COAST GUARD

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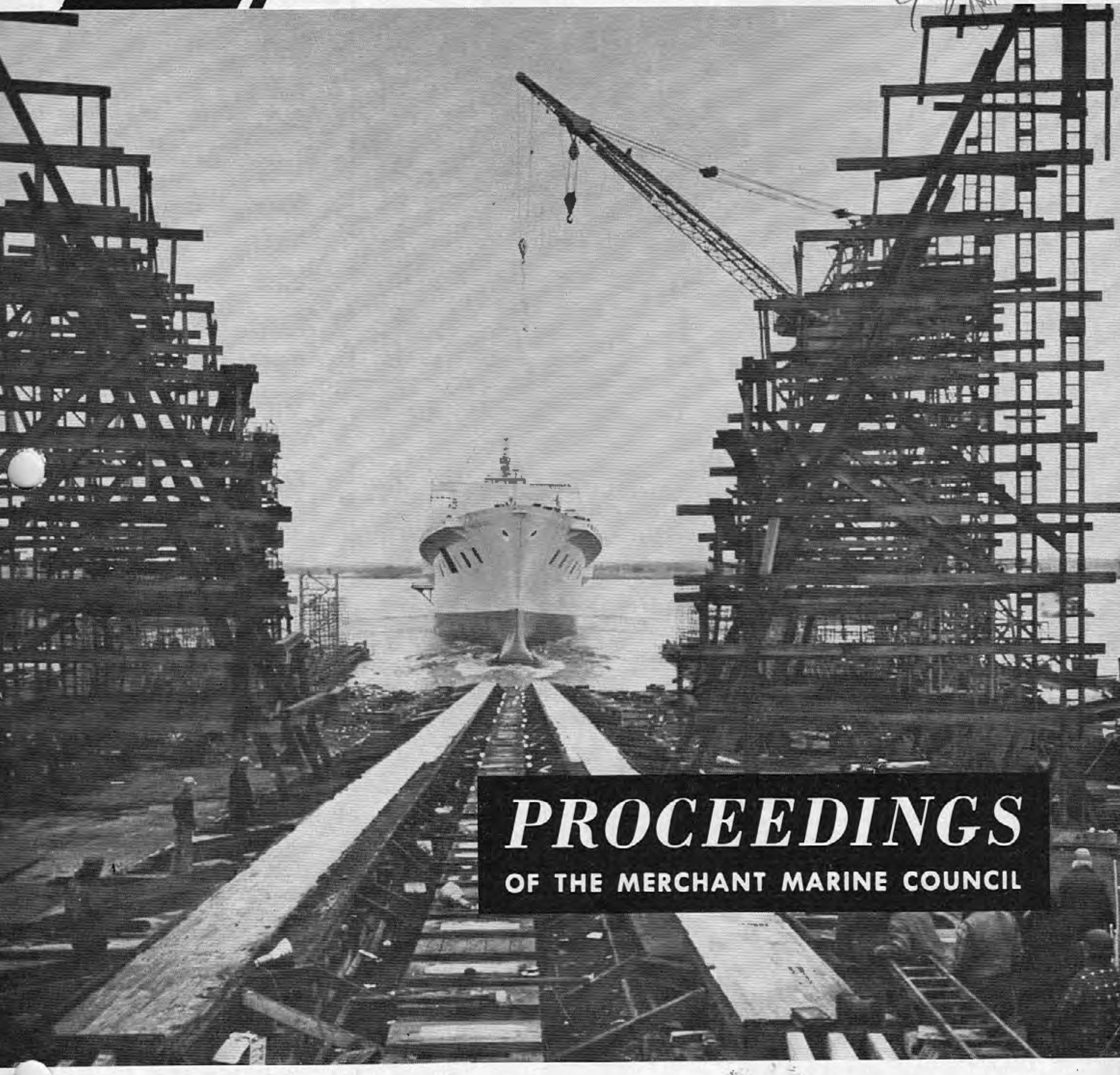

PROCEEDINGS

OF THE MERCHANT MARINE COUNCIL

Vol. 25, No. 5 CG-129 May 1968

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COVERS

FRONT COVER: In November 1967, the *SS Ponce de Leon* slid down the ways at Sun Shipbuilding & Dry Dock Co., Chester, Pa., destined for service between New York and San Juan. She is the largest and fastest ship in commercial service in the American Merchant Marine. *Photo courtesy Sun Oil Co.*

BACK COVER: The tug *Dauntless*, participating in a jumboizing operation, and the freighter *President Coolidge* underway illustrate two aspects of the maritime industry. (*Photos courtesy Newport News Shipbuilding & Dry Dock Co. and American President Lines, respectively.*)

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PROCEEDINGS

OF THE

MERCHANT MARINE COUNCIL

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IMCO ACTIVITIES UPDATED

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Chief, International Affairs Division, Headquarters

Commander Goddu attended Tufts Engineering College before entering the U.S. Coast Guard Academy in June 1942.

