primarily editorial to either bring references up to date, or to clarify the regulations by rearrangements of requirements.

(Federal Register of November 14, 1962.)

Title 33—NAVIGATION AND NAVIGABLE WATERS

Chapter I—Coast Guard, Department of the Treasury

SUBCHAPTER L—SECURITY OF WATERFRONT FACILITIES

[CGFR 62–39]

PART 125—IDENTIFICATION CREDENTIALS FOR PERSONS REQUIRING ACCESS TO WATERFRONT FACILITIES OR VESSELS

U.S. Coast Guard Port Security Cards

It is hereby found that compliance with the notice of proposed rule making, public rule making procedures thereon, and effective date requirements of the Administrative Procedure Act is contrary to the public interest since this amendment of 33 CFR Part 125 is to give effect to Executive Order 10173, as amended, and in the public interest should be placed in effect as soon as possible.

By virtue of the authority vested in me as Commandant, United States Coast Guard, by Executive Order 10173, as amended, § 125.17 is amended to read as follows; and shall become effective upon date of publication in the FEDERAL REGISTER:

§ 125.17 Persons eligible for Coast Guard Port Security Cards.

(a) Only the following persons may be issued Coast Guard Port Security Cards:

(1) Persons regularly employed on vessels or on waterfront facilities.

(2) Persons having regular public or private business connected with the operation, maintenance, or administration of vessels, their cargoes, or waterfront facilities.

(b) A holder of a Merchant Mariner's Document, Validated for Emergency Service, shall not be issued a Port Security Card, unless he surrenders the Merchant Mariner's Document to the Coast Guard. In this connection see § 125.09.

(40 Stat. 220, as amended; 50 U.S.C. 191; E.O. 10173, 15 F.R. 7005, 3 CFR, 1950 Supp.; E.O. 10277, 16 F.R. 7537, 3 CFR, 1951 Supp.; E.O. 10352, 17 F.R. 4607, 3 CFR, 1952 Supp.)

Dated: November 6, 1962.

[SEAL] D. McG. MORRISON,
Vice Admiral, U.S. Coast Guard,
Acting Commandant

[F.R. Doc. 62–11355; Filed, Nov. 14, 1962; 8:51 a.m.]

EQUIPMENT APPROVED BY THE COMMANDANT

[EDITOR'S NOTE.—Due to space limitations, it is not possible to publish the documents regarding approvals and terminations of approvals of equipment published in the Federal Register dated November 22, 1962 (CGFR 62–37) and Federal Register dated November 24, 1962 (CGFR 62–40). Copies of these documents may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.]

ARTICLES OF SHIPS' STORES AND SUPPLIES

Articles of ships' stores and supplies certificated from 1 November to 30 November 1962, inclusive, for use on board vessels in accordance with the provisions of Part 147 of the regulations governing "Explosives or Other Dangerous Articles on Board Vessels" are as follows:

CERTIFIED

Orb Industries, Inc., P.O. Box 589, Media, Pa., No. 52, dated 14 November 1962, TEECO INSECT SPRAY or ORB #207 INSECT SPRAY.

AFFIDAVITS

Sawhill Tubular Products Inc., P.O. Box 11, Sharon, Pa., PIPE AND TUBING. *Fischer and Porter Co.*,[1] Warminister, Pa.

Jordon Valves.[2] Division of Richards Industries, Inc., Helen & Blade Sts., Cincinnati 16, Ohio.

[1] Presently listed for VALVES AND FITTINGS, but the company desires new address to be shown as listed herein.

[2] Presently listed for VALVES, but the company desires new address to be shown as listed herein.

