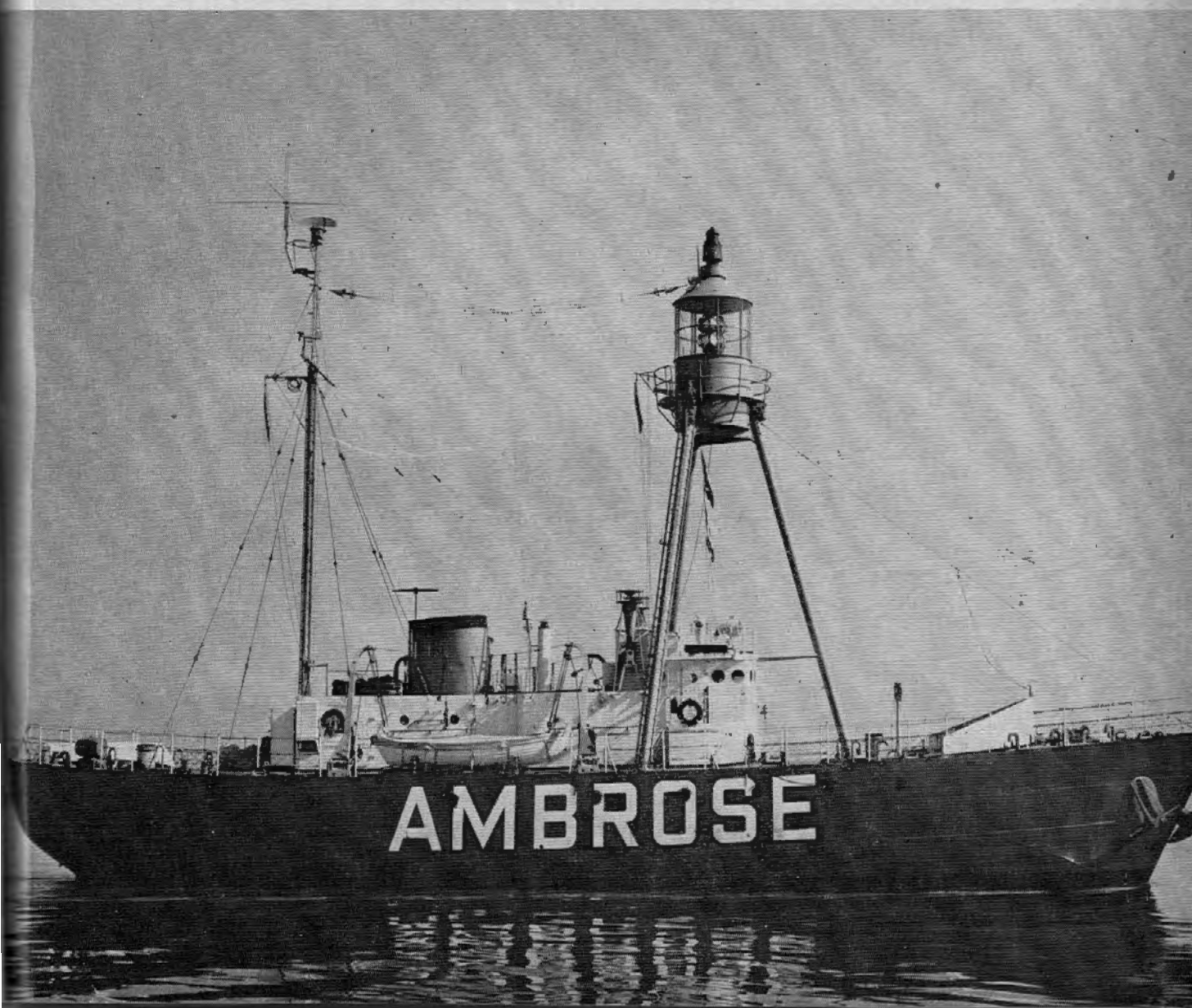
PROCEEDINGS OF THE
MERCHANT MARINE COUNCIL
UNITED STATES COAST GUARD

The printing of this publication has been approved by the Director of the Bureau of the Budget, March 11, 1952.

This copy for not less than 20 readers. PASS IT ALONG

CG 129

Vol. 11 February 1954 No. 2



Proceedings of the

MERCHANT MARINE COUNCIL

Published monthly at Coast Guard Headquarters, Washington 25, D. C., under the auspices of the Merchant Marine Council, in the interest of safety at sea. Special permission for republication, either in whole or in part, with the exception of copyrighted articles or pictures, is not required provided credit is given to the Proceedings of the Merchant Marine Council.

The
Merchant Marine Council
of the United States
Coast Guard

VICE ADMIRAL MERLIN O'NEILL, USCG
Commandant

REAR ADMIRAL H. C. SHEPHEARD, USCG
Chief, Office of Merchant Marine Safety
Chairman

CAPTAIN R. A. SMYTH, USCG
Assistant Chief, Office of Merchant Marine Safety
Vice Chairman

REAR ADMIRAL K. K. COWART, USCG
Engineer in Chief
Member

CAPTAIN I. E. ESKRIDGE, USCG
Deputy Chief of Staff
Member

CAPTAIN P. A. OVENDEN, USCG
Chief, Merchant Vessel Inspection Division
Member

CAPTAIN C. P. MURPHY, USCG
Chief, Merchant Marine Technical Division
Member

CAPTAIN JAMES D. CRAIK, USCG
Chief, Merchant Vessel Personnel Division
Member

CAPTAIN G. A. LITTLEFIELD, USCG
Executive Secretary and Member

MR. K. S. HARRISON
Chief Counsel

For each meeting two District Commanders and three Marine Inspection Officers are designated as members by the Commandant.

CONTENTS

DISTRIBUTION (SDL 56)

A: a, aa, b, c, d, dd (2); remainder (1).
B: e (35); c (16); g (2); f (4); h (3); remainder (1).
C: a, b, c, d, e, f, g, i, m, o (1).
D: i (5); a, b, c, d, e, f, g, h, j, k, l, m (1).
E: o (New London only) (1).
List 141 M.
List 111.

A NEW LIGHT FOR AMBROSE

The most powerful of all the 40,000 Coast Guard aids to navigation is the new Ambrose Lightship which is now in position at the head of Ambrose Channel, the entrance to the Port of New York. This light has a peak intensity of 5,500,000 beam candlepower, as compared with the 15,000 candlepower available at other major lightships. It is the most powerful light of its kind in the world.

In the study of the range at which a light can be seen, two different approaches are used. The first, the *geographic range*, is the one published in the Light Lists and on the charts. This is determined by adding the distance from the horizon to an observer 15 feet above sea level to the distance from the horizon to an observer at the same height as the center of the light, and is limited by the curvature of the earth. The other, the *luminous range*, is the distance the light could be seen at sea level at night if the earth were flat. This range depends on three factors:

(1) The ability of the human eye to detect the light at very low values of illumination (the threshold of vision).

(2) The intensity of the light source.

(3) The condition of the atmosphere.

For the first of these, an average figure is used, so that in the last analysis only the atmospheric conditions and the intensity of the light source determine the luminous ranges. Simply stated, a bright light can be seen further than a dim one when fog, rain, snow or smoke is reducing visibility.

It is obvious that low intensity lights cannot be seen at the published geographic range when visibility conditions are poor. Due to the impracticability of providing sufficient candlepower to make a light visible at the geographic range for 365 nights of the year, a compromise is necessary. The light provided on this vessel represents such a compromise in that the candlepower is about as high as can be obtained with the power available for this purpose. At the same time, its maximum candlepower is sufficient to make the light visible at the *geographic range* 67 more nights than is possible with the 15,000 candlepower light now installed on major light vessels and used on this vessel as a standby light.

In order to make high candlepowers economically feasible, it is necessary to gather and direct the light from the source in a narrow beam. The intensity of the beam of light achieved in this way with a given power input is illustrated by comparing the light from an ordinary 30 watt incandescent light bulb, and the light from a 30 watt sealed beam automobile headlight.

If the light is concentrated in a narrow beam, some provision must

be made on a lightship to keep the beam parallel to the surface as the ship rolls and pitches, or a large part of the illumination visible to an observer on the surface will be lost and the flashing characteristic may appear to be different from the advertised characteristic. This can be achieved by mounting the light in gimbals so that its axis remains vertical despite the movements of the ship, or in other words, to make the light itself into a compound pendulum.

An investigation was made to determine the best design for such a pendulous mechanism. As a result of observations made of the operation of a working model on two light vessels, and numerous calculations, a design for a pendulous light support was prepared.

The optical system of this beacon consists of four light sources, each equipped with two units, each of which has a lamp and mirrors, mounted vertically in line. Each source is centered at 90° spacing, but is arranged so that mirrors may be swung on a quadrant away from or toward each other to change the period of eclipse between flashes of the light. Two of the light sources are now turned at an angle of thirty degrees to give the required characteristic. If the characteristic is changed, by turning the mirrors to a different angle, the entire element must be rebalanced, because of the change in the position of the center of gravity of the mirrors. Only three light sources are energized, to give a triple flash, but the balancing of the light requires that the fourth light source have lamps and mirrors in place at all times.

The lamps used are standard Westinghouse T–20, 1,000 watt, mogul prefocus base, motion picture projector lamps. Since three light sources are in use, a total of six lamps burn at once. These six lamps are supplied by a 115 volt, three phase system and are connected in delta, through relays which activate an alarm in the radio transmitter room in the event of a lamp burn-out. There is a three phase variac installed on the system, permitting adjustment of lamp voltage from 0 to 114 volts. This will be used in steps of 43, 76, 95, and 114, giving beam candlepowers of 250,000, 1,500,000, 3,000,000 and 5,500,000, respectively. Also in this circuit is an elapsed time indicator energized through a voltage relay set to close at 105 volts, so that the indicator runs only when the lamp voltage is above that figure and indicates hours of operation of light at full intensity.

The optic is rotated by means of a ⅙ hp. constant speed, single phase, 115 volt motor through a set of gears which reduces the motor r. p. m. of 1,190 to 8 r. p. m. at the optic. Nine other sets of gears are provided so that speed of rotation may be changed in steps from ½ r. p. m. to 8 r. p. m. if it is desired to change the characteristic at some later time.

The upper part of the optic is balanced by a counterweight, consisting of a cylinder attached to the optic by a shaft, with the whole assembly hung in gimbals. The counterweight can be adjusted by adding or taking out weights to change the natural period of the whole element over a range from 8.8 to 26 seconds.

The complete assembly is enclosed in a lantern house mounted on a tripod structure above the wheelhouse as shown in figure 1. Figure 2 is a view of the lantern house with optical system inside. This picture also shows the 375 mm. lantern mounted on top of the lantern house which serves as an emergency standby light.