Graduated in 1946, he saw duty aboard the cutters Campbell, Yakutat, Bibb, *and* Duane. *He has served as Officer in Charge, Marine Inspection, Wilmington, N.C., and is presently serving as Chief, International Affairs Division at Coast Guard Headquarters.*

THERE HAVE BEEN several articles in this publication on the activities of a United Nations specialized agency dealing with maritime safety, called the Intergovernmental Maritime Consultative Organization (IMCO). However, it is felt appropriate at this time to update the prior articles with recent activities. It is gratifying to note that IMCO has continued its excellent record of cooperation and accomplishment in maritime technical matters. In addition to its regular work program, which was accomplished without serious delays and included the 1966 International Load Line Conference, IMCO met two additional major challenges. One dealt with fire protection for passenger ships and the other with oil pollution. These activities and the Load Line Conference will be discussed here.

FIRE PROTECTION

IMCO successfully rose to the challenge posed by disastrous fires on passenger ships at sea by rewriting and upgrading the fire safety standards applicable to passenger ships under the International Convention for Safety of Life at Sea. For many years the United States has been advocating a higher degree of structural fire protection in international conventions for passenger vessels. With the loss of the *Lakonia* by fire and 125 of its passengers during a Christmas vacation cruise in December 1963, the United States proposed a study of shipboard fire protection by the IMCO Maritime Safety Committee in April 1964. This study was started on a limited scale, but a very low priority was given the problem of passenger vessels. Subsequent to the *Yarmouth Castle* disaster, the United States, at the Maritime Safety Committee meeting in early February 1966, urgently requested a special meeting for the sole purpose of studying this problem of fire protection. In delivering this request, Admiral E. J. Roland, then Commandant of the U.S. Coast Guard and U.S. Representative to the meeting, stated in part:

> We believe this Committee and its parent body, the Intergovernmental Maritime Consultative Organization itself, have no task more important or more urgent than to take immediate action on this problem. . . . it has now become obvious that the course of events, and extremely well established facts, make unacceptable any further delay in taking remedial action.

A special meeting of the Maritime Safety Committee was agreed to and held in London from 3–10 May 1966 to consider the U.S. proposal for amending the 1960 International Convention for the Safety of Life at Sea. The *Viking Princess* fire, which occurred just before the meeting, served to heighten the urgency of the problem. Because of the magnitude of the problem, it was separated into two steps, the first being directed at upgrading existing passenger ships and the second to establishing new regulations for future passenger ships. At the conclusion of the conference the delegates had reached agreement on various proposed amendments, concerning existing passenger ships. These were forwarded to an Extraordinary Session of the IMCO Assembly called for this specific purpose. Forty-six governments met during the last week of November 1966 in London and approved the proposed amendments to the 1960 Safety of Life at Sea Convention. The results of the Extraordinary Session will bring about a higher degree of fire safety for existing passenger vessels, upgrading many of those vessels operating in the cruise trade from our ports.

The main problem with the existing convention is that it contains so-called grandfather clauses which permit existing vessels to continue as they are with little or no improvement. The purpose of the amendments adopted by the assembly is to eliminate the effects of these grandfather clauses and thereby bring all passenger vessels up to an acceptable modern standard of fire safety. The proposals adopted by the assembly will eliminate vessels with wooden hulls, wooden decks or deckhouses. Passenger vessels built before the 1948 Convention came into force (Nov. 19, 1952) will have to meet the 1948 Convention requirements for fire extinguishing systems.

The Extraordinary Session of the assembly determined that the amendments are of such an important nature that any contracting government which declares its nonacceptance of them shall cease to be a party to the convention 12 months after the amendments come into effect. This is a built-in enforcement procedure under article 9(e) of the 1960 SOLAS Convention. This article states, among other things, that an amendment may be declared of "an important nature" if approved by a two-thirds majority vote of the Assembly.

The amendments, however, must still be accepted by two-thirds of the contracting governments before they enter into force. Inasmuch as formal ratification may take considerable time, the assembly invited all Governments not only to accept the amendments at the earliest possible date, but to actually put the amendments into effect as soon as possible without awaiting their entry into force. In addition to adopting amendments to the convention, the assembly, by separate resolution, approved several recommendations for increased fire safety measures and recommended that all governments give immediate effect to them. To date 12 contracting governments, including the United States, have indicated their acceptance to IMCO.