MERCHANT MARINE SAFETY PUBLICATIONS

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

CG No.	TITLE OF PUBLICATION
101	Specimen Examination for Merchant Marine Deck Officers (7–1–58).
108	Rules and Regulations for Military Explosives and Hazardous Munitions (8–1–62).
115	Marine Engineering Regulations and Material Specifications (2–1–61). F.R. 9–30–61, 9–11–62.
123	Rules and Regulations for Tank Vessels (1–2–62). F.R. 5–2–62, 9–11–62.
129	Proceedings of the Merchant Marine Council (Monthly).
169	Rules of the Road—International—Inland (6–1–62).
172	Rules of the Road—Great Lakes (6–1–62). F.R. 8–31–62.
174	A Manual for the Safe Handling of Inflammable and Combustible Liquids (7–2–51).
175	Manual for Lifeboatman, Able Seamen, and Qualified Members of Engine Department (9–1–60).
176	Load Line Regulation (9–1–61). F.R. 7–27–62, 11–14–62.
182	Specimen Examinations for Merchant Marine Engineer Licenses (12–1–59).
184	Rules of the Road—Western Rivers (6–1–62).
190	Equipment Lists (4–1–60). F.R. 6–21–60, 8–16–60, 8–25–60, 8–31–60, 9–21–60, 9–28–60, 10–25–60, 11–17–60, 12–23–60, 12–24–60, 5–2–61, 6–2–61, 6–8–61, 7–21–61, 7–27–61, 8–16–61, 8–29–61, 8–31–61, 9–8–61, 9–9–61, 10–18–61, 11–3–61, 11–18–61, 12–12–61, 2–9–62, 2–17–62, 3–15–62, 4–17–62, 4–25–62, 5–17–62, 5–25–62, 7–24–62, 8–4–62, 8–11–62, 9–11–62, 10–4–62, 10–30–62, 11–22–62, 11–24–62.
191	Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel (6–1–62). F.R. 10–4–62.
200	Marine Investigation Regulations and Suspension and Revocation Proceedings (7–1–58). F.R. 3–30–60, 5–6–60, 12–8–60, 7–4–61, 5–2–62, 10–5–62.
220	Specimen Examination Questions for Licenses as Master, Mate, and Pilot of Central Western Rivers Vessels (4–1–57).
227	Laws Governing Marine Inspection (7–3–50).
239	Security of Vessels and Waterfront Facilities (8–1–61). F.R. 12–12–61, 8–8–62, 8–31–62, 11–15–62.
249	Merchant Marine Council Public Hearing Agenda (Annually).
256	Rules and Regulations for Passenger Vessels (1–2–62). F.R. 5–2–62, 9–11–62.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (3–2–59). F.R. 4–25–59, 6–18–59, 6–20–59, 7–9–59, 7–21–59, 9–5–59, 5–6–60, 5–12–60, 10–25–60, 11–5–60, 11–17–60, 12–8–60, 12–24–60, 7–4–61, 9–30–61, 10–25–61, 12–13–61, 5–2–62, 9–11–62.
258	Rules and Regulations for Uninspected Vessels (9–1–62). F.R. 1–20–62, 4–24–62, 5–2–62, 9–11–62.
259	Electrical Engineering Regulations (12–1–60). F.R. 9–30–61, 9–23–61, 5–2–62, 9–11–62.
266	Rules and Regulations for Bulk Grain Cargoes (5–1–62). F.R. 9–11–62.
268	Rules and Regulations for Manning of Vessels (9–1–60). F.R. 5–5–61, 6–28–61, 12–16–61.
269	Rules and Regulations for Nautical Schools (3–1–60). F.R. 3–30–60, 8–18–60, 11–5–60, 7–4–61, 9–30–61, 12–13–61, 5–2–62, 9–11–62.
270	Rules and Regulations for Marine Engineering Installations Contracted for Prior to July 1, 1935 (11–19–52). F.R. 12–5–53, 12–28–55, 6–20–59, 3–17–60.
293	Miscellaneous Electrical Equipment List (6–1–62).
320	Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf (10–1–59). F.R. 10–25–60, 11–3–61, 4–10–62, 8–31–62.
323	Rules and Regulations for Small Passenger Vessels (Not More Than 65 Feet in Length) (6–1–61). F.R. 9–11–62.
329	Fire Fighting Manual for Tank Vessels (4–1–58).

