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Feature

MARINE TRAFFIC CONTROL SYSTEM FOR THE PANAMA CANAL

PROCEEDINGS

OF THE

MERCHANT MARINE COUNCIL

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The Merchant Marine Council of The United States Coast Guard

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FRONT COVER

The M/V *Leonidas Polk*, part of the Canal Barge Company's fleet, towing petroleum barges above Saint Louis. *Courtesy Diesel Times.*

BACK COVER

The ever-present hazard of winches—vividly portrayed by G. Seal of Pacific Maritime Association.

USPHS SPECIAL AWARD

A SPECIAL CITATION AWARD has been presented to Waterman Steamship Corp. by the U.S. Public Health Service. The citation was awarded for excellence in sanitation on each of Waterman's vessels during 1961. The award was presented by Mr. C. H. Atkins, shown at right, Assistant Surgeon General, USPHS, and accepted on behalf of Waterman Steamship Corp. by Capt. W. E. Anthony, Vice President Marine Operations.

DIST. (SDL NO. 74)
A: a aa b c d (2); remainder (1)
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MARINE TRAFFIC CONTROL SYSTEM
for the
PANAMA CANAL

PORTION of Gatun Locks

THIS ARTICLE describes the basic features of the Marine Traffic Control System being designed for the Panama Canal, which will contribute toward reduction of hazards, including that of collision between vessels. The Control System also provides several other benefits, some of which may be considered more important to present Panama Canal operations than the added collision prevention features.

The Panama Canal is approximately 50 miles long, and utilizes a three-chamber lock at the Atlantic end, and one two-chamber and one single-chamber locks at the Pacific end. All three locks have two traffic lanes. The elevation of Gatun Lake, and therefore of the channel across the Isthmus, is approximately 85 feet above mean sea level. Random groups of ships approach the Canal from both ends daily, and should transit the Canal in a manner which makes efficient use of the Canal facilities, and at the same time results in each ship spending a minimum of time in transit. The channel across the Isthmus consists of the 800- to 1,000-foot-wide portion through Gatun and the 300- to 500-foot-wide portion through the Continental Divide. This latter channel is referred to as the "Cut."

This article is excerpted from a paper prepared by Gibbs & Hill, Inc. Consulting Engineers, New York City, and which was presented at the Third International Convention of the Three Institutes of Navigation (Germany, France, and Great Britain) at Dusseldorf during May 1961. ED.

INCREASED HANDLING CAPACITY NEEDED

An increase in the number of ships desiring transit through the Canal, together with the increasing size of the average ship, has demonstrated the need for increasing the previous operating capacity of the Canal. Several improvements have been undertaken to achieve this end. New techniques for overhauling the locks have been developed in order to reduce the time that any lock lane is out of service. This improvement has the effect of increasing the yearly capacity of the Canal, and shortening the time during which traffic congestion exists around a particular lock undergoing overhaul. New, larger and more powerful locks locomotives have been ordered, which will operate from a 60-cycle power system, to which the older system has been converted. These locomotives are expected to improve lock operations, to reduce lockage interval times, and to provide better handling capabilities for large ships in the locks. Both of these improvements have an effect on the overall safety of operations.

Several other improvements are under way which affect the capacity of the Canal to some extent, but, more importantly, they tend to reduce hazards in the Canal. The outstanding of these improvements is the widening of the channel traversing the Cut. Those portions which are presently 300 feet wide are being widened, or shortly will be widened, to 500 feet. A system of lighting is also being installed through the Cut to facilitate night-time transit with far less hazard.

TRAFFIC CONTROL SYSTEM

A new Marine Traffic Control System is presently being designed to aid in more efficient and safe operation of the Canal as a whole. The purpose of the System, in general terms, is to replace the present traffic signalling arrangement in the Cut, which arrangement consists of three signal masts upon which ball-and-cone signals are hoisted. Further, the purpose is to extend, as well as to modernize, the traffic control sys-

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tem to the entire length of the Canal.

The new Traffic Control System is to perform three basic functions:

FIRST; it is to provide facilities with which to prepare optimum schedules for handling the various random patterns of traffic as they occur each day. The optimum schedule has two fundamental criteria: (1) to shorten overall ships' time in Canal Zone waters; and (2) to balance the cost of Canal Company operations against the degree of achievement of the first criterion.

SECOND; it is to control traffic movement in a manner which will facilitate the execution of the prepared optimum schedules. It is obvious that a good schedule is of no value if it is not actually executed in fact.

THIRD; it is to reduce the various hazards of operation that are natural to the Canal, and that arise from the increasing traffic density.

Briefly, the System centers in a Central Dispatching Office, to be located in Balboa. This office will contain electronic digital computer equipment, a dispatcher's operating console, voice and data communication equipment, and a large display board depicting the Canal and continuously indicating the identity and location of all ships in the Canal. Special displays are to be provided, enabling the dispatcher to obtain detailed data concerning the location and performance of various ships in question. The communications system, between the central office and the ships, will consist of wire-line, microwave, and VHF radio communication facilities. The VHF base stations, of which there are five, will be located along the Canal. Each pilot will carry aboard ship a unit, approximately the size of an attache case, which will include his voice communication radio, the data communication radio, the logic equipment utilized in automatic data communication between the central office and the unit, and a hyperbolic radio location-sensing receiver utilized in determining each particular ship's location in the Canal.

This location-sensing receiver will intercept radio signals from land-based hyperbolic radio transmitters located at each end of each reach in the Canal. There will be approximately 16 reaches; thus, 16 pairs of hyperbolic radio transmitters. These transmitters will be automatically activated by the computer equipment in the central office, utilizing the data communications system to transmit its commands.

From a technical standpoint, the Marine Traffic Control System can be divided into two parts: (1) the portion used to prepare the traffic schedule; and (2) the portion used to monitor the performance of the locks and of ships, and to control the traffic in the Canal in accordance with the intent of the schedule.

SCHEDULING SYSTEM

The scheduling system is based primarily on electronic digital computer capacity, which will be used to prepare the optimum schedule for the particular list of ships desiring transit during any one period. This schedule will be figured on the basis of total ships' time in Canal Zone waters, as well as with respect to operating costs incurred by the Canal Company. The schedule, when completed, will be delivered automatically to various important points along the Canal, and to the monitoring system.

MONITORING SYSTEM

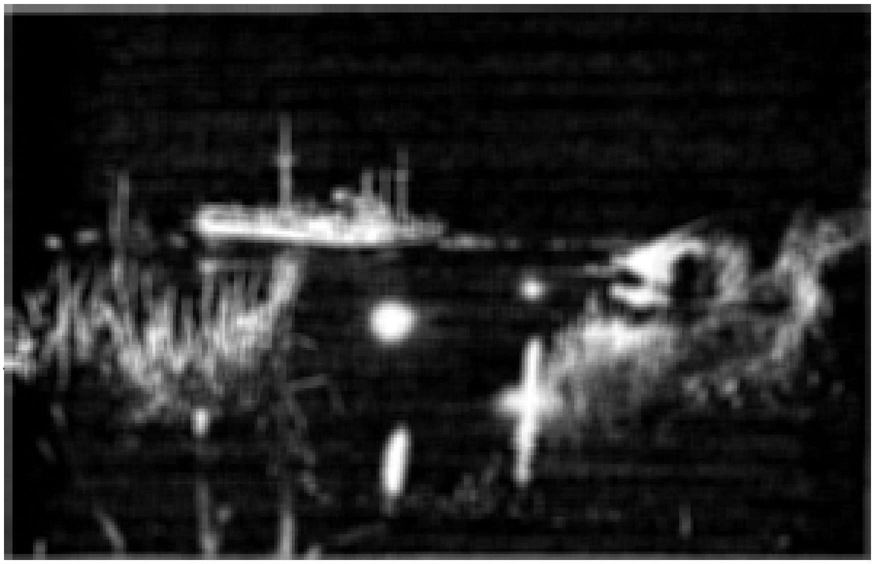
The monitoring system consists of the electronic digital computer capacity in the central office, the data communications system between the central office and each of the pilots' units aboard the transiting ships, and between the central office and the hyperbolic radio transmitters. Improved voice communication between the central office and the ships is also to be provided. A brief description of the operation of the monitoring system is as follows:

The monitoring computer receives, and uses as a reference, the schedule prepared by the scheduling computer. To obtain the operating performance data, for comparison with the desired schedule, the monitoring computer automatically causes the hyperbolic radio transmitter, for each reach in succession, to operate; and interrogates the pilot's unit aboard each ship in the Canal to obtain the position data recorded by its location sensing receiver. The information concerning identity and actual location of each ship, so obtained by the computer, is compared against the desired schedule and a signal aspect, or display, is prepared for delivery to each ship, where it is displayed on the face of the pilot's unit. This portion of the signal display will be utilized by the pilot in maintaining his scheduled position. Additional information for the pilot is also provided by the display unit with the intent of reducing hazards.