In operation, it is estimated that during 67 percent of the year the lowest intensity of the light, or 250,000 candlepower, will be used to give a *luminous range* of more than 15 miles, or 2 miles more than the geographical range of the light. As a haze or other conditions tend to reduce visibility, the intensities will be increased successively until the full 5½ million candlepower is in use. This latter condition is expected to exist about 23 percent of the year, with the middle intensities accounting for the other 10 percent.

The installation of similar high intensity lights on other light vessels will depend on reports on the serviceability of this installation and on whether reports from mariners using this light indicate that they obtain sufficient benefit from the high candlepower to warrant its use.

A GLANCE AT MARINE CASUALTY INVESTIGATIONS

The term "marine casualty or accident" shall mean any casualty or accident involving any vessel other than public vessels if such casualty or accident occurs upon the navigable waters of the United States, its territories or possessions, or any casualty or accident wherever such casualty or accident may occur involving any United States vessel which is not a public vessel—46 CFR 136.03–1.

The administration of the Coast Guard's marine casualty investigation function and the review of marine casualty investigation records indicates that there is some misconception, and in some respects serious misconception, concerning this function. It may, therefore, be of value to briefly outline its background.

Surprisingly, before the *Morro Castle* and *Mohawk* disasters, no agency of the Federal Government had complete authority or full responsibility for the investigation of marine casualties occurring on the navigable waters of the United States or involving U. S. vessels elsewhere.

Under the Act of June 20, 1874, whenever any vessel of the United States:

(1) Had sustained or caused any accident involving the loss of life, the material loss of property, or any serious injury to any person,

(2) Had received any material damage affecting her seaworthiness or her efficiency,

(3) Had been lost or unheard of, the managing owner/agent or master of such vessel had to submit a report to the Collector of Customs, who in turn was required to submit that report to the Secretary of Commerce.

Under the 1946 Reorganization Plan No. 3, all such reports are now required to be made to the Coast Guard.

It should be noted that this statute merely provides for the reporting of casualties involving documented vessels of the United States, and no investigative authority is provided. Penalty for failure to submit the necessary reports is most inconsequential.

An Act of Congress of June 18, 1878, provided that upon the occurrence of any shipwreck within the scope of the operations of the Coast Guard attended with loss of life, the Commandant was to investigate all the circumstances related thereto, to ascertain:

(1) The cause of the disaster.

(2) Whether any of the officers or employees of the Service have been guilty of neglect or misconduct in the premises.

This statute was of most limited application and was repealed by an Act of Congress approved on August 4, 1949.

An Act of Congress approved on February 28, 1871, and in large part derived from prior Congressional enactments, provided that the boards of local inspectors were to investigate all acts of incompetency or misconduct committed by any licensed officer while acting under the authority of his license, and if found guilty of misbehavior, negligence, unskillfulness, endangering life, or wilfully violating any of the provisions of Title 52 of the Revised Statutes, the officer's license was to be immediately suspended or revoked. This statute applied only to vessels subject to inspection and requiring licensed officers.

It should be observed that under the latter statute, the local inspectors had the authority and responsibility to investigate the conduct of licensed officers in relation to marine casualties. This authority did not extend to the investigation of the casualty or the determination of the cause or responsibility therefor. The Steamboat Inspection Service was criticized on many occasions for its failure to conduct comprehensive investigations of marine casualties, but in all such cases the Steamboat Inspection Service properly performed its duties in investigating the conduct of licensed officers in connection with casualties, and the failure to conduct a comprehensive investigation of the casualty was due to the inadequacies of the law. Serious casualties received executive and Congressional attention; for example, the *General Slocum* disaster was investigated by a commission appointed by the President of the United States; while the *Titanic* disaster was investigated by a committee of the U. S. Senate.

The Congressional committee investigating the *Morro Castle* and the *Mohawk* disasters explored fully the inadequacies of existing law—which did not provide for any comprehensive or effective investigation of marine casualties. After extensive Congressional hearings, R. S. 4450, the statute pertaining to the investigation of the conduct of licensed officers was comprehensively amended, and, *for the first time*, a Congressional enactment conferred the authority and imposed the responsibility upon an agency of the Federal Government to investigate all marine casualties occurring on the navigable waters of the United States *or* involving American vessels, regardless of location of occurrence, for the purpose of determining cause and responsibility. This statute and regulations thereunder, by the Reorganization Plan No. 3 of 1946, is vested in the U. S. Coast Guard for administration and enforcement purposes.

Under the provisions of R. S. 4450, as amended by the Act of May 27, 1936, and regulations thereunder, all marine casualties or accidents occurring on the navigable waters of the United States which involve:

(1) loss of life,

(2) injuries incapacitating for a period in excess of 72 hours,

(3) stranding or grounding (larger vessels),

(4) material damage affecting the seaworthiness or efficiency of a vessel (larger vessels),

(5) damage in excess of $1,500,

must be reported to the U. S. Coast Guard. This statute and regulations thereunder direct the Coast Guard to investigate all such marine casualties and accidents to determine, as far as possible:

(1) the cause of any such casualty or accident,

(2) the persons responsible therefor,

(3) whether or not any act of incompetency or misconduct was committed by any licensed officer acting under the authority of his license or by any other crew member acting under the authority of a certificate of service or efficiency.

These determinations are made so as to form a basis upon which to institute corrective safety measures, exclusively in the interest of safety of life at sea.

If during the course of a marine casualty investigation there is probable cause to believe that the conduct of any licensed officer or certificated seamen caused or contributed to the casualty, charges and specifications are preferred for trial before a hearing examiner in a proceeding separate and distinct from the investigation. Records containing evidence of probable criminality are referred to the Department of Justice under the requirement of R. S. 4450, as amended, which provides that if evidence of criminal liability on the part of any licensed officer or the holder of a certificate of service is found, it shall be referred to the Attorney General for further investigation.

Neither Coast Guard marine casualty investigations, nor any of its functions in relation thereto, are intended to fix civil or criminal liability or to assist either directly or indirectly in the determination of any issues involving private interests.

Side Lights on the Rules

It will be recalled the Side Lights on the Rules series was commenced in the September 1953 issue of the "Proceedings." The first article discussed the underlying similarities in the International Rules, the Inland Rules, Western Rivers Rules, and the Great Lakes Rules. Running lights for steam or other power-driven vessels and water-borne seaplanes were discussed in the October 1953 issue. The next article, which appeared in the November 1953 issue, discussed lights to be shown by vessels and seaplanes towing other vessels or seaplanes. Then, the series was held in abeyance for a month in order to devote space in the December 1953 issue to a timely quiz on the changes in the International Rules, which became effective January 1, 1954. In January, the Side Lights on the Rules series was continued with a discussion of lights and shapes to be shown by vessels and seaplanes not under command or engaged in special occupations. In this, the fifth article in the Side Lights on the Rules series, we shall compare Rule 5, International Rules, with the corresponding provisions in the Inland Rules, the Great Lakes Rules, and the Western Rivers Rules.

Rule 5, International Rules, prescribes the lights to be shown by sailing vessels under way and vessels and seaplanes being towed or pushed outside the boundary lines of Inland Waters. Three categories of vessels and seaplanes are considered in this Rule:

(1) Sailing vessels under way.

(2) Vessels or seaplanes that are being towed.

(3) Vessels being pushed ahead.

Sailing vessels under way and vessels or seaplanes that are towed astern or alongside at sea carry the regular screened side lights *and* a fixed twelve point white stern light (or in lieu thereof, a steering light). Vessels being pushed ahead, on the other hand, merely carry a single set of regular screened side lights at the forward end of the tow, whether there is one vessel or several vessels in a group being pushed. Rule 5, International Rules, reads as follows:

Rule 5 (a) A sailing vessel under way and any vessel or seaplane being towed shall carry the same lights as are prescribed by Rule 2 for a power-driven vessel or a seaplane under way, respectively, with the exception of the white lights specified therein, which they shall never carry. They shall also carry stern lights as specified in Rule 10, provided that vessels towed, except the last vessel of a tow, may carry, in lieu of such stern light, a small white light as specified in Rule 3 (b).

(b) A vessel being pushed ahead shall carry, at the forward end, on the starboard side a green light and on the port side a red light, which shall have the same characteristics as the lights described in Rule 2 (a) (iv) and (v) and shall be screened as provided in Rule 2 (a) (vi), provided that any number of vessels pushed ahead in a group shall be lighted as one vessel.

Inland Waters: In the rules applicable to Inland Waters, as in the International Rules, a sailing vessel under way and any vessel (except barges, canal boats, scows, and other vessels of nondescript type) being towed must carry the regular red and green side lights. Article 5, Inland Rules, states:

IT IS SUGGESTED THE READER REFER TO CG–169, "RULES TO PREVENT COLLISIONS OF VESSELS AND PILOT RULES FOR CERTAIN INLAND WATERS OF THE ATLANTIC AND PACIFIC COASTS AND OF THE COAST OF THE GULF OF MEXICO;" CG–172, "PILOT RULES FOR THE GREAT LAKES AND THEIR CONNECTING AND TRIBUTARY WATERS AND THE ST. MARYS RIVER;" AND CG–184, "PILOT RULES FOR THE WESTERN RIVERS AND THE RED RIVER OF THE NORTH;" WHICH CONTAIN THE LOCAL RULES TO PREVENT COLLISIONS BETWEEN VESSELS ON THE LOCAL WATERS OF THE UNITED STATES. REFERENCES TO RULES AND ARTICLES THROUGHOUT THIS SERIES MAY BE FOUND THEREIN.

Art. 5. A sailing vessel under way and any vessel being towed, except barges, canal boats, scows, and other vessels of nondescript type, when in tow of steam vessels, shall carry the same lights as are prescribed by article 2 for a steam vessel under way, with the exception of the white lights mentioned therein, which they shall never carry.

When overtaken, these vessels must, under Article 10, Inland Rules, show a white stern light or a flare-up light:

Art. 10. A vessel which is being overtaken by another, except a steam vessel with an after range light showing all around the horizon, shall show from her stern to such last-mentioned vessel a white light or a flare-up light.

Seaplanes are not specifically provided for in these rules. Likewise, these rules are silent as to the carriage of a small light abaft the funnel or after mast for the vessel directly astern to steer by.