Also of major importance was the upgrading of future passenger ships. The Maritime Safety Committee, at its session in May of 1966 had requested the Subcommittee on Fire Protection to examine the three existing methods of fire protection and extinction in passenger ships, as set out in chapter II of the International Convention for the Safety of Life at Sea, 1960. The committee was to report by December 1966 on the possibility of combining the best features of those methods, together with any other measures the subcommittee may recommend, in the form of new regulations for future passenger ships. This item was discussed in three meetings of the Subcommittee on Fire Protection held during that year.

After a full discussion of principles which underlie the requirements for structural fire protection, the subcommittee developed a set of proposed amendments for a single unified system embodying the concept of the maximum use of incombustible materials and appropriate use of automatic sprinkler and fire detection systems.

The proposed new method permits two variations of construction. These variations may be summarized as:

(*a*) The subdivision of accommodation and service spaces by incombustible fire retarding divisions, establishing a high degree of fire integrity, together with the installation of an automatic fire detection and fire alarm system, or

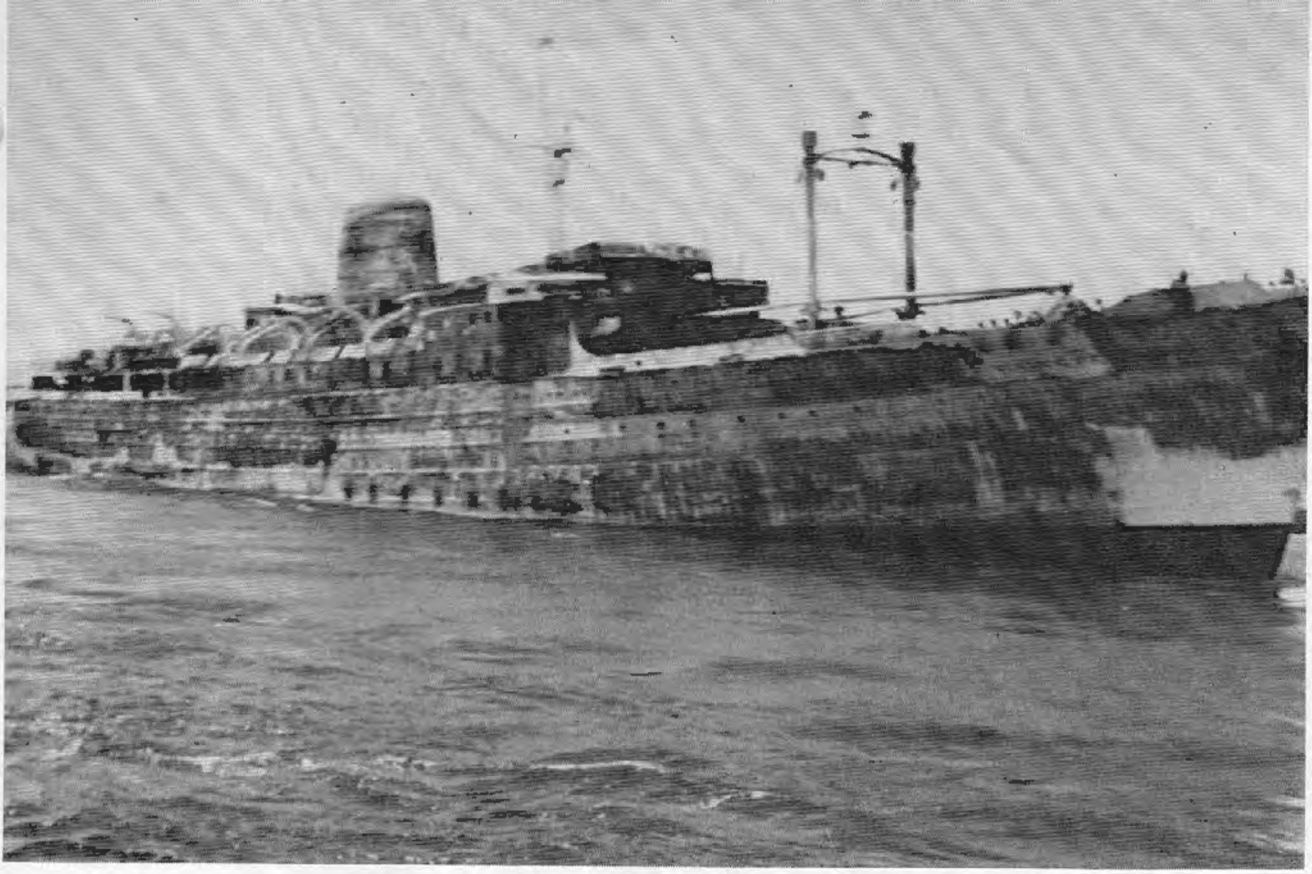
(*b*) The installation of an automatic sprinkler and fire detecting and fire alarm system, together with construction employing incombustible divisions which may have a lesser degree of fire integrity than those referred to above.