DESCRIPTION OF PILOT'S UNIT

The display on the face of the pilot's unit consists of a combination of lights together with numerical and alphabetic information. One combination indicates to the pilot the time of day, in hours and minutes, that he is due to pass the next reference point in the schedule. Several reference points, having different reasons for their establishment, will be utilized. The entry to, and exit from, each lock will be reference points. Passing by Gamboa will also be a schedule reference point. Buoys 17 and 71 in Gatun Lake are further reference points and, together with several reference points in the Cut, will be used to adjust the location at which ships will overtake each other in Gatun Lake or meet in the Cut.

NIGHT VIEW of Miraflores Locks with new lighting. *Photo courtesy Panama Canal Co.*



NIGHT TRANSIT of Gaillard Cut with help of new lighting. *Photo courtesy Panama Canal Co.*

LOCK SIGNALS

Another combination visually indicates the type of reference point that corresponds to the time display. For instance, when a vessel is approaching a lock an E or a W will be displayed by the unit which will indicate to the pilot that he is to enter either the east or west lane of the lock. This is important since some ships find it quite hazardous to enter the right lane due to the rotation of a single screw.

SPEED SIGNALS

The other combinations advise the pilot regarding the number of ships he will meet, the number of ships that will be met before reaching the reference point that he is approaching and that is referred to in the time display, and also how many ships he will meet in the section immediately beyond the same reference point.

Additional signals are provided on the display unit to advise the pilot to change his speed if such action becomes necessary, to increase his speed if practical, to decrease his speed, or simply an indication that neither an increase nor a decrease is desired.

A small light at the top of the display, is only illuminated when the pilot's signal-aspect is changed for some reason. Although a particular ship is interrogated approximately every 2 minutes, its appropriate signal-aspect may remain unchanged over a considerable length of time, in which case the annunciator light would not be illuminated. However, any time a new or changed signal-aspect is transmitted to the unit, the annunciator light is illuminated. The pilot would then acknowledge the receipt of the new aspect by extinguishing the light by depressing a push-button.

HAZARDS

At this point, it seems appropriate to enumerate some of the hazards of operation that are present in the Canal. One of the more obvious hazards is the entry into a lock. The approach to a lock chamber must be made in such a manner that ship speed is reduced to a minimum when coming alongside the end wall of the lock. The time of arrival at this position must be closely controlled to coincide with the readiness of the towing locomotives to attach their lines to the ship. Thus, the arrival time at a lock is an important consideration, both from the standpoint of maintaining the schedule and from the standpoint of reducing hazards.

Gaillard Cut presents several hazardous situations. There are certain bends in the Cut at which it is hazardous for ships to meet and pass each other. The problem is magnified by the existence of an intermittent north-to-south current in the Cut; and by a phenomenon called "bank suction" by the pilots. This action, which tends to force the stern of the ship toward the near bank, is caused by the hydraulic condition that develops when a ship moves through a narrow channel considerably closer to one bank than the other, and the velocity of the water between the ship and the near bank therefore becomes greater than that between the ship and the far bank, in turn causing a lower static pressure against the ship on the side of the near bank, with respect to the pressure on the side of the ship toward the far bank. Once this situation has developed, it is difficult to recover control of the ship unless the full width of the channel is available for maneuvering. Therefore, the avoidance of meets on bends is very important to safe operation. At some bends the portion of the Canal beyond the bend is not visible to the pilot. Thus it is important for him to know whether or not he will meet a ship in that section of the Canal, because such a condition would influence the manner in which he would navigate the bend.

"CLEAR CUT" SHIPS

Some ships, due to their size or cargo, are not permitted to meet another ship anywhere in the Cut. These ships are termed "clear cut ships" and traffic must be controlled in such a manner as to allow these ships to transit the Cut without meeting another ship.

In Gatun Lake between buoys 17 and 71 certain ships may overtake and pass other ships. Traffic control must, however, schedule passes so that vessels so engaged do not meet oncoming traffic at that time.

Nighttime and bad weather also pose obvious problems. During bad weather or low visibility, one ship may approach a preceding ship too closely and thus create the hazard of a bow-to-stern collision. This bunching of ships is prevented by the aforementioned speed indications to pilots from traffic control.

EMERGENCIES

Emergency conditions may arise in the Canal that call for various measures in order to avoid unusual and hazardous conditions. For instance, the channel might become fouled by a disabled ship, a barge or a slide in the Cut. A lane of a particular lock might experience a breakdown, and thus not be able to accept a ship, so that the ship would be required to stand off rather than approach the lock. Extreme rainfall might suddenly reduce visibility to a minimum, or a ship might develop trouble which would cause it to be extremely difficult to handle so that it should not meet other ships except in the widest portions of the Canal.

Any departure from normal conditions may require that the schedule which is being followed be rapidly revised to agree with actual conditions in the Canal or hazardous situations might result.

The Marine Tariffic Control System, with its current knowledge of the location and identity of all ships in the Canal, and its ability to correlate this information and send appropriate signal aspects to each pilot, has the ability to reduce the degree of hazard involved.

TIMING ARRIVAL AT LOCKS

In the case of the hazard created by closely approaching a lock before the lock-locomotives are ready, the time for arrival at the lock as displayed on the pilot's unit, is checked against the estimated time at which the lock will be ready. Each lock will have facilities for automatically transmitting these data to the computer in the central office at any time such estimate is revised by the lock's personnel. The computer, thus knowing the time at which the lock will be ready, is able to display that time to the pilot, enabling him to arrive at the lock at the appropriate time.

TIMING ARRIVAL AT BENDS

Of the several hazards that may occur in the Cut, meetings at a bend in the channel are the most frequent, and can be eliminated or reduced by the system. Knowing the locations of two ships approaching each other, the system can predict the point at which they are likely to meet. If this point is in an undesirable location, the computer will cause a signal aspect to be sent to the two pilots to slow one of them down and speed the other up, thus moving the point of meeting to an acceptable location. That portion of the signal aspect which tells the pilot how many ships he will meet before the next reference point, and immediately beyond the reference point, provides the pilot with knowledge that will enable him to adjust his speed, and to maneuver his ship appropriately.

VISIBILITY IS A PROBLEM

Visibility in the Cut is a problem for several reasons: blind corners in the Canal, nighttime operation (until the Cut is lighted), and bad weather. Bunching of traffic in the Cut is somewhat more of a problem than in the Lake, but in either case, if a ship begins to approach too closely a ship ahead which is proceeding in the same direction, the signal aspect displayed to the lead ship will tell him to speed up while the signal aspect displayed to the following ship will tell him to slow down. These requests will continue to be displayed until the distance between the two ships has increased to a safe margin.

In the case of one ship being scheduled to overtake and pass another in the Lake, the system will keep track of the location of both ships and provide appropriate speed control signals to bring about the occurrence in a safe location. It will prevent the maneuver from occurring at either of the two extremes of the allowable passing channels. Furthermore, by appropriate speed signals, the system will inform other ships not involved to speed up, or slow down, in order not to be in the vicinity where the overtaking is to occur, thus reducing the hazard of collision.

FOULED CHANNEL

Certain emergencies may arise, such as when the channel becomes fouled at any point for any reason, so that a ship may not proceed as planned. This fact is immediately entered into the computer-memory and the computer will send signal aspects to the pilots of those ships approaching the fouled point. These aspects will call for a reduction of speed to delay the ship in reaching the fouled point, so that the dispatcher may notify the pilots of the emergency condition by voice radio. The dispatcher, upon receiving a report of such an emergency condition, can immediately view his display board and determine which ships need to be called and which ships should be called first. Advice can be given to the pilot by the dispatcher depending upon the situation. These conditions are quickly apparent to the dispatcher by viewing the overall display board and by viewing the special displays to gain further detailed information as required.