Under the authority of Section 2 (a), numerous requirements have been promulgated regarding the lights to be carried by miscellaneous vessels and craft of all types when in tow of steam vessels. Section 2 (a) of the Act states:

Sec. 2. (a) That the Commandant of the United States Coast Guard shall establish such rules to be observed on the waters mentioned in the preceding section by steam vessels in passing each other and as to the lights to be carried on such waters by ferryboats and by vessels and craft of all types when in tow of steam vessels, or operating by hand power or horsepower or drifting with the current, and any other vessels not otherwise provided for, not inconsistent with the provisions of this Act, as he from time to time may deem necessary for safety, which rules are hereby declared special rules duly made by local authority, as provided for in article thirty of chapter eight hundred and two of the laws of eighteen hundred and ninety. Two printed copies of such rules shall be furnished to all vessels and craft mentioned in this subsection, which rules shall, where practicable, be kept posted up in conspicuous places thereon.

In effect, insofar as lights for barges, canal boats, scows, and other nondescript vessels are concerned, the requirements have been divided into three distinct categories, although each category is contained in the Pilot Rules applicable to the Inland Waters. One set of requirements applies to such vessels on certain inland waters on the Atlantic and Pacific Coasts. Another set of requirements for such vessels applies on certain inland waters on the Gulf Coast and the Gulf Intracoastal Waterway. The third set of requirements for such vessels applies on the Hudson River and adjacent waters and Lake Champlain. These requirements are contained in Sections 80.16, 80.16a, and Section 80.17 of the Pilot Rules for Inland Waters, which read as follows:

80.16 Lights for barges, canal boats, scows and other nondescript vessels on certain inland waters on the Atlantic and Pacific Coasts.—(a) On the harbors, rivers, and other inland waters of the United States except the Great Lakes and their connecting and tributary waters as far east as Montreal, the Mississippi River above Choctaw Point[5] with its all of its tributaries and their tributaries, the Red River of the North, the Mobile River above Choctaw Point[5] with its tributaries and their tributaries, the Atchafalaya River above its junction with

the Plaquemine-Morgan City alternate waterway, and the waters hereinafter described in §§ 80.16a and 80.17, barges, canal boats, scows, and other vessels of nondescript type not otherwise provided for, when being towed by steam vessels, shall carry lights as set forth in this section.

(b) Barges and canal boats towing astern of steam vessels, when towing singly, or what is known as tandem towing, shall each carry a green light on the starboard side and a red light on the port side, and a white light on the stern, except that the last vessel of such tow shall carry two lights on her stern, athwartship, horizontal to each other, not less than 5 feet apart, and not less that 4 feet above the deck house, and so placed as to show all around the horizon. A tow of one such vessel shall be lighted as the last vessel of a tow.

(c) When two or more boats are abreast, the colored lights shall be carried at the outer sides of the bows of the outside boats. Each of the outside boats in last tier of a hawser tow shall carry a white light on her stern.

(d) The white light required to be carried on stern of a barge or canal boat carrying red and green side lights except the last vessel in a tow shall be carried in a lantern so constructed that it shall show an unbroken light over an arc of the horizon of 12 points of the compass, namely, for 6 points from right aft on each side of the vessel, and shall be of such a character as to be visible on a dark night with a clear atmosphere at a distance of at least 2 miles.

(e) Barges, canal boats or scows towing alongside a steam vessel shall, if the deck, deck houses, or cargo of the barge, canal boat or scow be so high above water as to obscure the side lights of the towing steamer when being towed on the starboard side of the steamer, carry a green light upon the starboard side; and when towed on the port side of the steamer, a red light on the port side of the barge, canal boat, or scow; and if there is more than one barge, canal boat or scow abreast, the colored lights shall be displayed from the outer side of the outside barges, canal boats or scows.

(f) Barges, canal boats or scows shall, when being propelled by pushing ahead of a steam vessel, display a red light on the port bow and a green light on the starboard bow of the head barge, canal boat or scow, carried at a height sufficiently above the superstructure of the barge, canal boat or scow as to permit said side lights to be visible; and if there is more than one barge, canal boat or scow abreast, the colored lights shall be displayed from the outer side of the outside barges, canal boats or scows.

(g) The colored side lights referred to in this section shall be fitted with inboard screens so as to prevent them from being seen across the bow, and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least 2 miles, and so constructed as to show a uniform and unbroken light over an arc of the horizon of 10 points of the compass, and so fixed as to throw the light from right ahead to 2 points abaft the beam on either side. The minimum size of glass globes shall not be less than 6 inches in diameter and 5 inches high in the clear.

(h) Scows not otherwise provided for in this section on waters described in paragraph (a) of this section shall carry a white light at each end of each scow, except that when such scows are massed in tiers, two or more abreast, each of the outside scows shall carry a white light on its outer bow, and the outside scows in the last tier shall each carry, in addition, a white light on the outer part of the stern. The white light shall be carried not less than 8 feet above the surface of the water, and shall be so placed as to show an unbroken light all around the horizon, and shall be of such a character as to be visible on a dark night with a clear atmosphere at a distance of at least 5 miles.

(i) Other vessels of nondescript type not otherwise provided for in this section shall exhibit the same lights that are required to be exhibited by scows by this section. (R. S. 4233A, sec. 2, 30 Stat. 102, 38 Stat. 381, as amended, 33 U. S. C. 157, 178.)

80.16a Lights for barges, canal boats, scows and other nondescript vessels on certain inland waters on the Gulf Coast and the Gulf Intracoastal Waterway.—(a) On the Gulf Intracoastal Waterway and on other inland waters connected therewith or with the Gulf of Mexico from the Rio Grande, Texas, to Cape Sable (East Cape), Florida, barges, canal boats, scows, and other vessels of nondescript type not otherwise provided for, when being towed by steam vessels shall carry lights as set forth in this section.

(b) When one or more barges, canal boats, scows, or other vessels of nondescript type not otherwise provided for are being towed by pushing ahead of a steam vessel; such tow shall be lighted by an amber light at the extreme forward end of the tow, and at the centerline of the tow, or as near the centerline as it is practicable to carry such light; and a green light on the starboard side and a red light on the port side, so placed that they mark the tow at its maximum projection to starboard and port, respectively.

(c) When being towed alongside a steam vessel on the starboard side, a barge, canal boat, scow, or other vessel of nondescript type not otherwise provided for shall have a green light on the starboard bow, and when being towed alongside on the port side, a red light on the port bow.

(d) When being towed on either side of a steam vessel, two or more abreast, only outboard barges, scows, canal boats, or other vessels of nondescript type not otherwise provided for shall carry the appropriate side lights.

(e) When being towed singly or in tandem on a hawser behind a steam vessel, each barge, canal boat, scow, or other vessel of nondescript type not otherwise provided for shall carry a white light at each end.

(f) When being towed in tiers, two or more abreast, each of the outside barges, canal boats, scows, or other vessels of nondescript type not otherwise provided for shall carry a white light on its outer bow, and in addition each of the outside boats in the last tier shall carry a white light on the outer part of the stern.

(g) When one or more barges, canal boats, scows, or other vessels of nondescript type not otherwise provided for are moored to the bank or dock in or near a fairway, such tow shall carry two white lights not less than four feet above the surface of the water, as follows: On a single moored barge, canal boat, scow, or other vessel of nondescript type not otherwise provided for, a light at each outboard or channelward corner; on barges, canal boats, scows, or other vessels of nondescript type not otherwise provided for when moored in a group formation, a light on the upstream outboard or channelward corner of the outer upstream boat and a light on the downstream outboard or channelward corner of the outer downstream boat, and in addition any boat projecting toward or into the channel from such group formation shall have two white lights similarly placed on its outboard or channelward corners.

(h) The colored side lights described herein must be fitted with inboard screens so as to prevent them from being seen more than half a point across the bow, of such a character as to be visible on a dark night with a clear atmosphere at a distance of at least three miles, so constructed as to show a uniform and unbroken light over an arc of the horizon of ten points of the compass, and so fixed as to throw the light from right ahead to two points abaft the beam on either side.

(i) The amber light shall show an unbroken light over an arc of the horizon of 20 points of the compass, so fixed as to throw the light.

80.17 Lights for barges and canal boats in tow of steam vessels on the Hudson River and adjacent waters and Lake Champlain.—All nondescript vessels known as scows, car floats, lighters, and vessels of similar type, navigating the waters referred to in the following rules, shall carry the lights required to be carried by barges and canal boats in tow of steam vessels, as prescribed in such rules.

Barges and canal boats, when being towed by steam vessels on the waters of the Hudson River and its tributaries from Troy to the boundary lines of New York Harbor off Sandy Hook, as defined pursuant to section 2 of the act of Congress of February 19, 1895 (28 Stat. 672; 33 U. S. C. 151), the East River and Long Island Sound (and the waters entering thereon, and to the Atlantic Ocean), to and including Narragansett Bay, R. I., and tributaries, and Lake Champlain, shall carry lights as follows:

(a) Barges and canal boats being towed astern of steam vessels when towing singly shall carry a white light on the bow and a white light on the stern.

(b) When towing in tandem, "close up," each boat shall carry a white light on its stern and the first or hawser boat shall, in addition, carry a white light on its bow.

(c) When towing in tandem with intermediate hawser between the various boats in the tow, each boat shall carry a white light on the bow and a white light

[5] Public Law 232, 83d Congress, approved August 8, 1953, extended the applicability of the Inland Rules and the Pilot Rules published pursuant thereto to the Mobile River and its tributaries above Choctaw Point.

on the stern, except that the last vessel in the tow shall carry two white lights on her stern, athwartship, horizontal to each other, not less than 5 feet apart and not less than 4 feet above the deck house, and so placed as to show all around the horizon: *Provided*, That seagoing barges shall not be required to make any change in their seagoing lights (red and green) on waters coming within the scope of the rules of this section, except that the last vessel of the tow shall carry two white lights on her stern, athwartship, horizontal to each other, not less than 5 feet apart, and not less than 4 feet above the deck house, and so placed as to show all around the horizon.

(d) Barges and canal boats when towed at a hawser, two or more abreast, when in one tier, shall each carry a white light on the stern and a white light on the bow of each of the outside boats.

(e) When in more than one tier, each boat shall carry a white light on its stern and the outside boats in the hawser or head tier shall each carry, in addition, a white light on the bow.

(f) The white bow lights for barges and canal boats referred to in the preceding rules shall be carried at least 10 feet and not more than 30 feet abaft the stern or extreme forward end of the vessel. On barges and canal boats required to carry a white bow light, the white light on bow and the white light on stern shall each be so placed above the hull or deck house as to show an unbroken light all around the horizon, and of such a character as to be visible on a dark night with a clear atmosphere at a distance of at least 2 miles.

(g) When nondescript vessels known as scows, car floats, lighters, barges or canal boats, and vessels of similar type, are towed alongside a steam vessel, there shall be displayed a white light at the outboard corners of the tow.