The recommendations for amendments to the 1960 SOLAS Convention for future passenger ships that emanated from these meetings were considered and adopted by the Maritime Safety Committee and Assembly meetings held this past year. These amendments will come into effect 1 year after acceptance by two-thirds of the contracting governments to the 1960 SOLAS Convention has been deposited with IMCO. At the present time the President is seeking advice and consent of the Senate for U.S. ratification of these amendments.

LOAD LINES

Another item of considerable interest to the maritime world is the recently completed International Convention on Load Lines, 1966. The Assembly of IMCO decided, at its third regular session in October 1963, that the organization should convene an international conference on load lines in the spring of 1966 in order to draft a new convention and thus bring the load line regulations into accord with the latest developments and techniques in ship construction. The U.S. delegation, headed by Admiral Roland, felt that the resultant convention is one that will accomplish improvements in safety as well as in the economics of shipping. As compared with the 1930 Load Line Convention, which is currently in force, the new convention will allow considerable reduction in freeboards for large ships. For example, a 700-foot tanker, constructed in accordance with the new convention, will be able to load 16 inches deeper than previously. For a normal tanker of this size this would mean approximately 2,400 additional tons of cargo.

There was lengthy discussion on the relationhip between freeboards



The charred remains of the Norwegian-flag M/V Viking Princess. *The vessel burned in the Caribbean shortly before an Extraordinary Session of the IMCO Assembly approved amendments to the 1960 Safety of Life at Sea Convention.*

and subdivision and stability; and, as a result, the subdivision concept has been introduced into the assignment of freeboards for large ships. Large tankers and large ore carriers which meet the prescribed subdivision and other conditions will have their freeboards reduced about 10–15 percent. Large dry cargo ships having steel hatch covers will have their freeboards reduced about 10 percent. Such vessels having dogged type hatch covers and complying with subdivision conditions may be permitted further freeboard reductions with a maximum total reduction of 20–25 percent. On the other hand, the freeboards of small ships under 300 feet in length, when fitted with little or no superstructure, will be slightly increased in order to improve the range of stability and other safety conditions. For small ships having wooden hatch covers a further freeboard increase of about 2 inches applies.

The 1966 Load Lines Convention, more completely discussed in the December 1966 issue of this publication, will come into force on 21 July 1968, which is 12 months after it was accepted by at least 15 countries, seven of which possess not less than 1 million gross tons of shipping. To date 16 countries, including the United States, have deposited their instruments of acceptance with IMCO.

OIL POLLUTION

Last year, IMCO was suddenly confronted with one of the most serious maritime disasters of recent years. On March 18, 1967, the *Torrey Canyon,* a supertanker of 120,890 deadweight tons capacity, under Liberian registry, foundered on the Seven Stones, submerged rocks in international waters off the southwest coast of England between the Scilly Islands and Land's End, while nearing the end of a voyage to Milford Haven in Wales. The accident resulted in the spilling of thousands of tons of crude oil, which was washed up on beaches and harbors in the resort areas of southwestern England and subsequently across the Channel in France.

The incident and the extensive damage to the coasts and to wildlife that resulted focused worldwide attention on the need for measures to prevent future accidents of this nature and tu minimize ill effects if such accidents should occur.

As a result of the 1954 and 1962 Oil Pollution Conferences, several duties were imposed upon IMCO. Many of these are in the nature of collecting and disseminating material, which is being handled by the Secretariat. For example, results have been published of inquiries to governments regarding the existence and adequacy of facilities for the reception of oily residues in ports, as well as educational facilities, manuals, national committees, etc. Resolution 13 of the 1962 conference states that a panel of technical experts should be established on whom the organization could call for advice on oil pollution matters. With this resolution in mind, the Maritime Safety Committee at its Eighth Session agreed to establish a Subcommittee on Oil Pollution, consisting of interested member governments, to deal with practical measures to combat and further diminish the menace of pollution of the seas hy oil.

For some time now the United States has had its own National Committee for Prevention of Pollution of the Seas by Oil and an Oil Pollution Panel. The former is comprised of interested government agencies and the latter of interested marine industry groups. These committees have made valuable contributions by assisting in formulating U.S. positions on agenda items and by advising the government in its selection of experts for the various IMCO meetings on oil pollution.