BREAK DOWNS

Any breakdown in a lock lane is reported immediately to the central office by the lock personnel whereupon the dispatcher would enter this condition into the computer that sends signal aspects to pilots of ships approaching that lock instructing them to delay, so that a new schedule can be prepared.

In the event of any such emergency, the scheduling portion of the system immediately prepares a new reference schedule for traffic, based upon the traffic conditions in the Canal and the breakdown in the lock or other unusual condition. The new schedule is delivered to the monitoring computer, within a matter of minutes, to enable the monitoring portion of the system to control traffic with respect to a schedule that has taken the emergency condition into account. The system thus provides facilities for gathering current data and for handling and correlating this material with sufficient speed and accuracy to provide up-to-date information for all pilots of ships in the Canal.

PURPOSE OF CONTROL SYSTEM

The new Marine Tarffic Control System is intended to increase Canal capacity by increasing efficiency while at the same time reducing present hazards as well as those that may result from closer scheduling and denser traffic. In reality, the system does not change the physical aspects of the Canal in any regard. It is simply a tool to enable the pilots of the ships and the dispatcher to perform their duties more effectively. It provides more information, accurate and up-to-date, than has heretofore been available. It provides facilities for handling and correlating data, and presents the results to the pilots and dispatchers in a form that enables them to do that which man is far more qualified to do, namely, exercise judgment. It releases the traffic dispatcher from menial and mundane tasks of a repetitious nature, and allows him to focus his attention on the ever-changing traffic conditions in the Canal.

DON'T WORRY---WE'LL MAKE IT FIT

Courtesy Maritime Reporter

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The 940-foot tanker *Manhattan*, the Nation's largest commercial ship, completed her maiden voyage when she arrived in New York Harbor last February. In her hold was 20,355,761 gallons of fuel oil and petroleum products. The cargo, totaling 60,303.9 tons, is the largest single cargo ever to be delivered to New York Harbor.

RADAR AND THE RULE OF THE ROAD

(By Captain F. J. Wylie, R.N.)

> The following pertinent comments by Captain Wylie are in response to an article published in the February, 1961 "Proceedings." Captain Wylie is associated with the Chamber of Shipping of the United Kingdom, and the Liverpool Steam Ship Owners' Association. These remarks represent his own opinions and are not necessarily those of his associates.

In the Proceedings for February 1961, there was an interesting article by Paul Reyff who, on the whole, appears to have taken a view of the achievements of the 1960 Safety Conference, as far as radar and the Rules of the Road are concerned, from which I dissent quite strongly and, having been associated with the work preliminary to and at the Conference, I would like to explain why. I should state that the opinions given are my own and not necessarily those of the Chamber of Shipping of the United Kingdom or the Liverpool Steam Ship Owners' Association.

The points will be taken in the order in which they were discussed in the article.

The first item concerns Item (3) of the Annex to the Rules and the question of "ascertainment." There is no doubt that the Rules must be conformed with strictly, but the question here is not "whether" but "how" to conform with Rule 16(b). Courts have shown that one does not necessarily have to see the other vessel at the moment of ascertainment and Lord MacMillan in the *N.Y.K.* v. *China Navigation Co.* ruled that the other vessel must be known "to be in such a position that both vessels can safely proceed without risk of collision." This would seem to involve knowledge of at least the direction of the other vessel's movement, if any, or, if stopped, the direction of heading and therefore of probable initial movement. A single radar range and bearing alone cannot give either piece of information but a plot of a number of observations might well be held to do so and ascertainment might be said to have been effected if there was no reasonable doubt of identity between the sources of the radar echo and of the fog signal.

It is my understanding that the wording of Item (3) of the Annex "the radar range and bearing alone" was held to mean exactly what it says, no more no less.

Mr. Reyff does not subscribe to this view but considers that the wording of Item (3) makes radar range and bearing "unallowed information." This view would seem to miss the whole force of the word "alone." The radar range and bearing are surely "unallowed" only when in isolation.

I do not think it is correct to say that plotting postulates steady course and speed; the whole object of plotting is to discover the past course and speed and to detect any changes in it, with the minimum possible interval between past and present. No radar information can possibly bridge the interval but inference will be drawn which will be considered justified or not according to the level of intelligence shown to have been employed.

In connection with Rule 16(c), the great majority of seamen would probably define a close quarter situation, in the fog context, quite simply, as a separation of less than 2 to 3 miles. It can be described also as the distance at which the data rate of normal marine radar observation and plotting fails to give warning of changes of movement by another ship in time to permit safe remedial action. It depends upon many circumstances and there does not seem to be any gain in proceeding beyond the simple form of definition.

It seems unwise to make legal play on the words "may" and "shall." Rule 16(c) includes two quite distinct injunctions, the first permissive and the second mandatory. When outside the close quarter situation it is made permissible, by early and bold action, to try to avoid entering it. When inside it, the stopping of engines has to be related to the collision risk even if Rule 16(b) has not become operative.

It is quite clear that, in certain practical circumstances, a close quarter situation has to be accepted. In others, avoidance of it may be possible but extremely inconvenient or hardly practicable. It would seem quite wrong in this context to suggest that the man on the spot should not be permitted to exercise his discretion in deciding how to proceed in company with other vessels. Such a proposition could lead to a corollary involving unpractical definitions of "early" and "bold."

Coming to Item (2) of the Annex, Mr. Reyff takes the third sentence to preclude any idea that information from radar might justify somewhat greater speed. If this item was not intended to imply that radar should have some effect on the choice of moderate speed it would hardly have been included; so it is fair to assume that either increases or decreases or both were envisaged. The final sentence in the item is devoted to a warning that in certain circumstances moderate speed should be slower than in the absence of radar indications; the impression that the second sentence must therefore have the implication of an increase is irresistible. The third sentence is a caution which sets comfortably on this implication, removing any suggestion that it is a general invitation to speed.

Concerning the reference to Item (4), I agree that this is an emphasis on the necessity for plotting or using some device which will give the same kind of intelligence. Some people, however, hold that true motion radar will do this in good measure.

LUCK IS NOT RELIABLE

The ship was discharging cargo from No. 2 lower hold. Two sections of hatchboard were in place in the after end of the tweendeck. Cargo was being dragged into the square from the after wings of the lower hold, so that the cargo falls were pulled up against the bottom of the tweendeck strongbacks.

As one load was being dragged out, the upward pull of the falls dislodged a strongback in the tweendeck, which fell directly between two longshoremen in the lower hold. Fortunately, and somewhat strangely, all of the hatchcovers remained in place when the strongback fell, supported by a queen beam and the remaining king beam. Thus only an unusual amount of luck prevented several serious injuries to the gang in the hold.

Unfortunately, we cannot rely on such luck to prevent all injuries. We can, however, make use of the lessons we can learn from such near-misses, and thus avoid identical future accidents.

In this case, the obvious lesson is to be sure that strongbacks are securely locked in place, especially when loads are being dragged from under them and the cargo falls are pulling up on them. The investigation of this accident brought out that everyone *thought* the strongbacks were locked in, because the previous night gang had worked the same operation with no accidents.

MARITIME SIDELIGHTS

Practical training in defense against atomic, biological, and chemical warfare is being given to American merchant seamen (licensed and unlicensed) through a program sponsored by the Maritime Administration. The training sessions are conducted with the use of MSTS facilities and instructors at the U.S. Navy Base, Treasure Island, San Francisco, Calif.

The course includes schooling and movies on atomic war and decontamination methods, and do-it-yourself drills in up-to-date firefighting and damage control techniques.

Each session consists of a 3-day period—Tuesday, Wednesday, and Thursday—from 8 a.m. to 4 p.m. each day. Classes are held every 2 weeks and are scheduled throughout the year.

The training, at no charge to trainee, is available to the following: Shoreside personnel employed by American-flag steamship or towboat companies, seamen of American-flag ships, and unemployed seamen who have been to sea within the past 6 months.

All who complete the course receive a Certificate of Training.

Steamship companies, maritime unions, and other organizations concerned with sea transportation regularly nominate candidates for this training. Any qualified applicant may also enroll by contacting the Maritime Administration direct giving address, "Z" number, and rating (or license and number). Applications should be made to Pacific Coast Director, Maritime Administration, 180 New Montgomery St., San Francisco 5, Calif.