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CHANGES PUBLISHED DURING NOVEMBER 1962

The following have been modified by Federal Registers:
CG–176, Federal Register, November 14, 1962.
CG–190, Federal Registers, November 22, and November 24, 1962.
CG–239, Federal Register, November 15, 1962.

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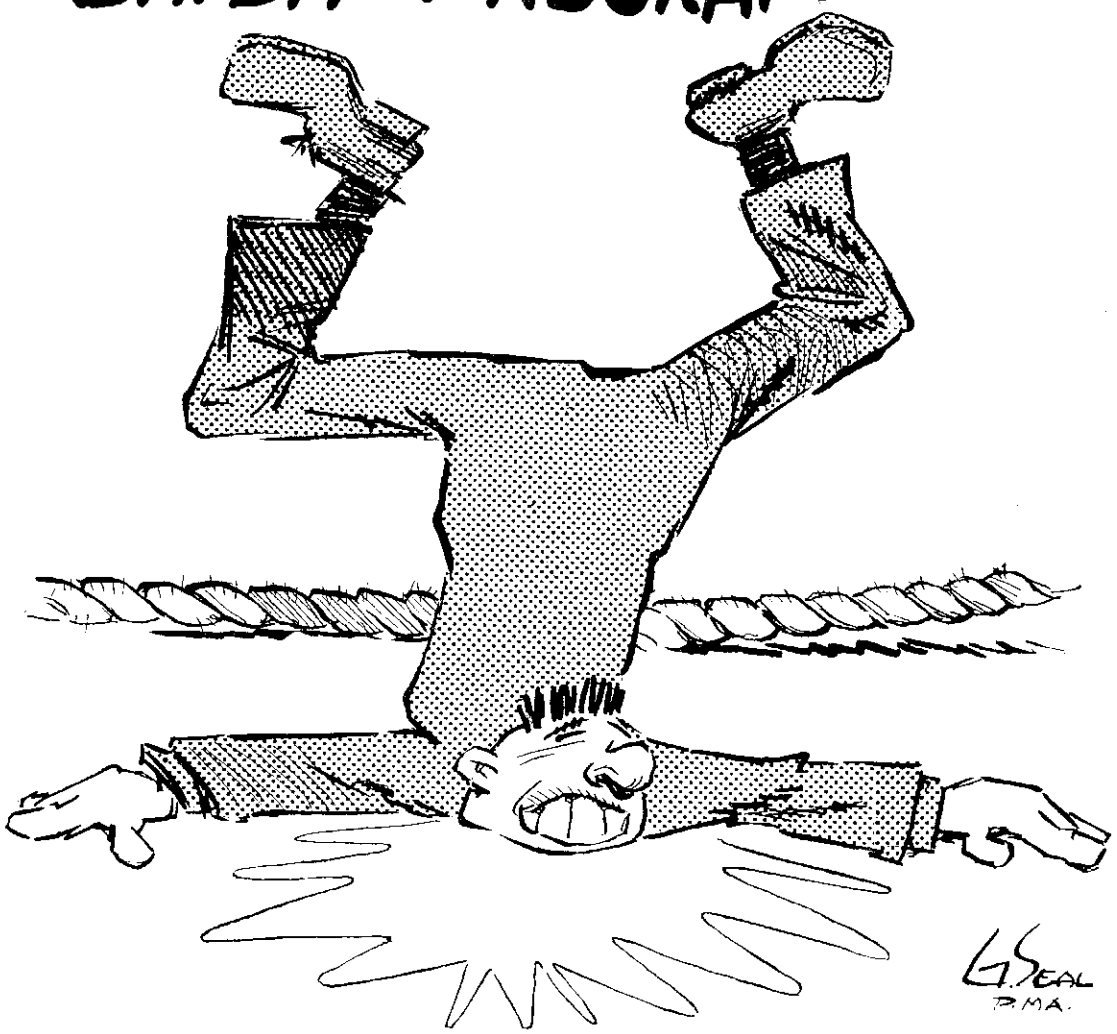

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