(h) When under way between the hours of sunset and sunrise there shall be displayed a red light on the port bow and a green light on the starboard bow of the head barge or barges, properly screened and so arranged that they may be visible through an arc of the horizon of 10 points of the compass; that is, from right ahead to 2 points abaft the beam on either side and visible on a dark night with a clear atmosphere at a distance of at least 2 miles, and be carried at a height sufficiently above the superstructure of the barge or barges pushed ahead as to permit said side lights to be visible.

(i) Dump scows utilized for transportation and disposal of garbage, street sweepings, ashes, excavated material, dredging, etc., when navigating on the Hudson River or East River or the waters tributary thereto between loading points on these waters and the dumping grounds established by competent authority outside the line dividing the high seas from the inland waters of New York Harbor, shall, when towing in tandem, carry, instead of the white lights previously required, red and green side lights on the respective and appropriate sides of the scow in addition to the white light required to be shown by an overtaken vessel.

The red and green lights herein prescribed shall be carried at an elevation of not less than 8 feet above the highest deck house, upon substantial uprights, the lights properly screened and so arranged as to show through an arc of the horizon of 10 points of the compass, that is, from right ahead to 2 points abaft the beam on either side and visible on a dark night with a clear atmosphere a distance of at least 2 miles.

Provided, That nothing in the rules of this section shall be construed as compelling barges or canal boats in tow of steam vessels, passing through any waters coming within the scope of said rules where lights for barges or canal boats are different from those of the waters whereon such vessels are usually employed, to change their lights from those required on the waters from which their trip begins or terminates; but should such vessels engage in local employment on waters requiring different lights from those where they are customarily employed, they shall comply with the local rules where employed.

Western Rivers: In the rules applicable to Western Rivers, as in the International Rules, a sailing vessel under way and any vessel (except barges, canal boats, scows, and other vessels of nondescript type) being towed must carry the regular red and green side lights. But, note that in these rules the side lights may show one-half point across the bow. When overtaken, these vessels must show a white stern light or a flare-up light. The white stern light may be a fixed light, and if it is, it must be a fixed twelve point light, visible at least 2 miles.

The governing rules, Rules 8 and 10, Western Rivers Rules, state:

Rule Numbered 8. A sailing vessel under way, and any vessel being towed except barges, canal boats, scows, and other vessels of nondescript type when in tow of steam vessels, shall carry screened side lights as prescribed by rule 3, sections (a), (b), and (c), for a steam vessel, and a stern light as prescribed by rule 10.

Rule Numbered 10. A vessel which is being overtaken by another, except a steam vessel, which already has one or more running lights visible from aft, shall show from her stern to such overtaking vessel a white light or a flare-up light.

The white light required to be shown by this article may be fixed and carried in a lantern, but in such case the lantern shall be so constructed, fitted, and screened that it shall throw an unbroken light over an arc of the horizon of twelve points of the compass, namely, for six points from right aft on each side of the vessel, so as to be visible at a distance of at least 2 miles.

Seaplanes are not specifically provided for in the rules applicable to the Western Rivers. Likewise, these rules are silent as to the carriage of a small light abaft the funnel or after mast for the vessel directly astern to steer by.

THE GREATEST SAFETY DEVICE KNOWN TODAY IS A CAREFUL MAN

Under the authority of Section 4233A of the revised statutes and Rule 7 (b), Western Rivers Rules, numerous requirements have been promulgated regarding the lights to be carried by miscellaneous vessels and craft of all types when in tow of steam vessels. Section 4233A (a), revised statutes, and Rule 7 (b), Western Rivers Rules, state:

Sec. 4233A. (a) The Commandant of the United States Coast Guard shall establish such rules to be observed on the waters mentioned in the preceding section by steam vessels in passing each other and as to the lights to be carried on such waters by ferryboats and by vessels and craft of all types when in tow of steam vessels, or operating by hand power or horsepower or drifting with the current, and any other vessels not otherwise provided for, not inconsistent with the provisions of this Act, as he from time to time may deem necessary for safety, which rules are hereby declared special rules duly made by local authority, as provided for in article thirty of chapter eight hundred and two of the laws of eighteen hundred and ninety. Two printed copies of such rules shall be furnished to all vessels and craft mentioned in this subsection, which rules shall, where practicable, be kept posted up in conspicuous places thereon.

Rule 7 (b) The lights for barges, canal boats, scows, and other vessels of nondescript type, when in tow of steam vessels, and for ferryboats, shall be as prescribed by the Commandant, United States Coast Guard.

It will be noted the rules applicable to the Western Rivers do not differentiate between a barge, canal boat, scow, or any other vessel of nondescript type not otherwise provided for. By definition, the word "barge" includes a barge, canal boat, scow, or any other vessel of nondescript type not otherwise provided for. This definition is contained in Section 95.03 (a), Pilot Rules for the Western Rivers:

95.03 Definitions. (a) In this part the words "steam vessel" or "steamer" shall include any vessel propelled by machinery; and the word "barge" shall include barge, canal boat, scow, and any other vessel of nondescript type not otherwise provided for herein.

When one or more barges are towed by pushing ahead, such a tow is lighted by a 20 point amber light at the extreme forward end of the tow, at the center line, visible at least three miles; and, with the regular red and green side lights, which are so placed that they mark the tow at its maximum projection to starboard and port, respectively.

When a barge is towed alongside, it must carry the proper sidelight on the bow. When one or more barges are towed alongside, two or more abreast, the outboard barges must carry the appropriate side light. The side lights

must not show more than one-half point across the bow and must be visible at least three miles. Moreover, all of the lights, side lights and amber light, must be carried at least eight feet above the surface of the water, at approximately the same height.

These requirements are found in Section 95.29, Pilot Rules for the Western Rivers:

95.29 Lights for barges towed ahead or alongside. (a) When one or more barges are towed by pushing ahead of a steam vessel, such tow shall be lighted by an amber light at the extreme forward end of the tow and at the centerline of the tow, or as near the centerline as it is practicable to carry such light; a green light on the starboard side and a red light on the port side, so placed that they mark the tow at its maximum projection to starboard and port, respectively. When a barge is towed alongside a steam vessel on the starboard side, such barge shall have a green light on the starboard bow; if towed alongside on the port side, a red light on the port bow. When barges are towed on either side of a steam vessel two or more abreast, the outboard barges only shall carry the appropriate side light.

(b) The colored side lights referred to in paragraph (a) must be fitted with inboard screens so as to prevent them from being seen more than half a point across the bow, of such a character as to be visible on a dark night with a clear atmosphere at a distance of at least three miles; so constructed as to show a uniform and unbroken light over an arc of the horizon of ten points of the compass, and so fixed as to throw the light from right ahead to two points abaft the beam on either side. The amber light shall be screened so as not to be visible more than two points abaft the beam and shall likewise be visible at least three miles. All of these lights shall be carried at least eight feet above the surface of the water and at approximately the same height.

Barges that are towed singly or in tandem on an astern hawser must carry a 32 point white light at each end of each barge. Barges towed in tiers, two or more abreast, must carry a 32 point white light on the outer bow of each outside boat. In addition, the outside boats in the last tier must carry a white light on the outer part of the stern. All these lights must be at least 8 feet above the surface of the water.

These lights are prescribed in Section 95.31, Pilot Rules for Western Rivers, as follows:

95.31 Lights for barges towed astern. Barges being towed singly or in tandem on a hawser behind steam vessels shall carry a white light at each end of each barge. When barges are towed in tiers, two or more abreast, each of the outside boats shall carry a white light on its outer bow, and the outside boats in the last tier shall each carry, in addition, a white light on the outer part of the stern. The lights shall be carried not less than 8 feet above the surface of the water, and so as to show all around the horizon.

Great Lakes: In the rules applicable to the Great Lakes, as in the International Rules, a sailing vessel under way and any vessel (except barges, canal boats, scows, and other vessels of nondescript type) being towed must carry regular red and green side lights.

These vessels must also carry a light similar to the steering light aft; however, stern lights as such are not otherwise provided for for such towed vessels.

Rule 6, Great Lakes Rules, provides:

Rule 6. A sailing vessel under way and any vessel being towed shall carry the side lights mentioned in rule three.

A vessel in tow shall also carry a small bright light aft, but such light shall not be visible forward of the beam. (33 U. S. C. 255.)

Seaplanes are not specifically provided for in the Great Lakes Rules.

Under the authority of Rule 7, Great Lakes Rules, quoted below, numerous requirements have been promulgated regarding the lights to be carried by miscellaneous vessels and craft of all types not otherwise provided for by the statutory requirements.

Rule 7. The lights for tugs under 100 tons register (net), whose principal business is harbor towing, and for boats navigating only on the River Saint Lawrence, also ferryboats, rafts, and canal boats, shall be regulated by rules which have been or may hereafter be prescribed by the Commandant of the Coast Guard. (33 U. S. C. 256.)

Section 90.19a, Pilot Rules for the Great Lakes, defines the term "canal boat" as including barges, canal boats, scows, and other craft of nondescript type not otherwise provided for in the case of pusher type tows. However, there is no similar definition of the term "canal boat" in the requirements applicable to alongside or astern tows.

When one or more canal boats or similar vessels of nondescript type are towed by pushing ahead, such a tow is required to carry the regular red and green side lights at the maximum projection to port and starboard, respectively. In addition, the tow *may* carry a twenty point amber light at the extreme forward end of the tow near the centerline, visible at least 3 miles.

When a canal boat is towed alongside or when two canal boats are towed one on each side, the regular red and green side lights must be carried on the outer sides of the canal boats. There is no provision, however, for the towing of more than one canal boat on a particular side of the towed vessel.

Canal boats towed astern, singly or in tandem, must each carry the regular red and green side lights and a small bright white light aft not visible forward of the beam. Canal boats towed astern in one or more tiers, two or more abreast, must carry regular red and green side lights on the outer side of each tier and a small bright white light not visible forward of the beam on the after end of each of the outside boats in the last tier.

Sections 90.19 and 90.19a, Pilot Rules for the Great Lakes, which prescribe these requirements, read as follows:

90.19 Lights for canal boats in tow of steam vessels.—(a) Canal boats when in tow of steam vessels on the Great Lakes and their connecting and tributary waters as far east as Montreal shall carry lights as follows:

(1) Canal boats when towed astern of steam vessels and towed singly or tandem shall each carry a green light on the starboard side, a red light on the port side, and a small bright white light aft.

(2) When canal boats are towed at a hawser in one or more tiers, two or more abreast, the boat on the starboard side of each tier shall carry a green light on her starboard side, and the boat on the port side of each tier shall carry a red light on her port side, and each of the outside boats in the last tier shall also carry a small bright white light aft.