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As of December 1961, there was a reported total of 61 ships on order or under construction in American shipyards for a total of 868,500 gross tons.

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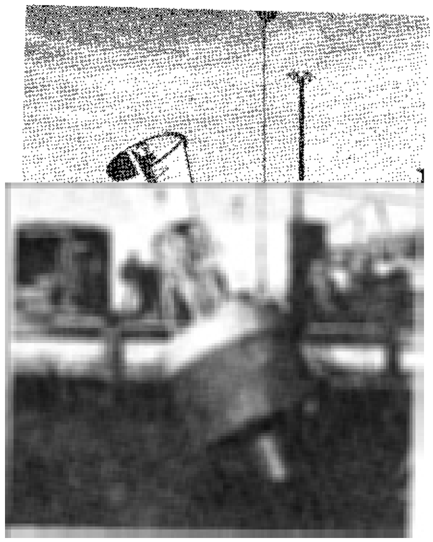
Construction has recently started on berthing facilities for deep-sea vessels on the shores of Lake Washington. The project, to be completed in 1963, will include five deep-sea berths and two shallow-draft slips.

ATOMIC BUOY



SHOWN ABOVE is the launching of the world's first atomic buoy at the Coast Guard Yard in Baltimore, Md. The buoy is lighted by SNAP-7A (denoting the Atomic Energy Commission's Systems for Nuclear Auxiliary Power), a strontium 90 thermoelectric system. This system may be used to improve the reliability of many remote Coast Guard aids to navigation lights, lighthouses, beacons, and buoys.

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The *Ancon*, one of the country's best known medium-sized luxury liners, appears destined to finish her career as a training ship.

The 9,978-ton, 17½-knot steamship made her debut in 1939 as one of three then new liners ordered by the Panama Line for its weekly passenger and cargo run from New York to the Canal Zone.

She has emerged from semiretirement—layup in New Orleans since last June—to a floating classroom for 2,000 in the Army Transportation Corps. The soldiers, stationed at Camp Leroy Johnson in Louisiana, will use the 493-foot liner to brush up on cargo loading and unloading skills.

Record runs were established recently by two new ships of the Lykes Bros. Steamship Co.

The *Thompson Lykes* made the round trip from the U.S. Gulf to Europe in 29 days and 5 hours, as compared with approximately 36 days required by a C-2-type vessel.

The *Zoella Lykes* made the Singapore to New Orleans run in 28 days, clipping 3 days from the voyage time of a C-2 ship.

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The *Orion Hunter*, a new 67,100-ton supertanker, is now in operation. The vessel was built by Bethlehem Steel for Colonial Tankers Corp. and is currently under a 5-year charter to MSTS. The steamship is 860 feet in length, has a designed speed in excess of 16 knots, and can carry 23,407,000 gallons of bulk liquid in 38 cargo tanks.

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During October 1961, there was a drop of over 300,000 tons in the tonnage of ships using the Suez Canal, according to Lloyd's List. During the month, 1,567 ships of 15,958,847 tons net used the canal, compared with 1,598 vessels of 16,284,744 tons in the corresponding month last year. The daily average of transits was 50.5, against 51.5 in October last year.

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Lykes Bros. Steamship Co. has received its ninth new $10 million cargo liner the *Leslie Lykes* following her completion by the shipbuilding division of the Bethlehem Steel Corp., at Sparrows Point, Md.

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Standing Rigging: Shrouds and other standing rigging that are served have displayed a marked tendency to rust through under the served area. The serving traps water and hastens the rusting process; in many instances the cable will be in good shape except for the area under the serving, which will be completely gone. Does the practice of serving standing rigging accomplish any useful purpose on your vessel?

nautical queries

DECK

Q. What does the proposed annex recommend as to the use of information obtained from radar when determining moderate speed in restricted visibility at sea?

A. Information obtained from radar is one of the circumstances to be taken into account when determining moderate speed. In this regard it must be recognized that small vessels, small icebergs and similar floating objects may not be detected by radar.

Q. As recommended in the proposed annex what should be done if the speed of a vessel is altered to avoid a close quarters situation?

A. Alterations of speed should be substantial. A number of small alterations of speed should be avoided.

Q. (a) What is the effect of grounding on the stability of a vessel?

(b) What precautions must be borne in mind prior to discharging ballast or fuel in an effort to refloat a grounded vessel?

A. (a) Grounding reduces the effective stability available to a vessel.

(b) Prior to discharging ballast or fuel in an effort to refloat a vessel, careful consideration must be given to the effect on the stability where the ballast or fuel is low in the ship. Unless careful preparations have been made, lightening a vessel may cause her to go further aground, broach to, or capsize.

Q. Deflection of a current to the right of the wind's direction in the Northern Hemisphere and to the left of the wind's direction in the Southern Hemisphere is caused by:

(a) The coriolis force
(b) Subsurface current characteristic
(c) The equatorial bulge
(d) Variability of wind velocity
(e) The polar ice caps

A. (a) The coriolis force

Q. During the ice season in the North Atlantic, regular ice reconnaissance is made by:

(a) The North Atlantic Track Agreement Signatory Companies
(b) Commercial planes overflying the area
(c) Joint U.S. Canadian Military Forces
(d) The International Ice Patrol
(e) U.S. Navy Hydrographic Office

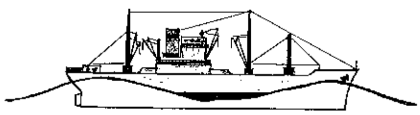
A. (d) The International Ice Patrol

SHIP CONSTRUCTION

Q. (a) To what type of bending moment is the vessel illustrated being subjected?

(b) What type stress is put on the deck and sheer strake?

(c) What type stress is put on the bottom?



A. (a) A "sagging" stress where the ends are receiving more buoyant support than the center.

(b) The deck and sheer stroke are in compression.

(c) The bottom is in tension.

ENGINE

Q. What are the usual causes of sticking stems on stop valves? Give the remedy for each.

A. Sticking of valve stem is caused by:

(a) Stuffing box set or packed too tightly. Slack up on the gland and relieve the packing pressure.

(b) Stuffing box gland cooked due to uneven setting up of the gland nuts. Correct the positions of the nuts.

(c) Paint or rust on valve stem which should be removed by cleaning.

(d) Valve jammed shut while hot, with the result that subsequent cooling causes contraction which binds the disc tightly to the seat. To relieve the strain, carefully slack the yoke nuts; if not a yoke valve, slack back slightly on the bonnet nuts. This may permit freeing the disc from the seat.

(e) Valve jammed open while cold, with the result that subsequent heating causes expansion which binds the valve open. Usually can be started with a wrench, care being taken not to spring the stem. After opening valve wide, close in a half turn so that the danger of binding will be eliminated.

(f) Burred threads in stem or bent valve stem. Straighten and clean, or renew the damaged stem.

Q. What is the purpose of the auxiliary exhaust automatic unloading valve?

A. The automatic unloading valve is fitted into the auxiliary exhaust system for the purpose of unloading excessive pressures into one or more of the main or auxiliary condensers, thus relieving the excess pressure without losing the steam to the atmosphere while maintaining sufficient back pressure for the proper operation of the various heating systems, gland seal systems, etc., which are dependent upon the back pressure.

Q. Briefly describe the final alignment of the line shafting of a new vessel. Where and why is this accomplished?

A. The actual final alignment of the line shafting is accomplished by slightly shifting the bearings, with the coupling flanges open, until the peripheries of the mating shaft section flanges are concentric and the flange faces are truly parallel. The alignment of the shafting is not the same when the vessel is water-borne as when it is in dry docks, hence the final alignment and bolting up of the main propulsion shafting should always be done when the vessel is water-borne.

Q. What is the main difference between safety valves and relief valves?

A. Safety valves function by popping wide open at the set pressure and remaining in that position until the pressure has dropped a predetermined amount after which the valve snaps shut. They cannot be used for liquids. Relief valves start to open at a set pressure but require about 20% over pressure to open wide. As the pressure drops they start to close gradually and seat at about the set pressure.