In the aftermath of the *Torrey Canyon* disaster, the United Kingdom Government, supported by the United States and others, called for a meeting of the IMCO Council, the organization's administrative body, at the earliest possible date, to institute a program of study of measures that might be taken. The meeting was arranged for May 4–5, 1967 at the IMCO headquarters in London, after 1 month's notice to the participants, as required by the IMCO Convention.

Interest in the United States was high, both in corrective measures at a national level and in international cooperation toward the same end. It was generally recognized, too, that actions to be taken in both areas are interdependent and must be compatible. The Chairman of the House Committee on Merchant Marine and Fisheries issued a statement prior to the May London meeting strongly supporting this international approach to the problem. Additionally, several bills introduced in both houses of the Congress called for action by the executive branch to promote international agreements to alleviate dangers resulting from accidents like the *Torrey Canyon* disaster.

At its meeting in May, the council produced a list of subjects for IMCO to study "with a view to avoiding the hazards presented by the carriage of oil or other noxious or hazardous cargoes." These subjects fall into three categories. One includes studies in preventive measures: On sea lanes and prohibited areas, requirements for additional navigational aids, shore guidance for ships near to land, speed restrictions, testing of navigation equipment, officer and crew training (including training and qualifications for large ships, the use of navigational equipment, and international standardization of officers licenses), use of automatic pilots, construction and design, identification and charting of hazards, and organization of watches. Another category includes studies of measures to minimize damage: National and international procedures in the event of accidents and research and exchange of information in pertinent scientific areas. Also included are studies of legal questions: Participation by affected States in official inquiries, the legal ability of a State threatened by a casualty in international waters to take measures to protect its coastline, several questions relating to the nature and extent of liability, access of foreign salvage equipment to territorial waters, and coast States' powers of surveillance and control.

It was agreed that the assignments in the first two categories (preventive measures and measures to minimize damage) should be undertaken on a priority basis by existing subcommittees of the Maritime Safety Committee, which is IMCO's principal technical body. These subcommittees are on Safety of Navigation, Oil Pollution, and Ship Design and Equipment. It was proposed and agreed to establish an Ad Hoc Legal Group to deal with the legal questions involved. This group will be in effect, a subcommittee of the council, and will report to the council. This group has now been reestablished as the Legal Committee.

To date a total of nine meetings of these committees have been held. The results of these meetings have been forwarded to the Maritime Safety Committee which convened in March 1968. Final action by IMCO is still unknown, but one may reasonably expect several IMCO recommendations as well as amendments not only to the International Convention for Prevention of Pollution of the Seas by Oil, 1962, but also to the International Convention for Safety of Life at Sea, 1960. These recommendations and amendments will undoubtedly cover such items as navigational equipment, traffic separation areas, crew training and qualifications as well as legal aspects of liability and salvage. It is felt this work will contribute materially to the reduction of pollution of the seas by oil while maintaining the interests of the marine industry in the foreground.

It is anticipated that there might be an Extraordinary Session of the Assembly called, to be held this fall, in order to solidify international action in this field. ⚓

OPERATION, MAINTENANCE AND INSPECTION OF WIRE ROPE

W. I. Lex
Roebling Wire Rope Trenton, N.J.

WIRE ROPE is one of the safest products made for use in any field where loads must be lifted and where a high degree of safety must be maintained. It should be quickly added that the truth of this statement is largely conditional upon the design of the equipment and also upon proper maintenance and inspection of the rope while in service.

Wire rope is safe and reliable because it is made of many wires stranded into a flexible structure in such a way that each takes its proportionate share of the load. Each wire, during its manufacturing process, is cold drawn through a series of dies to reduce it in size and increase it in strength. It takes a considerable force to pull the wire through the die, and this operation in itself constitutes a continuous test of every inch of every wire in the finished product.

Since most ropes used for hoisting are made with at least 114 wires, and some of the larger ropes have as many as 379 wires, it can be seen that this product must be quite uniform in quality from one end to the other. Barring some accident which cuts it apart or imposes a load on it in excess of its strength, a wire rope simply cannot fail without warning.