(3) When a canal boat is towed alongside and on the starboard side of a steamer, the boat towed shall carry a green light on the starboard side; and when towed on the port side of a steamer, the boat towed shall carry a red light on the port side.

(4) When two canal boats are towed alongside of a steamer, one on the starboard and one on the port side, the starboard boat shall carry a green light on the starboard side and the port boat shall carry a red light on the port side.

(b) The colored side lights referred to in this section for canal boats in tow of steam vessels shall be fitted with inboard screens, so as to prevent them from being seen across the how, and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least 2 miles, and so constructed as to show a uniform and unbroken light over an arc of the horizon of 10 points of the compass, and so fixed as to throw the light from right ahead to 2 points abaft the beam on either side. The minimum size of glass globe shall not be less than 6 inches in diameter and 5 inches high in the clear.

(c) The small bright white light aft required to be carried on canal boats in tow shall not be visible forward of the beam. (Sec. 1, rule 7, 28 Stat. 646; 33 U. S. C. 256.)

90.19a Lights for canal boats towed by being pushed ahead.—When a tow of one or more canal boats is towed by being pushed ahead of a steam vessel such tow shall carry a green light on the starboard side and a red light on the port side so placed that they mark the tow at its maximum projection to starboard and port, respectively, and may carry an amber light at the extreme forward end of the tow as near the centerline as it is prac-

ticable to carry such light. The term "canal boats" as used in this section shall be construed to include barges, scows, and other craft of nondescript type not otherwise provided for by statute or regulations in this part. The amber light described shall show an unbroken light over an arc of the horizon of 20 points of the compass, so fixed as to throw the light 10 points on each side, namely, from right ahead to 2 points abaft the beam on either side, and be of such a character as to be visible at a distance of at least 3 miles. The colored side lights shall be fitted with inboard screens, so as to prevent them from being seen across the bow, and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least 2 miles, and so constructed as to show a uniform and unbroken light over an arc of the horizon of 10 points of the compass, and so fixed as to throw the light from right ahead to 2 points abaft the beam on either side. (Secs. 1 and 3, 28 Stat. 646, 649, as amended; 33 U. S. C. 243, 256.)

Inland Waters, Western Rivers, Great Lakes. Rafts in tow are specifically provided for in addition to the foregoing nondescript craft. The specific requirements are to be found in Section 80.32, Pilot Rules for Inland Waters; Section 95.37, Pilot Rules for the Western Rivers; and Section 90.21, Pilot Rules for the Great Lakes. The requirements are the same in each case except for bag or boom rafts:

Rafts of one crib and not more than two in length shall carry one white light.

Rafts of three or more cribs in length and one crib in width shall carry one white light at each end of the raft.

Rafts of more than one crib abreast shall carry one white light on each outside corner of the raft, making four lights in all.

The white light required by this section for rafts and other watercraft shall be carried from sunset to sunrise, in a lantern so fixed and constructed as to show a clear, uniform, and unbroken light, visible all around the horizon, and of such intensity as to be visible on a dark night with a clear atmosphere at a distance of at least 1 mile. The lights for rafts shall be suspended from poles of such height that the light shall not be less than 8 feet above the surface of the water.

Section 90.21, Pilot Rules for the Great Lakes, is the only regulation prescribing lights for bag or boom rafts:

Bag or boom rafts navigating or anchored in the fairway of any bay, harbor, or river shall carry a bright white light at each end of the raft, and one of such lights on each side midway between the forward and after ends.

Next Article. These are perhaps the most complex requirements in the local rules. The next article will go on to discuss Rules 6 and 7, International Rules, at which time the Motorboat Act of April 25, 1940, will be compared to these two rules.

Your Fact Forum

Q. What is the meaning of lateral system buoys colored as follows:

(a) Black;

(b) Red;

(c) Red and black horizontal bands; and

(d) Black and white vertical stripes?

A. When proceeding from seaward:

(a) Black buoys mark the port (left) sides of channels, or the location of wrecks or obstructions which must be passed by keeping the buoy on the port (left) hand.

(b) Red buoys mark the starboard (right) sides of channels, or the location of wrecks or obstructions which must be passed by keeping the buoy on the starboard (right) hand.

(c) Red and black horizontal banded buoys mark junctions in the channel, or wrecks or obstructions which may be passed on either side. If the topmost band is black, the preferred channel will be followed by keeping the buoy on the port (left) hand. If the topmost band is red, the preferred channel will be followed by keeping the buoy on the starboard (right) hand. (Note, however, when proceeding *toward seaward*, it may not be possible to pass on either side of these buoys and the chart should always be consulted.)

(d) Black and white vertically striped buoys mark the fairway on the channel and should be passed close to, or either side.

Q. How can you temporarily repair a large hole in a lifeboat's side or bottom?

A. Temporary repairs can be made as follows:

(1) Straighten and smooth the jagged edges around the hole.

(2) Place canvas which has first been soaked in linseed oil and then painted with heavy red or white lead about the hole, both inside and outside the shell, so as to cover an area of a foot or so about the hole.

(3) Place a white or red leaded piece of wood big enough to cover the canvas on the inside of the boat.

(4) Place a white or red leaded sheet of lead or tin, big enough to cover the canvas, on the outside of the lifeboat shell.

(5) Nail the lead or tin sheet through the shell plating, canvas, and wood, spacing the nails close together and clinching them on the inside.

Q. What should you know regarding steam smothering pipes?

A. You should know the location of all the valves in steam smothering pipes, the outlets in the various holds and compartments, and whether they are clear and unobstructed.

Q. How is the hand lead line secured to the lead?

A. The eye of the hand lead is passed through the hole or grommet at the top of the lead, and then the lead is passed through the eye, whereupon the parts are drawn tight.

Q. What is meant by dead reckoning?

A. Dead reckoning is a method of navigation by which the position of a vessel is determined from the direction and amount of anticipated progress through the water from the last known position of the vessel.

Q. What is the difference between piloting and celestial navigation?

A. Piloting is the directing of a vessel's movements in reference to land marks, aids to navigation, or soundings.

Celestial navigation, on the other hand, is the determining of a vessel's position by the aid of celestial bodies, such as the sun, moon, planets, and stars.

Q. What is a cofferdam?

A. A cofferdam is an empty space between two bulkheads separating two adjacent compartments. Its purpose is to isolate one compartment from another, preventing liquid contents of one from entering the other in the event one bulkhead loses its tightness.

Q. What is a rat guard? How is it used?

A. A rat guard is a sheet metal disk which is constructed in conical form with a hole in the center and slit from the center to the edge. It is installed over the mooring lines to prevent rats from boarding the ship from the shore over the mooring lines.

Q. How do you know how many persons a lifeboat is allowed to carry?

A. The number of persons allowed is stated on the builder's plate attached to the boat, is painted on the bow of the boat and also on at least two of the thwarts.

Q. What is the primary purpose of the Light List?

A. It gives a navigator a permanent record of light characteristics so he will not be forced to rely on memory.

Q. What is the first duty of a lookout who thinks he has seen an object in the water?

A. To report it, making sure his report is heard.

LESSONS FROM CASUALTIES

OVERCHARGED

A few months ago, a fine modern 38-ton fishing vessel was completely consumed by fire and lost, in the Gulf of Mexico, due to a storage-battery explosion. A $20,000 loss was caused by the neglect of a few simple precautions in the use and charging of storage batteries. That no lives were lost was due to luck, not care, as there was another fishing vessel in the nearby vicinity which arrived in time to save the crew.

The fisherman, with the master and a crew of 3 aboard, was underway shrimping with a heavy-duty generator running off the main engine charging the storage batteries. There were two banks of storage batteries, one for engine starting and one for lights and radio-telephone power. The latter consisted of four 8-volt heavy duty marine storage batteries in series, less than 6 months old. During the preceding night the boat had laid at anchor and large demands were placed on the lighting batteries. Due to repeated attacks by mosquitos, the crew gave up trying to sleep about 2:00 a. m. and remained at Battle Stations the rest of the night, with all lights on, but no battery charger in operation. Repeated use of the radio-telephone helped pull down the batteries. Therefore when the main engine was started early in the morning, the remaining charge of the batteries on the lighting bank was low and the charging rate, or current flow, was high. Due to the cramped condition of the engine room, lack of forced ventilation in that compartment, and high ambient temperatures (a hot summer day), the engine room was very hot, and the temperature of the storage batteries being charged was in the neighborhood of 110° F.

About 5 hours after getting underway, one of the crew members in the galley who was preparing lunch heard a sharp "crack", similar to the sound of a high voltage electrical discharge spark, from the direction of the engine room. Through a crack in the bulkhead between the galley and engine room he could see that the engine room was ablaze. Calling the other crew members, he opened a door to the engine space, and all three men played the contents of three 2½-gallon foam extinguishers into the engine room without effect on the fire. In the short time it took the master to reach the engine room door from the pilothouse, the engine room was a solid mass of flames. A strong acid smell and biting fumes were very noticeable. The crew, after expending their extinguishers, hooked up a hose to the deck outlet of the continuous-discharge bilge pump, but due to the progress of the fire and fumes, the engine stopped before the hose stream could do any good. Further efforts appeared to be hopeless and all hands abandoned ship. The fishing vessel burned to the waterline and sank. Source of the igniting spark was not determined, but sparks from the generator brushes were high on the list of suspects.

Unbelievably, it had been the practice of the past and present owner, when the main diesel engine lube oil needed changing to drain the used oil into the bilge and allow it to slosh around before pumping overboard, considering this practice to be beneficial for the preservation of timbers and planking. While any beneficial effect of thus soaking wooden members in oil is considered to be nil, the contrary effect of creating a first-class fire hazard in the bilges is definite and foolhardy. One of the strongest rules of good housekeeping aboard ship is to keep your bilges clean. Oily bilges make for splendid fires and slippery footing. In addition, pumping oil overboard is illegal under certain conditions and usually fouls your own hull if not other hulls.

Storage batteries under charge must be carefully watched and well ventilated, as oxygen and hydrogen are liberated. Since oxygen and hydrogen unite with explosive violence to form water, it is necessary that certain precautions be taken to avoid accident. Open flames of any kind in a storage-battery room are not permissible and ample ventilation must be provided to prevent any accumulation of hydrogen. Four percent of hydrogen in air is a dangerous mixture and the concentration should be kept well below this figure. Battery connections should be kept tight during charge to avoid electrical spark and ignition of a possibly explosive mixture. The point at which gassing of a storage battery begins while on charge is determined by the voltage, but the quantity of gas liberated depends on the portion of current which is not absorbed by the battery. Oxygen is liberated at the positive plates on charge, and hydrogen at the negative plates. In general, gassing is much more pronounced toward the end of the normal charge period when the cell voltage is almost up to its designed voltage. At this stage the voltage of the cell, connected in counter-polarity to the charging voltage, offers greater resistance to the passage of current through the plates and electrolytic solution and there is more gassing. Therefore the charging rate must be reduced as the battery approaches normal charge and greater precautions as to ventilation and the avoidance of any source of ignition must be taken. Apparently on the above fishing vessel no precautions at all were taken and disaster struck without notice.