Q. You would release nitrogen accumulation from an oxygen breathing apparatus every:

(a) 15 to 20 minutes
(b) 25 to 30 seconds
(c) 30 minutes
(d) Time you feel it is necessary
(e) Time oxygen cylinders are changed

A. (a) 15 to 20 minutes

Q. An oxygen breathing apparatus tests airtight if:

(a) The bag deflates
(b) The safety valve relieves
(c) The bag inflates
(d) None of the above

A. (d) None of the above

UNITED STATES COAST GUARD

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

MVI
25 September 1961

Commandant's Action

on

Marine Board of Investigation; sinking of the tug *Philip Arthur* with barges *Alamo 100, Alamo 400,* and *Alamo 600* in tow on 31 December 1960 with loss of life

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

The 65-foot, uninspected, diesel tug *Philip Arthur,* while towing three empty and unmanned tank barges, sank at the intersection of the Intracostal Waterway and the Port Arthur Ship Canal at about 11:40 P.M., CST, 31 December 1960. The barges did not sink, nor were they otherwise damaged. Of the six crew members known to have been aboard the tug, five bodies have been recovered, and the sixth crew member is missing and presumed dead. The tug was salvaged 2 days after the sinking.

In the area of the casualty, the Intracostal Waterway runs in an approximate east-west direction with a width of about 275 feet narrowing to 100 feet between abutments of Route 87 Highway Bridge. The Highway Bridge crosses the Intracoastal Waterway about 700 feet west of the intersection of the Waterway with the Gulf-Taylor Bayou Channel, the Sabine-Neches Canal, and the Port Arthur Canal. Currents from the Intracoastal Waterway, the Bayou Channel and the Sabine-Neches Canal meet at the intersection forming heavy eddies and the current then flows to the south in the Port Arthur Canal. Recent heavy rains and a moderate, westerly breeze had increased the currents, and in the Intracoastal Waterway it was flowing at about 3 knots in an easterly direction.

The *Philip Arthur* enroute from Texas City, Tex., to Lake Charles, La., approached the Highway Bridge, from the west, with the three tank barges, *Alamo 100, Alamo 400* and *Alamo 600* in tandem tow astern. The bridge tender estimated that the tug and tow were traveling at a faster than usual speed and that the bow of the lead barge was about 15 feet astern of the tug. There was no other traffic in the immediate area and the bridge was opened well in advance of the tow's arrival. Shortly after the tow cleared the bridge, the tender was attracted by a reduction of the tug's engine noise. Looking out of the control tower he observed the three barges near the southwest bank of the intersection but the tug was not in sight. Three cries for help were heard from the area but no one was seen. In response to the bridge tender's telephone call, representatives from the local sheriff's office arrived on the scene 15 minutes after the casualty, followed shortly by a Coast Guard boat from the Sabine Pass Lifeboat Station.

The mast of the *Philip Arthur* was found protruding above the water, the vessel having apparently settled on the bottom in an upright position. The tug later shifted its position and the mast disappeared beneath the surface. On 2 January 1961 she was raised and three bodies were recovered from within the vessel. Two other bodies were subsequently recovered along the shore line. The body of the sixth crew member has not been recovered.

After the tug was raised, examination disclosed that the 8-inch manila towing hawser was cleanly cut about three-fourths of the way through and the remainder frayed. An axe was found on the afterdeck. There was no evidence of collision damage, but the stern was protected by a heavy manila fender. Engine controls in the pilothouse were set in the slow ahead position, and several of the weather type doors leading into the deckhouse were found to be open.

REMARKS

Concurring with the Board, it is considered that the lead barge with her high and raked bow overrode the stern, probably on the starboard quarter, of the tug causing her to flood and sink. As pointed out by the Board, the large manila fender on the stern could account for the absence of evidence indicating contact.

The Board speculated that the tug upon reaching the eddy currents experienced a reduction of speed through the water, which resulted in the tow overtaking her. Whether it occurred in this manner is not known, but it is evident that the tug must have experienced some difficulty which dictated the necessity of cutting the towing hawser. In connection with the speed reduction, the fact that the pilothouse controls were found in the slow ahead position when the tug was raised would indicate that speed was purposely reduced.

The Board also expressed the opinion that the design and physical characteristics of the *Philip Arthur* were not compatible with the service in which she was employed. Testimony revealed that this tug had been capsized or swamped on at least three occasions in recent years, and this information, coupled with the circumstances of the latest casualty, raises the question of stability and freeboard. Stability tests are normally conducted to determine whether a vessel has adequate freeboard and stability; in the case of towboats, wind heel, hawser pull at different leads and cross current effect are among the principal considerations. Without a stability test it is impossible to evaluate the adequacy of a towboat's stability.

Because the stability characteristics of the *Philip Arthur* are still in question and were very possibly a factor in this case, future safe operation dictates that the owners positively establish the tug's suitability for employment in towing service by means of a stability test and stability investigation.

The opinion of the Board that this vessel had inadequate watertight integrity is not concurred in. Watertight integrity for vessels of this type is normally considered in terms of hull closures and watertight bulkheads.

In this case the record does not contain evidence that the watertight integrity of the *Philip Arthur* was substandard, having regard either to the applicable rules considerable the vessel's age, or to the vessel's route and service.

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

A. C. RICHMOND,
Admiral, U.S. Coast Guard,
Commandant.

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 1–62

JANUARY 2, 1962

Subj: Use of inflatable liferafts on vessels subject to the Safety of Life at Sea Convention (SOLAS) 1948

PURPOSE

To advise vessel operators, shipboard personnel, Coast Guard personnel, and others of the conditions under which Coast Guard-approved inflatable liferafts may be carried as excess lifesaving equipment on the subject vessels.

DISCUSSION

Approved inflatable liferafts are now available and Coast Guard regulations permit their use as primary lifesaving equipment on vessels not subject to SOLAS, 1948. The use of such inflatables as primary lifesaving equipment is required and/or permitted by SOLAS, 1960, but the date this new convention will become effective is not known at the present time. Some ship operators have expressed a desire to equip their vessels during this interim period with inflatable liferafts to supplement the equipment presently required, but have felt that since SOLAS, 1948, and present Coast Guard regulations do not specifically authorize their use on vessels subject to the convention, they could not install them. However, neither SOLAS, 1948, nor present Coast Guard regulations prohibit their use as additional equipment over and above that required. Accordingly, inflatable liferafts may be installed on vessels subject to SOLAS, 1948, under the following conditions:

a. The liferafts shall be Coast Guard approved.

b. The liferafts shall be in addition to and not a substitute for any primary lifesaving equipment required by present Coast Guard Regulations and/or SOLAS, 1948.

c. The details of stowage and arrangement of all such liferafts shall be satisfactory to the cognizant Officer in Charge, Marine Inspection.

Effective date. Upon receipt.

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 2–62

JANUARY 23, 1962

Subj: Watertight Bulkheads in All Inspected Vessels; Maintenance of Watertight Integrity

PURPOSE

To advise inspection personnel, vessel operators, and others concerned as to the need for maintenance of integrity of watertight bulkheads.

DISCUSSION

a. Within about the last 18 months, two tankers have been lost as a consequence of failures in the propelling plant installation resulting in machinery space flooding. In both of these cases, eventual loss was apparently caused by extension of initial flooding through relatively minor openings in bulkheads which were otherwise watertight. Although there was no loss of life in either of these instances, the fact that such loss might have occurred under more unfavorable circumstances cannot be disregarded. When it is realized that in many cases such losses can be prevented by simple inexpensive measures without any adverse effect on the vessel's operation, the wastefulness of not taking such measures becomes apparent.

b. The Coast Guard regulations applicable to passenger vessels are the only regulations containing specific requirements for watertight subdivision. In the case of such vessels, maintenance of watertight integrity is a requirement for certification. In the case of some nonpassenger vessels of special type, compliance with watertight subdivision may also have been a condition of original approval. In such cases, maintenance of watertight integrity is also required.

c. For application to remaining vessel types, reference is made to Section 12 of the Rules for Building and Classing Steel Vessels of the American Bureau of Shipping. This section recognizes the need for watertight bulkheads and prescribes, based on the vessel's length, the minimum number of watertight bulkheads which ordinarily should be fitted. However, much latitude is permitted in applying this section, and the specified number and location of bulkheads is not related to any specific degree of floodability. For this reason, the provisions of this section are not regarded as forming a basis for mandatory enforcement of bulkhead watertight integrity by the Coast Guard under the provisions of the Law and Regulations making reference to the American Bureau of Shipping Rules.