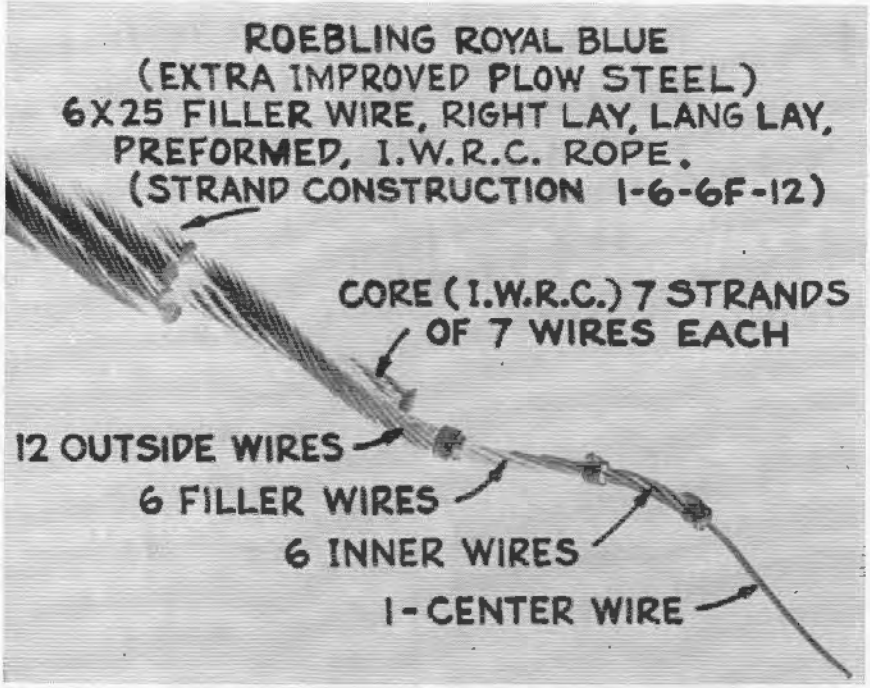
Mr. W. I. Lex is a 1929 graduate of the Moore School of Electrical Engineering, University of Pennsylvania. Mr. Lex has been employed for the past 33 years with C F & I Steel Corp., Trenton, N.J., formerly John A. Roebling's Sons Co., where he started in the Wire Rope Engineering Department, first as Engineer, then Assistant Chief Engineer, then in his present position as Chief Engineer.

He is a member of the Wire Rope Technical Board, American Petroleum Institute Manufacturers Sub-Committee on Wire Rope Standardization, American Society for Metals, American Institute of Mining, Metallurgical and Petroleum Engineers, and the Marine Technology Society.

From an address before the 1966 Marine Section, of the National Safety Congress.

Wire rope, however, is a product which is subject to wear and deterioration in service. When it is used as the operating member on a crane, derrick, elevator, or other equipment, it must be replaced at intervals which vary from as little as a week or two in some cases, to many years in others. Thus it becomes important for any user to understand what should be done while the rope is in service to get the most out of it. It is even more important for him to understand how it wears, and how to judge from inspection the proper time to remove it from service.

Speaking first of maintenance, the user is faced with operating his rope in such a way as to obtain maximum service on equipment which has been designed by someone else. Sheave sizes, reeving, drum diameter and even load capacity ratings have already been established. Thus there is not much the user can do except to be sure that the most suitable type of rope is employed, and that it is properly cared for during operation.



All photographs courtesy: C. F. & I Steel Corp.

Figure 1.

Most wire rope manufacturers have personnel who are glad to offer advice or make recommendations on suitable rope constructions.

In regard to handling and operation, many articles have been written on the subject. It should not be necessary here to state the importance of proper sheave grooves, good drum winding and careful operation. The rope should be handled with care when it is installed and naturally this means that it should not be kinked, or distorted or scrubbed unnecessarily. In operation; whipping, vibration, and undue rotation should be avoided; as well as impact stresses and other types of loading beyond those for which the equipment and the rope have been designed.

While on the subject of maintenance, there is one very important point which should be mentioned, and that is in regard to lubrication. Lubrication in the field is always beneficial, and it is not difficult to understand the reason for this, when it is remembered that a rope is made of many wires which must move with respect to each other every time a rope bends on or off a sheave. If relative motion between wires did not occur, the rope would be no more flexible than a steel bar.

Like any piece of machinery with moving parts, the service life of a rope is enhanced when relative wire motion can occur with a minimum of friction. Thus lubrication has its greatest benefit in keeping the rope flexible and retarding the development of fatigue. There are additional important benefits to lubrication, one being to protect the wires against corrosion, and another to reduce the rate of wear of the rope and also of the sheave and drum equipment over which it operates.

The subject of inspection and removal from service involves one of the most important decisions which must be made by an inspector or operator. This is not too difficult in cases where the drum and sheave sizes are liberal, the factor of safety is good, and the expected service life is fairly long. It becomes more difficult, however, as operating conditions become more abusive, and this is the case today of an increasing number of installations, where for one reason or another, sheaves are made smaller in diameter and the ropes are subject to much heavier loading.