—REMEMBER—

A remorseful conscience cannot restore a limb or life lost through carelessness!

A TONGUE OF FIRE

The tiny tanker lay at the dock in the warm sunshine preparing for a trip down the bay. Of only 43 gross tons, she had a proud record of service supplying small fueling stations and consumers along this portion of the New England coast. Her master suddenly noticed a slight list to port and a decrease in freeboard. Running forward, he found the main oil cargo tank containing diesel fuel was full, although it had not been filled with oil. Realizing there must be a leak in the hull with sea water running in, he called for help from the Pilot and the two crew members and cast off the stern mooring line. The small tanker drifted down the face of the dock with the current and came to rest on a shoal just below the loading dock, with her port rail 2 feet below water and about 1 foot of freeboard on the starboard side.

A small 60-gallon-per-minute portable gasoline-driven pump was obtained from shore and pumping started; i. e., taking suction from the bottom of the cargo tank, discharging sea water on deck from whence it ran overboard.

About 25 barrels of lube oil were standing on deck at the time. As the pumping-out operation restored a slight buoyancy to the vessel, the barrels were shifted back and forth on deck until the little tanker regained an even keel. Then, the barrels were thrown overboard where they could easily be salvaged later.

Since the small salvage pump could make very little headway against the apparent leakage, a larger 500 g. p. m. gasoline pumper was brought aboard and a request was made to the city fire department for pumping assist-

ance. The 500 g. p. m. pump was started, with suction taken at the bottom of the cargo tank and the discharge directed overboard. However, the larger pump quickly picked up diesel oil with water. Consequently, as soon as oil was seen spilling into the harbor, this pump was stopped to avoid pollution of the harbor. A large company fuel oil truck was called for, and the larger pump was started again, discharging into the tank of the truck.

The type of 500 g. p. m. pump used in this operation utilized a small part of the liquid being pumped to cool the exhaust. It was so designed that, by means of a small bypass line, a fine stream of the liquid being pumped would be injected directly into the main exhaust pipe, where it would mix with the hot exhaust gases, cool them, and keep the temperature of the exhaust outlet within reasonable limits. Accordingly, a 12-foot section of heavy rubber exhaust hose was usually provided for installation on the exhaust outlet, in order to lead the hot exhaust away from the pump.

In the operation being conducted on the small tanker this exhaust hose was either forgotten or unavailable, and was not used. About 30 seconds after the 500 g. p. m. pump was started (discharging into the truck) some of the liquid, partly oil and partly water, atomizing in the hot exhaust pipe of the pump, ignited, and a tongue of fire shot out several feet onto the deck of the tanker. Everything in the immediate vicinity being partially soaked or coated with oil from the preceding events, the fire quickly communicated itself to the deck, and then to all other nearby objects, including the pilothouse structure. The pump was quickly stopped, and all hands abandoned ship to the dock. Fortunately none were injured.

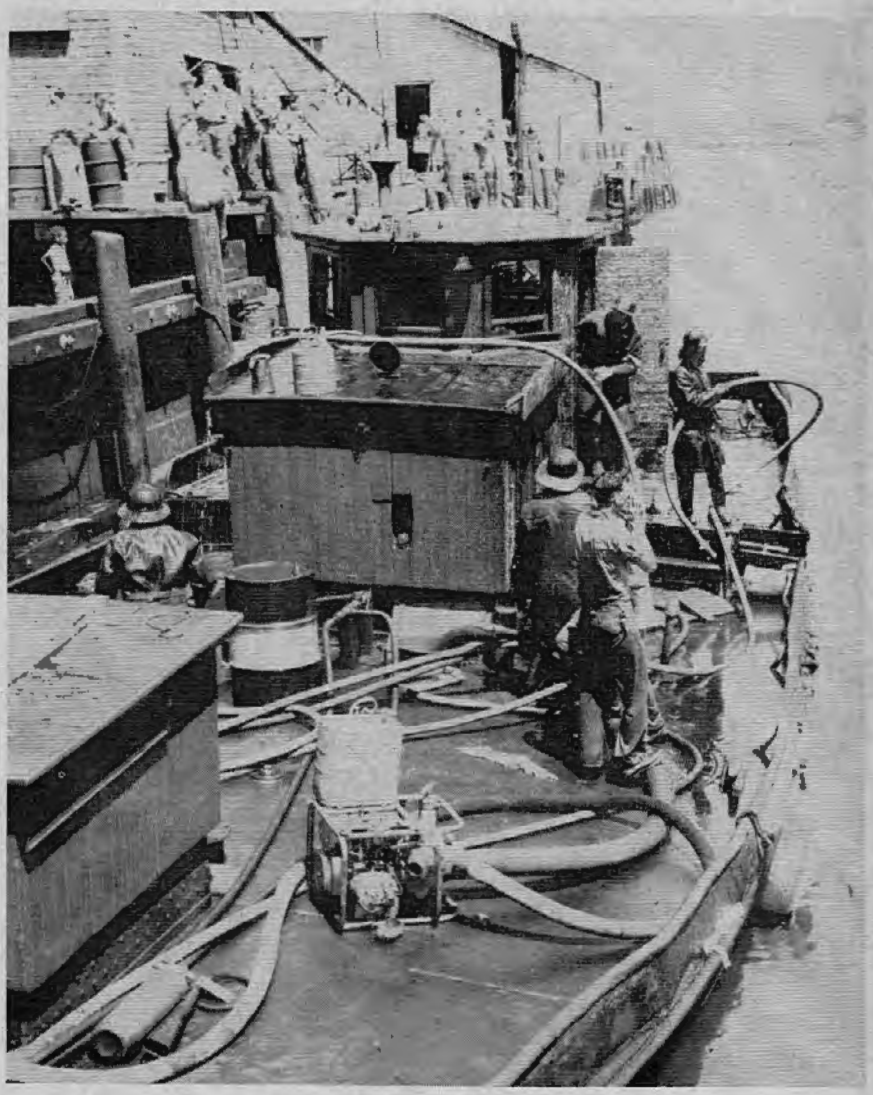
Luckily, the city fire department and other firefighting equipment were on hand, and the fire on board the vessel was quickly extinguished, by using hose lines and foam equipment, and there was no explosion. Some of the oil slick on the harbor water ignited and burned furiously for a few minutes, but was extinguished by the city fire department.

When all traces of fire had been removed, another large-capacity portable pump was borrowed from the city fire department. This time the pump was operated from a position on the dock, with its exhaust pointed away from the vessel. No further trouble was experienced, and the mixture of oil and water in the cargo tank was pumped into the tank truck until the bow had risen several feet.

A puncture in the hull plating between the light and load water line was thereupon discovered, probably the result of striking a submerged object on the vessel's last trip loaded. As soon as the puncture was above water and all leakage stopped, the pumping equipment was secured.

While the actual cost of repairs of fire damage and hull plating damage was nominal, the fire could easily have resulted in the total destruction of the tanker, or explosion with injuries or loss of life, had it not been for the presence of firefighting equipment and personnel in the immediate vicinity when the ignition first took place. This was indeed a case where "The first 5 minutes were worth the next 5 hours," as fire engineers are wont to say.

Most of the witnesses were quite sure they heard a backfire just before the tongue of fire appeared from the exhaust of the 500 g. p. m. pump. However, there is some doubt whether they heard a backfire or the original ignition of diesel oil vapors in the hot exhaust. Whether or not a backfire may be blamed, the real villain was the presence of diesel oil in the liquid being pumped out of the tanker during the initial salvage operation. While the use of the 12-foot hose on the exhaust outlet may well have prevented the fire, this type of pump should never have been used to pump a liquid containing flammable components. However, assuming its use to have been a calculated risk balanced against the damage to the vessel due to sinking, immersion, corrosion, salvage expense, etc., it is difficult to condemn the use of the pump, especially since this was apparently the only pump on hand at the time needed, which could handle the job. But the lesson should remain clear—do not pump liquids which contain petroleum products with a pump which uses part of the liquid being moved as a coolant to the exhaust.

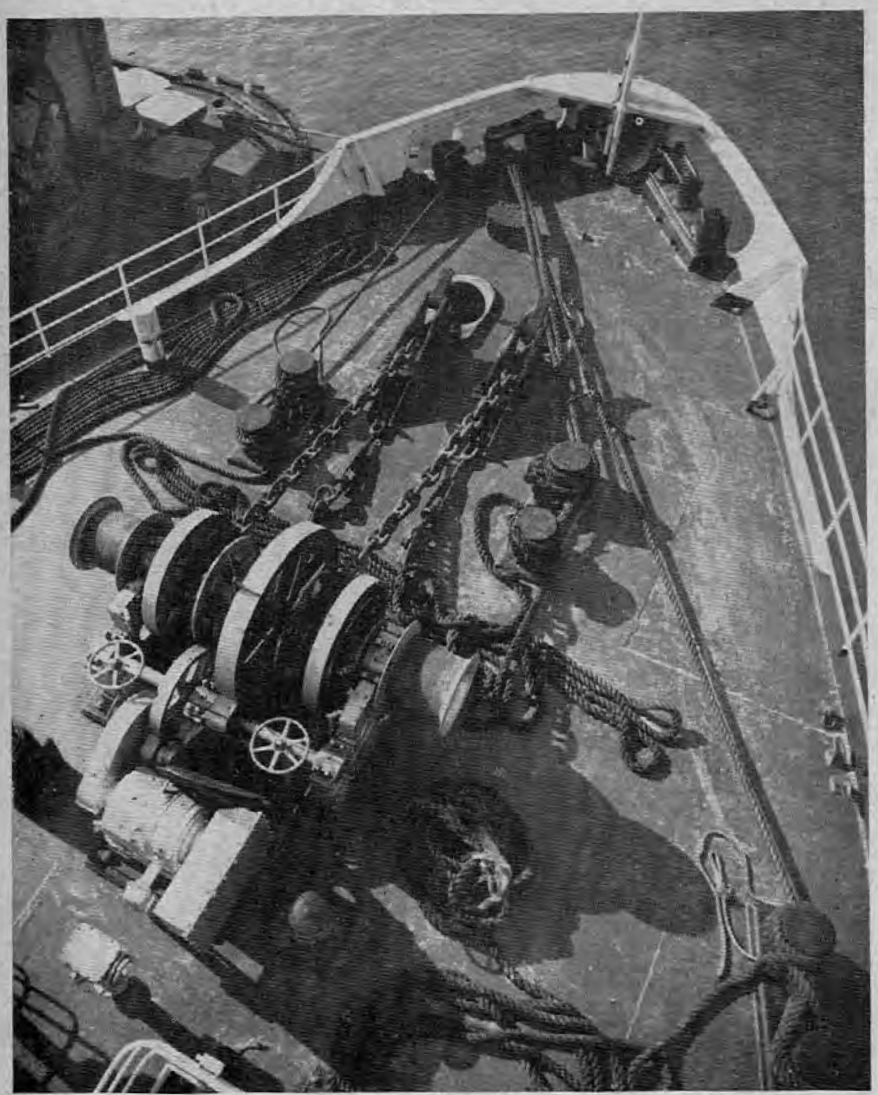


HIGH TENSION LINES

Death struck one afternoon on the forecastle head of a C–3 freighter in a West Coast harbor. The instrument of execution was an ordinary 8-inch manila mooring line which was suddenly released from great tension and leaped at the victim with the ferocity of a charging leopard. The victim was an ordinary seaman who had been warned in the strongest of terms to keep clear of the line but had strained the limits of divine providence and all earthly common sense just one jot too much. Soft and supple as a dead rattlesnake when coiled on deck, the mooring line when stretched under great force had become as hard and deadly as a guillotine blade.