ACTION

a. In the case of passenger vessels, maintenance of watertight integrity of all bulkheads, including any flats forming a part of bulkhead steps or recesses, originally so constructed and approved, is mandatory for continued certification. This is also the case for special type vessels, wherein compliance with watertight subdivision was a condition of original approval.

b. In the case of other vessels, inspectors will note all exceptions to watertight integrity and will recommend their correction. Completion of such corrective action will not be a mandatory requirement for certification but any such exceptions shall be included in the inspection records for the vessel and the owner or operator, as the case may be, shall be advised thereof in writing.

c. Nothing herein shall be taken as countenancing violations of integrity in the case of tanks or in other portions of a vessel where such integrity is specifically required by the regulations. Violations of watertight integrity resulting from excessive structural wastage or from other causes which adversely affect the seaworthiness of a vessel as related to its normal operating conditions shall be required to be corrected

Effective date. Upon receipt.

OIL SPILLAGE

Floating inflatable oil booms may provide a valuable aid in cleaning up after an accidental oil spillage.

The need to limit water pollution in the vicinity of tankers loading or discharging oil in harbours, rivers, canals and less sheltered waterways has led to the development of an inflatable oil boom by William Warne & Co., Ltd., Barking, England. While its main application is to localize the effects of oil pollution attributed to leaks or accidental spillage, the boom has an added safety function in reducing fire risk by confining burning oil so that it does not spread to other shipping.

The new boom consists of a flexible, inflatable tube made of neoprene synthetic rubber and reinforced with "Terylene" synthetic fibre. A weighted skirt of the same material hangs down below the tube to a depth of 22 inches, this prevents oil seepage underneath the tube. Weighting the skirt down is a chain which helps to prevent the tube and skirt from taking any tensile stresses due to wind, waves or currents. A tube diameter of 16 inches is, in the opinion of the manufacturers, the minimum that will withstand the buffeting of the sea and at the same time support the weight of the skirt and chain.

50-FOOT LENGTHS

The boom is made in lengths of 50 feet and any number of lengths can be jointed together to achieve the required overall length. When inflated, the boom sits about 14 inches above water level. Air pressure inside is approximately 2 pounds per square inch and a safety valve is provided and set to release pressure in excess of 4 p.s.i. Excessive air pressure would make the boom too rigid to respond quickly enough to changing wave contours.

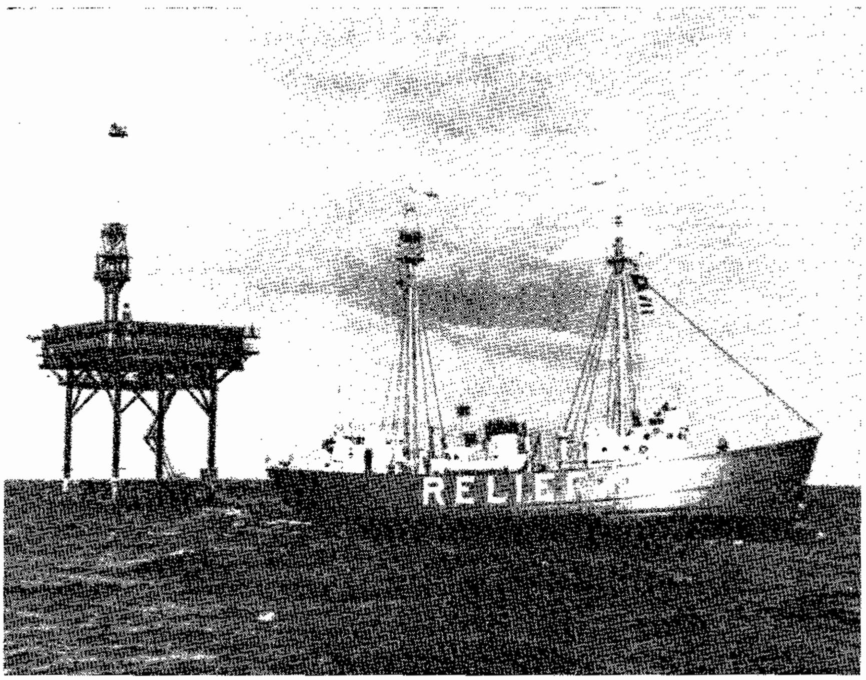
In one form the boom is quickly sunk to allow a vessel to pass over it and later refloated in a matter of minutes. It can be towed end-on and gives very little towing resistance. A future development envisaged is towing a boom between tugs to encircle oil patches that float out to sea. It is collapsible and can be carried in a truck for crash action in case of emergency; the vehicle exhaust may be used to inflate the boom.

NEOPRENE SUITABLE MATERIAL

When specifying the boom construction the makers had to find a strong material which would be unaffected by oils and seawater. Neoprene was the only suitable material because not only does it have excellent resistance to petroleum products, sea water, abrasion and weathering but also it will not support combustion and has good ageing properties.

The toughness of the neoprene material was put to a severe test when a tanker unloading crude oil caught fire. An inflatable oil boom had been positioned round the jetty-side of the tanker with the object of containing any oil that may have leaked out onto the sea, enclosing an area of some 80,000 square feet. The boom was made up of seventeen 50-foot lengths of 16-inch diameter tube. When the tanker caught fire some 600 tons of burning crude oil fell into the area enclosed by the boom and burned for over an hour. In spite of the high temperatures the boom remained inflated, thus preventing the burning oil from floating away and becoming a serious hazard to other shipping and shore installations. In addition it afforded a handhold for members of the crew who had jumped overboard. As a result of this experience inflatable oil booms now have lifelines fitted along their length as standard fittings.

COAST GUARD ACCOMPLISHMENTS—1961



The year 1961 was a busy one for the U.S. Coast Guard.

During the year the Coast Guard answered 32,335 assistance calls and rescued 3,499 persons from peril. In the same period, the total value of property saved, including cargo, was 1.735 billion dollars—approximately five times the amount appropriated for the entire service during 1961.

1961 was notable for several advances in modernization of the service. They included the launching of an atomic-powered buoy, utilizing strontium-90; pioneering in the application of the gas-turbine principle to helicopters, 82-foot and 210-foot vessels; and the building of a new-type offshore light structure at Buzzards Bay, Mass. Loran C, the Coast Guard's latest refinement of its Long Range Aid to Navigation program, was expanded to many additional areas of the world.

In the field of merchant marine safety, the Coast Guard completed 5,433 inspections of merchant vessels with a gross tonnage of 11,301,814 tons; made drydock examinations of 5,810 vessels with a total tonnage of 13,654,872 tons; conducted 6,204 miscellaneous inspections and reviewed 32,300 plans for vessels subject to inspection.

In the year 1961, there were 40,853 aids to navigation maintained by the Coast Guard in the United States and other areas. They included 68 loran stations; 194 radiobeacons; 6,023 daybeacons; 10,513 lights (including lightships); 575 fog signals (except sound buoys); and a total of 23,460 lighted and unlighted buoys. Four ocean stations were maintained by the Coast Guard in the North Atlantic and two in the Pacific throughout the year.

BRIDGE ACCIDENT

The need for strict observance of the regulations relating to the opening of bridges was highlighted by the proceedings in the case of the *Lembulus* before the U.S. Court of Appeals (1961: American Maritime Cases, 1,755). The proceedings arose out of the collision of the *Lembulus*, owned by the Shell Petroleum Co., with the Lincoln Highway drawbridge and occurred at the time the bridge was in the process of opening. The regulations provid that when a vessel approaches within signaling distance of the bridge for passage, the master shall signify his intention by three blasts of the whistle or horn, this signal of the vessel to be immediately answered by the operator of the bridge. If the drawbridge is ready for immediate opening, three blasts of the whistle or horn will be given from the bridge, but in the case of any delay in the opening, the signal from the bridge will be two long blasts. In all cases, when such delay signals have been given, this will be followed by three blasts so soon as it is possible for the bridge to be opened.

In the circumstances of this particular case, the *Lembulus*, following the discharge of her cargo at Kearney Point, N.J., situated some distance north of the bridge, was taken into the channel of the river by tugs, and commenced her voyage downstream; as she was approaching the bridge the vessel gave the required signal of three blasts to indicate to those in charge of the bridge that she required to pass through the bridge.