Machines must be designed to perform the required work with maximum efficiency and lowest cost. Since wire rope represents only one of many factors which must be considered in overall economy, it is often impractical or impossible to provide what a rope engineer would truly call ideal conditions of operation. This means that wire rope may be consumed at a fairly rapid rate, but it is far cheaper to operate this way than to design equipment which would be heavier, less mobile, and much higher in initial cost. It is on equipment such as this that greater care must be exercised in the inspection of wire rope.

On installations where the operating conditions are fairly easy, the service life of the rope is generally long. Thus rope inspections do not have to be made too often, and barring corrosion, or some other abnormal abuse, deterioration generally occurs in the form of wear and broken wires which can be easily detected and evaluated at the time of external examination.

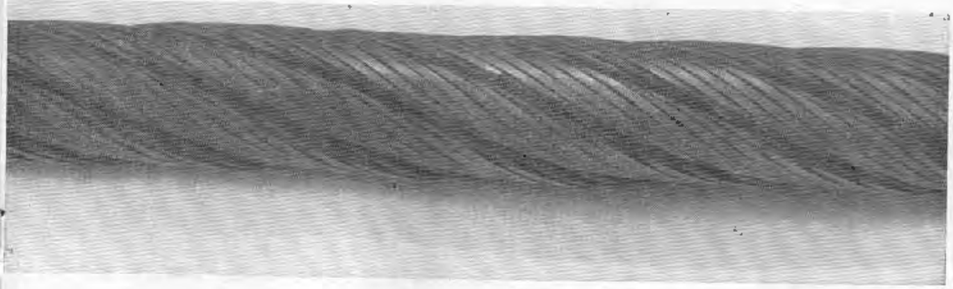


Figure 2.

On installations where the operation is more abusive, and the service life is relatively short, inspections should be made at much shorter intervals. Furthermore, rope deterioration may follow an entirely different pattern making it necessary for the inspector to evaluate the true condition of the rope on a somewhat different basis.

Thus to begin with, an inspector should have some idea as to what service life has been obtained on an installation, or what service life is expected. Intervals between inspections should be established accordingly and some decision should be made regarding the amount of deterioration to allow in the worn rope.

Naturally, inspections should be made most frequently on any installation where a rope failure would cause loss of life or extensive property damage, and this is especially true if the expected service life is short. It should also be the rule in these cases to condemn the rope and replace it with relatively little reduction in metallic area. On the other hand, long service ropes can safely be inspected at less frequent intervals, since in general it is here that bending is easier and loads are lighter. It also follows that worn ropes on installations of this type can be allowed to wear further without impairing the safety of the installation.

Figure 1 should be examined to understand the various parts of a rope structure. At the left in the picture, the complete wire rope is shown. At a point near the left, five of the six strands have been cut away leaving one strand and the core, and in this case the core is an independent wire rope having seven strands of seven wires each, or a total of 49 wires. Further along, the sixth strand is cut away to show that it is made of one center wire, six inner wires, six filler wires and 12 outside wires. Thus, in each strand there are a total of 25 wires, and it is from this that the rope gets the nomenclature 6 x 25 construction.

Referring back to the rope structure at the left, it can be seen that only the 12 outside wires in each strand, or a total of 72 wires in this particular rope, are exposed to abrasion and scrubbing when the rope is in operation. All of the inside wires of the strands are protected, and unless the rope has become corroded or abused in some other manner, these wires can be depended upon to remain intact through the life of the rope. It is for this reason that the inside wires in any rope construction are referred to as the reserve area or reserve strength of the rope. This area varies from about 30 percent for some of the coarser rope constructions to as much as 58 percent in some of the more flexible.

To estimate the condition of a worn rope there are many things an inspector must watch for, but the most important are wear and breaks in the wires of the outer layer. If lubrication has been good and operating conditions have been such that the inside wires are intact, he can count on this reserve strength and then estimate what must be subtracted from the area represented by the outside wires. Let's say, for example, a rope has a reserve strength of 40 percent. This means that in a new rope the area of the outside wires represents 60 percent of the total area. If abrasion has worn away one-third the area of the outside wires, this would be one-third of the 60 percent, or 20 percent. Thus, the area remaining in the worn rope would be 80 percent and its remaining strength would be approximately the same. If the outside wires were worn half through, this would represent one-half of the 60 percent figure or 30

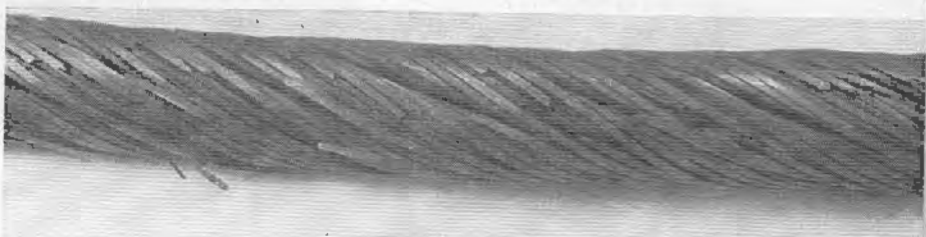


Figure 3.