The ship was alongside the dock it was mooring to with a spring line and two head lines out. The starboard head line had been led through the starboard bow chock and then lead directly to the starboard niggerhead of the windlass. On this vessel as on many other ships, mooring bitts were located almost directly in line between the windlass niggerhead and the appropriate chock, for the obvious purpose of facilitating transfer of the line, under strain, from windlass to bitt. The pair of bitts on the vessel (see picture below.) were thus in a position whereby the line would rub up against the side of the bitt as the slack was taken up between chock and windlass.

On this type of installation a steel cap, which is about 4 inches larger in diameter than the bitt itself, is welded on top of each bitt to form a lip extending about 2 inches all around. This lip is advantageous in keeping round turns or the eye of a mooring line from sliding off the bitt if the lead of the line is upward, such as in the locks of the Panama Canal. However, in taking up the slack of the mooring line in a straight lead across the bitts, the line tends to hang up on this lip, until tension causes it to squeeze past the lip and flip upward with tremendous power. Depending on whether the first turn of the line has been led under or over the niggerhead, the line tends to snap upward from 6 to 20 inches.



Accordingly the above vessel was fitted with an efficient fairlead sheave, just aft of the niggerhead, which unfortunately was not used, as it was the established practice on board this vessel to lead the lines direct to the windlass to save the extra handling in using the fairlead. This proved to be a fatal error.

As the ship slowly breasted into the dock, there was considerable strain on the starboard head line, which was caught under the lip of the bitt. The windlass was stopped, and the deck crew forward began to stop off the head line in order to shift it to the bitt. At this moment, the ordinary seaman stepped over the taut line. He was immediately chided by several of the crew and especially by the Boatswain who used dramatic hand gestures to leave no room for doubt as to what could have happened.

The order was given to pass a stopper on the line, whereupon the seaman, undismayed by the tongue lashing he had just received, grabbed the stopper and leaned over the mooring line. As the reader can well imagine, it was at this exact moment that the mooring line chose to snap off the lip. The tremendous potential energy lying in wait in the taut line burst forth and the manila, hard as a rock, smote said seaman squarely on the forehead. Two hours later, the injured man expired in a hospital, never having regained consciousness. The cause of death—fractured skull with multiple brain injuries.

Following the accident, part of the crown or cap of the bitts was burned off and ground flush on several vessels of this type, so that it would be impossible for a mooring line to catch underneath the lip, and recurrence of this type of accident would be avoided. Nevertheless, no matter how many safety features are designed, no matter how many alterations for the sake of safety are accomplished, many situations of possible danger as described in this article will always be found aboard ship, and safety will ultimately rest upon the common sense and considered judgment of prudent seamen. The moral was once aptly expressed in talking of automobiles: "Manufacturers have now engineered highest safety features into every part of modern autos except the nut behind the wheel."

APPENDIX

AMENDMENTS TO REGULATIONS

[EDITOR'S NOTE.—The material contained herein has been condensed due to space limitations. Copies of the documents may be obtained by writing to Coast Guard Headquarters, care of Commandant, Washington 25, D. C.]

TITLE 33—NAVIGATION AND NAVIGABLE WATERS

Chapter I—Coast Guard, Department of the Treasury

Subchapter G—Navigation Requirements for Certain Inland Waters

[CGFR 53-49]

PART 82—BOUNDARY LINES OF INLAND WATERS

GULF COAST; MISCELLANEOUS AMENDMENTS

A notice regarding the establishment of a line of demarcation between the high seas and inland waters from Mobile Bay to the Rio Grande River on the Gulf of Mexico was published in the FEDERAL REGISTER dated May 1, 1953 (18 F. R. 2556). A public hearing was held by the Commander of the 8th Coast Guard District on June 2, 1953, in the Jackson Room of the St. Charles Hotel, New Orleans, Louisiana. Upon request the Commander of the 8th Coast Guard District permitted until July 3, 1953, additional comments and data to be submitted and made a part of the record of this hearing.

All the comments, views, and data submitted in writing or orally at the public hearing, together with the recommendations of the Commander of the 8th Coast Guard District, were considered by the Merchant Marine Council. Where practicable, the comments, views, and data relating to safe navigation were accepted and parts of the described lines as proposed were revised accordingly. The comments, data, and views submitted which were based on reasons not directly connected with promoting safe navigation were rejected.

The establishment of descriptive lines of demarcation is solely for purposes connected with navigation and shipping. Section 2 of the act of February 19, 1895, as amended (33 U. S. C. 151), authorizes the establishment of these descriptive lines primarily to indicate where different statutory and regulatory rules for preventing collisions of vessels shall apply and must be followed by public and private vessels. These lines are not for the purpose of defining Federal or State boundaries, nor do they define or describe Federal or State jurisdiction over navigable waters. Upon the waters inshore of the lines described, the Inland Rules and Pilot Rules apply. Upon the waters outside of the lines described, the International Rules apply.

The purposes for these changes in the line of demarcation between the high seas and rivers, harbors, and inland waters, from Mobile Bay to the Rio Grande River on the Gulf of Mexico, are (1) to extend or connect lines previously published for certain localities; (2) to remove confusion that has arisen regarding where the lines should be; and (3) to clearly indicate where the rules for preventing collisions at sea (International Rules) apply and where the Inland Rules and Pilot Rules for preventing collisions of vessels apply.

The purpose for amending 33 CFR 82.95 is to describe a line of demarcation from Mobile Bay, Alabama, to Mississippi Passes, Louisiana.

The purpose for amending 33 CFR 82.100 is to change the provisions of this regulation to agree with Public Law 232, 83d Congress (62 Stat. 249; 33 U. S. C. 154, 301). Public Law 232 made the Inland Rules applicable to the Mobile River and all its tributaries.

The purpose for adding a new regulation 33 CFR 82.103 is to describe the line of demarcation from Mississippi Passes, Louisiana, to Sabine Pass, Texas. Numerous objections to the descriptive line proposed and considered at the public hearing were received and were the basis for certain changes adopted. The new regulation 33 CFR 82.103 sets forth the line from Mississippi Passes, Louisiana, to Sabine Pass, Texas.

33 CFR 82.105, regarding Inland Rules to be followed in Sabine Pass, Texas, is canceled. This line is not necessary since a new regulation designated 33 CFR 82.106 includes Sabine Pass, Texas.

The new regulation designated 33 CFR 82.106 describes the line from Sabine Pass, Texas, to Galveston, Texas.

33 CFR 82.110, regarding the descriptive line for Galveston Harbor, is canceled. This line is not necessary since a new regulation designated 33 CFR 82.111 includes Galveston Harbor.

A new regulation designated 33 CFR 82.111 describes the line from Galveston, Texas, to Brazos River, Texas.

33 CFR 82.115, regarding the descriptive line for Brazos River, Texas, is canceled. This line is not necessary since a new regulation designated 33 CFR 82.116 includes the Brazos River.

A new description designated 33 CFR 82.116 describes the line from Brazos River, Texas, to the Rio Grande, Texas. Numerous comments regarding this proposed description were received. The proposed descriptive line was not adopted. The line of demarcation adopted will permit oceangoing vessels running between Aransas Pass Lighted Whistle Buoy 1A and Brazos Santiago Entrance Lighted Whistle Buoy 1 to operate under the International Rules at all times.

In order to prevent confusion regarding effective date of regulations because the revised International Rules become effective on and after January 1, 1954, it is hereby found to be in the public interest that these amendments become effective on and after January 1, 1954.

By virtue of the authority vested in me as Commandant, United States Coast Guard, by Treasury Department Order No. 120, dated July 31, 1950 (15 F. R. 6521), to promulgate rules and regulations in accordance with the statutes cited with the regulations below, the following amendments to the regulations are prescribed which shall become effective on and after January 1, 1954:

1. Section 82.95 is amended to read as follows:

§ 82.95 *Mobile Bay, Ala., to Mississippi Passes, La.* Starting from a point which is located 1 mile, 90° true, from Mobile Point Lighthouse, a line drawn to Mobile Entrance Lighted Whistle Buoy 1; thence to Ship Island Lighthouse; thence to Chandeleur Lighthouse; thence in a curved line following the general trend of the seaward, high-water shore lines of the Chandeleur Islands to the southwesternmost extremity of Errol Shoal (Lat. 29°35.8′ N., Long. 89°00.8′ W.); thence to Pass a Loutre Lighted Whistle Buoy 4.

2. Section 82.100 is amended to read as follows:

§ 82.100 *Mississippi River.* The Pilot Rules for Western Rivers are to be followed in the Mississippi River and its tributaries above the Huey P. Long Bridge.

3. Part 82 is amended by adding a new § 82.103, reading as follows:

§ 82.103 *Mississippi Passes, La., to Sabine Pass, Tex.* A line drawn from Pass a Loutre Lighted Whistle Buoy 4 to South Pass Lighted Whistle Buoy 2; thence to Southwest Pass Entrance

Midchannel Lighted Whistle Buoy; thence to Ship Shoal Lighthouse, thence to Calcasieu Pass Lighted Whistle Buoy 1; thence to Sabine Pass Lighted Whistle Buoy 1.