ANSWERING SIGNAL

The signal of the vessel was answered by two blasts from the bridge at which time those in charge immediately started opening the bridge, but no three-blast signal was given, apparently for the reason that the process of opening the bridge was slowed up by the bridge mechanism either slowing down or temporarily stopping. As a result the bridge was not fully open at the time the vessel reached it. The *Lembulus* struck the partially opened bridge with both her foremast and mainmast, and this gave rise to the proceedings in which the owners of the vessel sought to recover the costs of the damage sustained.

From the evidence before the court, it became apparent that there had been some difficulty with the bridge mechanism, but the court found that the vessel was at fault, as she disobeyed the regulations in that, while she had properly signaled the bridge on approaching, the bridge responded with only what was a caution signal of two blasts, which signal, the court ruled, was effective until removed by a three-blast signal. It was also ruled that the commencement of the opening of the bridge could not be regarded as an invitation to proceed. It was held that the vessel was solely at fault for disobeying the regulations and it mattered not whether she was going fast or slow; if her failure to obey the signal contributed to the collision, she could not seek any recovery in respect of the damage sustained. The court commented, as regards the regulations, that they were not "merely prudential regulations, but binding enactments, obligatory from the time the necessity for precaution begins, and continuing so long as the means and opportunity to avoid danger remains. . . . Obviously they must be rigorously enforced in order to attain the object for which they were framed."

COLLISION WITH DOCK

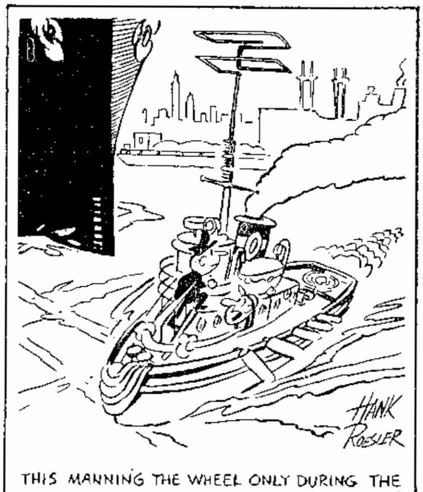
The case of *International Terminal Company* v. *Aznar, S.A., et al.* (1961: American Maritime Cases, 1,758), before the U.S. district court, concerned the collision of the *Monte Urquiola* with a dock in Hoboken during the process of undocking the vessel under her own power and with the assistance of two tugs. The proceedings for the recovery of damages in respect of the damage to the dock were brought against both the owners of the vessel and the owners of the tugs concerned; also the pilot. As regards the latter, however, the towage contract contained a clause which provided that, when the captain of any tug furnished to or engaged in the service of assisting a vessel which was making use of her own propelling power went on board such vessel, or any licensed pilot went on board such vessel, it was to be understood and agreed that such tugboat captain or licensed pilot became the servant of the owners of the vessel assisted in respect to the giving of orders to any of the tugs furnished to or engaged in the assisting service. It was also provided in the contract that, in respect of the handling of the vessel, neither those furnishing the tugs and/or pilot nor the tugs, their owners, agents, charterers, operators, or managers should be liable for any damage resulting therefrom.

It is settled law in the United States that, when a vessel comes in contact with a stationary object, there arises a presumption of negligence that operates against all the parties participating in the management of the vessel at the time of the contact, and that the burden of proof rests upon those parties to rebut that presumption.

PILOT'S NEGLIGENCE

After considering a great deal of evidence, the court decided that one of the tugs had succeeded in providing evidence sufficient to rebut the presumption of negligence, and the proceedings against the particular tug and her owners were dismissed. The pilot was found at fault and through him the owners of the vessel as well as the employers of the pilot. The other tug also was found at fault. Dealing with the effect of the pilotage clause, the court said that the pilot was certainly negligent with respect to the handling of the vessel and possibly with regard to the orders given to the tug.

It was held that the owners of the vessel and the owner of the bow tug were jointly and severally liable for the damage, and that under the terms of the pilotage clause, the pilot's negligence, in proceeding too fast astern, and in the delay in giving proper orders, was imputable to the vessel; to the extent that the faults of the pilot were within the scope of the pilotage clause, his employer was entitled to indemnity from the shipowner. It was further ruled that, although the bow tug was operating under the supervision of the pilot, the tug was nevertheless at fault for not preventing the vessel's bow from striking the dock.



THIS MANNING THE WHEEL ONLY DURING THE T-V COMMERCIALS IS GETTING ME JITTERY!

Courtesy Maritime Reporter

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 February 9, 1962 (CGFR 61–64), and Federal Register dated February 17, 1962 (CGFR 62–1). 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 February to 28 February 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

Octagon Process, Inc., 596 River Rd., Edgewater, N.J., Certificate No. 505, dated 1 February 1962, MIGHTY MULSE 550–S.O. 9.

Fine Organics, Inc., 205 Main St., Lodi, N.J., Certificate No. 118, dated 6 February 1962, F.O.–300–B SOLVENT DEGREASER — HEAVY DUTY.

The Enequist Chemical Co., Inc., 100 Varick Ave., Brooklyn 37, N.Y., Certificate No. 145, dated 21 February 1962, GRE-SOLV B.

DuBois Chemicals, Inc., Broadway at Seventh Sts., Cincinnati 2, Ohio:

Certificate No. 506, dated 1 February 1962, WAX-AWAY.

Certificate No. 507, dated 1 February 1962, M–1200 ALUMINUM BRIGHTENER.

Certificate No. 508, dated 6 February 1962, M–102 TANK CLEANER.

Certificate No. 509, dated 1 February 1962, M–400 CARBON REMOVER.

Certificate No. 510, dated 1 February 1962, M–500 WATER SCALE DISSOLVER.

Certificate No. 511, dated 1 February 1962, M–302 OIL EMULSIFIER.

Certificate No. 512, dated 1 February 1962, M–140 DOUBLE BOTTOM CLEANER.

Certificate No. 513, dated 1 February 1962, M–300 DEGREASER.

Certificate No. 514, dated 1 February 1962, M–900 EMULSION BREAKER.

Certificate No. 515, dated 1 February 1962, M–200 ELECTRICAL CLEANER.

Certificate No. 516, dated 6 February 1962, M–225 ODORLESS SOLVENT.

Certificate No. 517, dated 6 February 1962, M–301 DEGREASER.

Sonneborn Chemical & Refining Co., 300 Park Ave., South, New York 10, N.Y.:

Certificate No. 241, dated 21 February 1962, PETROSENE D–S.

Certificate No. 242, dated 21 February 1962, PETROSENE D–R.

Certificate No. 243, dated 21 February 1962, PETROSENE D–M.

AFFIDAVITS

The following affidavits were accepted during the period from 15 January 1962 to 15 February 1962:

Bradshaw Steel & Forge Co.,[1] P.O. Box 6266, Birmingham 7, Ala., FLANGES.

Standco Bolt Co., P.O. Box 93, Houston 1, Tex., BOLTING.

Nuclear Products Co., 15635 Saranac Rd., Cleveland 10, Ohio, VALVES.

Whitey Research Tool Co., 5525 Marshall St., Oakland 8, Calif., VALVES.

Cajon Co., 902 East 140th St., Cleveland 10, Ohio, FITTINGS.

Willamette Iron & Steel Co., 2800 NW. Front Ave., Portland 10, Oreg., VALVES.

Kieley & Mueller, Inc., 64 Genung St., Middletown, N.Y., VALVES AND FITTINGS.

Kahlenberg Brothers, P.O. Box 358, Two Rivers, Wis., VALVES.

Ohio Seamless Tube Division of Copperweld Steel Co., Shelby, Ohio, PIPE AND TUBING (ferrous).

The Okonite Co., 220 Passaic St., Passaic, N.J., PIPE AND TUBING (nonferrous).

Associated Control Equipment, Inc., 853 Fourth Ave., Coraopolis, Pa., VALVES.

Stets Co., Inc., 1440 Broadway, New York 18, N.Y., FITTINGS.

Western Foundry Co., P.O. Box 6313, Portland 23, Oreg., FITTINGS AND FLANGES.

Olympic Foundry Co., 5200 Airport Way, Seattle 3, Wash., PIPE AND TUBING (ferrous), VALVES, FITTINGS, FLANGES, AND BOLTING.

Atlantic Steel Corp., 1775 Broadway, New York 19, N.Y., FORGINGS.

Reading Gray Iron Castings, Inc., 500 Tulpehocken St., Box 616, Reading, Pa., CASTINGS.

Stainless Insert Flange Co., 6526 Upland St., Philadelphia 42, Pa., FLANGES.

[1] Currently listed in CG–190 for fittings. The listing is hereby annotated to indicate that the listing includes flanges.

FUSIBLE PLUGS

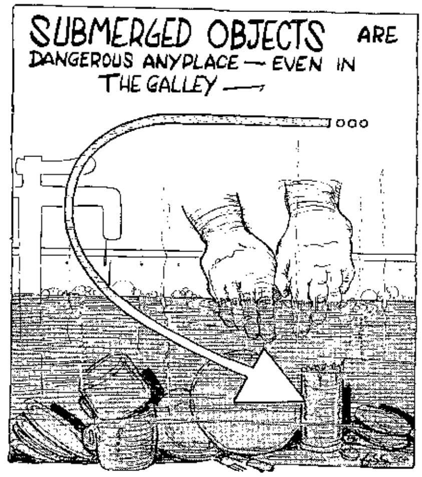
The regulations prescribed in Subpart 162.014, Subchapter Q Specifications, require that manufacturers submit samples from each heat of fusible plugs for test prior to plugs manufactured from the heat used on vessels subject to inspection by the Coast Guard. A list of approved heats which have been tested and found acceptable during the period from 15 January 1962 to 15 February 1962 is as follows:

The Lunkenheimer Co., Cincinnati 14, Ohio, HEAT NOS. 653, 654 AND 655.

MERCHANT MARINE STATISTICS

There were 938 vessels of 1,000 gross tons and over in the active oceangoing U.S. merchant fleet on January 1, 1962, 5 more than the number active on December 1, 1961, and 19 less than the number active on January 1, 1961, according to data released by the Maritime Administration.

There were 35 Government-owned and 903 privately owned ships in active service. These figures did not include privately owned vessels temporarily inactive, or Government-owned vessels employed in loading storage grain. They also exclude 23 vessels in the custody of the Departments of Defense, State, and Interior, and the Panama Canal Co.



Courtesy Pacific Maritime Association

LOOK OUT FOR BROKEN CROCKERY OR CHIPPED GLASS

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 (8–1–58).
115	Marine Engineering Regulations and Material Specifications (2–1–61).
123	Rules and Regulations for Tank Vessels (12–1–59). F.R. 3–30–60, 10–25–60, 11–5–60, 12–8–60, 7–4–61, 9–30–61, 11–23–61, 12–13–61.
129	Proceedings of the Merchant Marine Council (Monthly).
169	Rules of the Road—International—Inland (5–1–59). F.R. 5–21–59, 6–6–59, 5–20–60, 9–21–60, 4–14–61, 4–25–61.
172	Rules of the Road—Great Lakes (5–1–59). F.R. 1–7–60, 3–17–60, 5–20–60, 9–21–60.
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).
182	Specimen Examinations for Merchant Marine Engineer Licenses (12–1–59).
184	Rules of the Road—Western Rivers (5–1–59). F.R. 6–6–59, 5–20–60, 9–21–60, 10–8–60, 12–23–60, 4–14–61, 4–25–61.
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.
191	Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel (11–1–60). F.R. 11–30–60, 1–4–61, 4–19–61, 10–25–61.
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249	Merchant Marine Council Public Hearing Agenda (Annually).
256	Rules and Regulations for Passenger Vessels (3–2–59). F.R. 4–25–59, 6–18–59, 6–20–59, 7–9–59, 7–21–59, 9–5–59, 1–8–60, 5–6–60, 8–18–60, 10–25–60, 11–5–60, 11–17–60, 12–8–60, 12–24–60, 12–29–60, 4–19–61, 7–4–61, 9–30–61, 11–23–61, 12–13–61.
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.
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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.
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320	Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf (10–1–59). F.R. 10–25–61, 11–3–61.
323	Rules and Regulations for Small Passenger Vessels (Not More Than 65 Feet in Length) (7–1–61).
329	Fire Fighting Manual for Tank Vessels (4–1–58).

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CHANGES PUBLISHED DURING FEBRUARY 1962

The following have been modified by Federal Registers:

CG–190, Federal Registers February 9 and 17, 1962.

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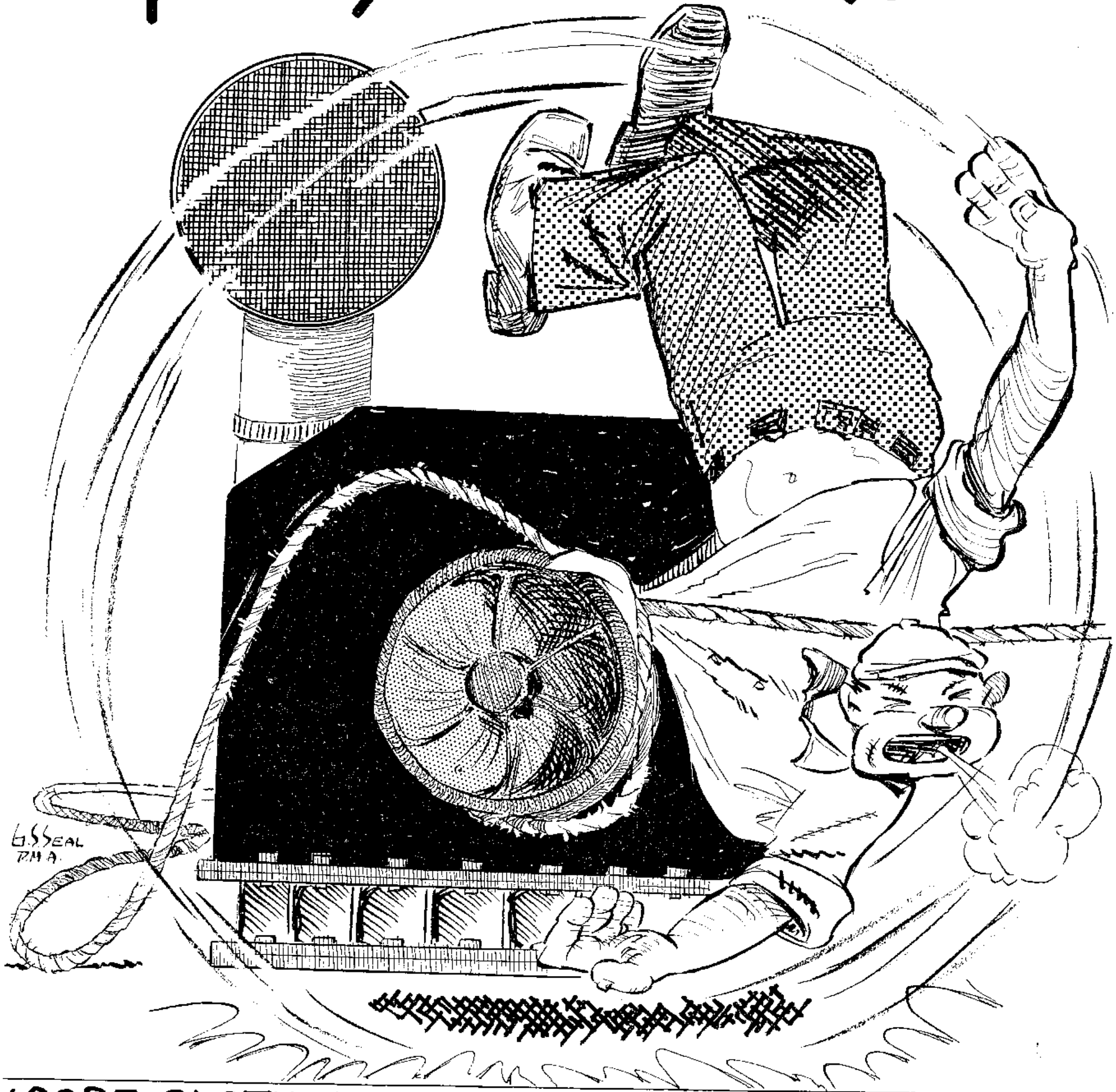

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