4. Section 82.105 *Sabine Pass, Texas,* is canceled.

5. Part 82 is amended by adding a new § 82.106, reading as follows:

§ 82.106 *Sabine Pass, Tex., to Galveston, Tex.* A line drawn from Sabine Pass Lighted Whistle Buoy 1 to Galveston Bar Lighted Whistle Buoy 1.

6. Section 82.110 *Galveston Harbor* is canceled.

7. Part 82 is amended by adding a new § 82.111, reading as follows:

§ 82.111 *Galveston, Tex., to Brazos River, Tex.* A line drawn from Galveston Bar Lighted Whistle Buoy 1 to Freeport Entrance Lighted Bell Buoy 1.

8. Section 82.115 *Brazos River, Tex.* is canceled.

9. Part 82 is amended by adding a new § 82.116, reading as follows:

§ 82.116 *Brazos River, Tex., to the Rio Grande, Tex.* A line drawn from Freeport Entrance Lighted Bell Buoy 1 to Pass Cavallo Lighted Whistle Buoy 1; thence to Aransas Pass Lighted Whistle Buoy 1A; thence to a position 10½ miles, 90° true, from the north end of Lopeno Island (Lat. 27°00.1′ N., Long. 97°15.5′ W.); thence to Brazos Santiago Entrance Lighted Whistle Buoy 1.

(Sec. 2, 28 Stat. 672, as amended, 33 U. S. C. 151)

Dated: December 1, 1953.

[SEAL] A. C. RICHMOND,
Rear Admiral, U. S. Coast Guard,
Acting Commandant.

[F. R. Doc. 53-10234; Filed, Dec. 7, 1953; 8:48 a. m.]

Courtesy Marine Reporter

TITLE 33—NAVIGATION AND NAVIGABLE WATERS

Chapter I—Coast Guard, Department of the Treasury

Subchapter M—Coast Guard Vessels

[CGFR 53-50]

PART 135—LIGHTS FOR COAST GUARD VESSELS OF SPECIAL CONSTRUCTION

EXEMPTIONS OF STATUTORY REQUIREMENTS FOR COAST GUARD VESSELS

The provisions of section 2 and Rule 13 (b) in section 6 of the act of October 11, 1951 (65 Stat. 407, 415; 33 U. S. C. 143a, 145k), and section 1 of the act of December 3, 1945, as amended (59 Stat. 590; 33 U. S. C. 360), provide, in essence, that Coast Guard vessels of special construction may be exempted from certain requirements of the various applicable laws with respect to the number, position, range of visibility, or arc of visibility of the lights required to be displayed by vessels when navigating on the high seas or on navigable waters of the United States, its territories or possessions. Section 2 of the act of October 11, 1951, and section 1 of the act of December 3, 1945, also provide that if any exempted vessel or class of vessels, by reason of special construction, cannot comply with the applicable requirements, the lights prescribed shall conform as closely to the requirements of the applicable laws as it is found or certified to be feasible. These laws also require that notice of such findings or certifications, together with the requirements describing the character and position of the lights to be displayed on such exempted vessel, or class of vessels, shall be published in the FEDERAL REGISTER and in the Notice to Mariners.

The new Subchapter M, containing Part 135, for placement in Chapter I of Title 33 of the Code of Federal Regulations, as contained in this document, sets forth the findings, certifications, exempted requirements, and the requirements certified to be found feasible for certain Coast Guard vessels with respect to lights.

TITLE 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

[CGFR 53-25]

MISCELLANEOUS AMENDMENTS TO CHAPTER

Notices regarding proposed changes in the rules and regulations governing vessel inspection were published in the FEDERAL REGISTER dated February 13, 1953, 18 F. R. 880-883, as Items II to XI, inclusive, and Item XIX, and in the FEDERAL REGISTER dated March 7, 1953, 18 F. R. 1334, as Item XX on the agenda to be considered by the Merchant Marine Council, and a public hearing was held by the Merchant Marine Council on March 24, 1953, in Washington, D. C. All comments submitted were considered and where practicable were incorporated into the regulations.

Amendments to the regulations prescribed herein shall become effective on and after January 1, 1954, unless otherwise indicated within the amendment itself.

TITLE 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

Subchapter O—Regulations Applicable to Certain Vessels During Emergency

[CGFR 53-51]

PART 154—WAIVERS OF NAVIGATION AND VESSEL INSPECTION LAWS AND REGULATIONS

NATIONALITY OF CREWS OF NONSUBSIDIZED MERCHANT VESSELS

The purpose of this order is to cancel the general waiver designated § 154.11, as well as 33 CFR 19.11, effective January 1, 1954, regarding the nationality of crews of nonsubsidized merchant vessels.

TITLE 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

Subchapter N—Explosives or Other Dangerous Articles or Substances and Combustible Liquids on Board Vessels

[CGFR 53-54]

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

MISCELLANEOUS AMENDMENTS

A notice regarding proposed miscellaneous changes in the regulations governing the transportation or stowage of explosives or other dangerous articles or substances and combustible liquids on board vessels was published in the FEDERAL REGISTER dated September 9, 1953, 18 F. R. 5434, 5435, as Items XVII to XXVI, inclusive, on the Agenda to be considered by the Merchant Marine Council on September 29, 1953, at Washington, D. C. All comments, views, and data submitted were considered and where practicable incorporated into the regulations.

Amendments to the regulations prescribed herein shall become effective 90 days after date of publication of

this document in the FEDERAL REGISTER, except as otherwise indicated in the regulations.

TITLE 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

Subchapter C—Uninspected Vessels

[CGFR 53-55]

PART 25—REQUIREMENTS

SUBPART 25.30—FIRE EXTINGUISHING EQUIPMENT

FIRE EXTINGUISHING EQUIPMENT REQUIRED FOR MOTORBOATS

This amendment to 46 CFR 25.30-20 will require all outboard motorboats not carrying passengers for hire to carry hand-portable fire extinguishers, except for outboard motorboats of the rowboat or canoe type which are less than 26 feet in length.

TITLE 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

[CGFR 53-56]

Subchapter P—Manning of Vessels

PART 157—MANNING REQUIREMENTS

Subchapter Q—Specifications

PART 160—LIFESAVING EQUIPMENT

MANNING OF VESSELS; SPECIFICATION FOR BUOYANT APPARATUS AND LIFE FLOATS

A notice regarding proposed regulations regarding enforcement of Officers' Competency Certificates Convention, 1936, manning of vessels, and proposed changes in the specification for buoyant apparatus and life floats was published in the FEDERAL REGISTER dated September 9, 1953, 18 F. R. 5432, 5435, as Items III, XXVII, and XXVIII on the agenda to be considered by the Merchant Marine Council, and a public hearing was held by the Merchant Marine Council on September 29, 1953, in Washington, D. C. No comments were received proposing changes in the proposed regulations.

Amendments to the regulations prescribed herein shall become effective thirty days after publication of this document in the FEDERAL REGISTER.

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 9-53

19 November 1953

Subj.: Ferry vessels; safety practices for embarking motor vehicles

1. *Purpose.* The purpose of this circular is to inform all parties concerned of certain mandatory safety precautions to be observed while loading or unloading vehicular ferry vessels.

5. *Safety practices.* To minimize casualties it is essential that operators of vehicular ferry vessels exercise essential safety practices. It is urged that the following safety practices be followed:

a. The operators of automobiles should not be permitted to proceed at excessive speed while embarking on or leaving a ferry vessel.

b. After an automobile enters a ferry vessel, it should be required to stop at least 20 feet from the offshore barrier and then to proceed to its parking place at the lowest minimum speed (if necessary).

c. The ferry vessel should be equipped with sturdy guard chains or rails which should be properly installed and maintained in good condition. The guard chains or rails should be in position at the offshore end of the ferry vessel before loading is permitted.

d. All vehicles at both ends of the ferry vessel should be effectively chocked immediately after loading and before the ferry vessel leaves the dock.

e. As soon as a motor vehicle is properly placed on a ferry vessel, its brakes should be set and its motor should be stopped immediately.

f. No loading or unloading of motor vehicles shall be permitted until the ferry vessel is securely made fast to the dock.

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 10-53

10 December 1953

Subject: Waivers of navigation and vessel inspection laws and regulations; authority and procedure for

Purpose. The purpose of this circular is to bring to the attention of all concerned that on and after January 1, 1954, no individual waivers will be issued which would reduce the percentages of citizen seamen required by statute to be employed in the unlicensed crews of subsidized vessels, and that the general waiver reducing the percentage of citizen seamen required in the unlicensed crews of non-subsidized vessels to the extent necessary to permit one-half the number of able seamen and one-half the number of qualified members of the engine department required on such vessels to be aliens is being canceled effective December 31, 1953, in accordance with a notice published in the Federal Register dated December 9, 1953, 18 F. R. 7903. A survey conducted recently by the Coast Guard indicated that the need for these particular waivers no longer existed.

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 December 15, 1953 (CGFR 53-52). Copies may be obtained upon request from the Commandant (CMC), U. S. Coast Guard, Washington 25, D. C.]

FUSIBLE PLUGS

The regulations prescribed in Subpart 162.014, Subchapter Q Specifications, require that manufacturers submit samples from each heat of fusible plugs for test prior to plugs manufactured from the heat being used on vessels subject to inspection by the Coast Guard. A list of approved heats which have been tested and found acceptable during the period from November 15, to December 15, 1953, is as follows:

The Lunkenheimer Co., Cincinnati 14, Ohio, Heat Nos. 468 through 476.

AFFIDAVITS

The following affidavits were accepted during the period from November 15, to December 15, 1953:

Beaumont Iron Works Co., 1404 Dunlavy, Houston, Texas, Valves.

The Johnson Corp., 805 Wood St., Three Rivers, Mich., Fittings.

Malsbary Manufacturing Co., 845 92d Ave., Oakland 3, Calif., Valves.

ARTICLES OF SHIPS' STORES AND SUPPLIES

Articles of ships' stores and supplies certificated from December 1, 1953 to December 28, 1953, 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

John B. Moore Corp. 349 Franklin Ave. Nutley 10, N. J. Certificate No. 143, dated December 22, 1953. "PERTROLENE SOLVENT M-2."

John B. Moore Corp. 349 Franklin Ave. Nutley 10, N. J. Certificate No. 149, dated December 22, 1953. "CINECLENE SOLVENT M-5."

John B. Moore Corp. 349 Franklin Ave. Nutley 10, N. J. Certificate No. 150, dated December 22, 1953. "FRIGISOL SOLVENT M-3."

John B. Moore Corp. 349 Franklin Ave. Nutley 10, N. J. Certificate No. 151, dated December 22, 1953. "OXYLENE SOLVENT M-6."

2 TRIPS

ARE SAFER THAN

U. S. GOVERNMENT PRINTING OFFICE: 1954