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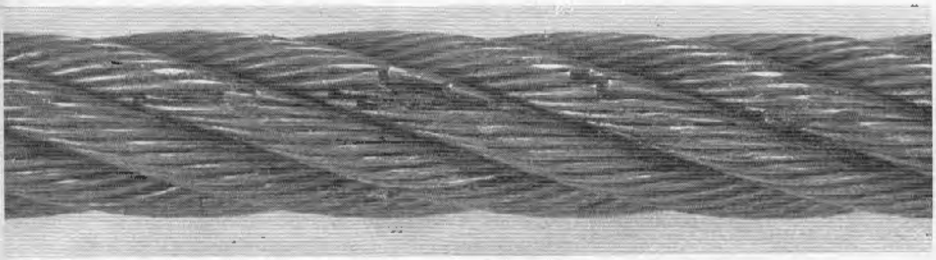


Figure 4.

percent, and the remaining strength of such a rope would be about 70 percent.

This brings up a very important fact, and that is, that abrasion alone can result in considerable loss of strength and should never be neglected. Many inspectors, unfortunately, consider that a rope is not worn until they see evidence of broken wires.

Figure 2 shows a heavily worn Lang lay rope. Despite the fact there are no broken wires, the outside wires show a considerable loss of metallic area. The truth is that this rope has been seriously weakened to the point that its remaining strength is only about 50 or 55 percent of original.

Figure 3 is another picture of the same rope showing that after very little additional service the outside wires were worn completely through. This rope failed in operation and the point of failure was only about 2 feet from the place where this picture was taken.

A heavily worn regular lay rope was used on an elevator under circumstances where abrasion was the most important factor, and it wore to this extent before any wire breaks developed. As a matter of fact, the outside wires were worn just past the midpoint, and when a test was made on this rope, a strength of only 53 percent of catalog was developed. This rope should have been removed earlier but the inspector did not condemn it because he was waiting for the development of broken wires.

In another case where an elevator rope was used under similar circumstances, it ran a little longer and breaks occurred due to the heavy wear. Practically every outside wire in all strands was broken. A test on this rope developed 50 percent and it is interesting to note, that even with this number of breaks, its remaining strength was very little lower than in the case of the rope shown in the previous illustration which showed heavy wear and no breaks.

The worn ropes shown so far were chosen primarily to illustrate how important abrasion can be. However, it is true that in most cases broken wires, caused by bending fatigue do occur after the rope has worn to some extent. The rope shown in *Figure 4* has fairly light crown wear and a few broken outside wires. It can be noted that the breaks have occurred at the worn crowns where they are readily visible to external examination. These are fatigue breaks resulting from repeated bending or other changes in stress which cause the propagation of a crack or rupture through the wire to the point where it breaks completely. One or two fatigue breaks do not represent much loss in the strength of a rope having 150 or 200 wires. However, as fatigue develops and more breaks occur, the loss of strength becomes quite significant and this should be watched from one inspection to the next.

The condition of a rope in regard to broken wires is generally judged by the number of breaks in the length of one rope lay, a rope lay being the distance along the rope in which one strand makes a complete revolution around the rope axis. This unit has been chosen since it has been found that the loss due to a broken wire is effective for approximately this distance. Beyond the length of one rope lay, the wire is again able to support its proportionate share of the total load on the rope.

The rope shown in *Figure 5*, like the one shown in *Figure 4*, can be judged by the same factors of wear and broken wires. This particular rope is of a more flexible type and it was used on an overhead traveling

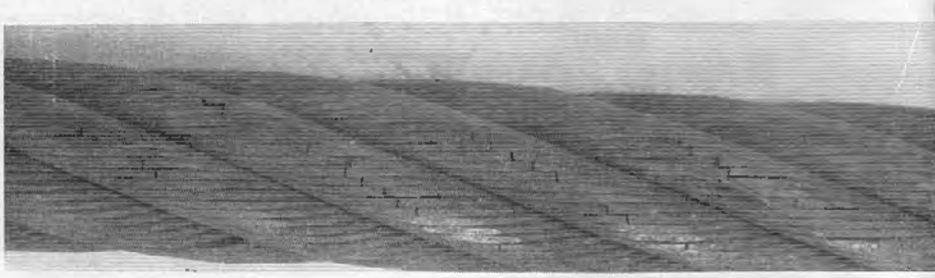


Figure 5.

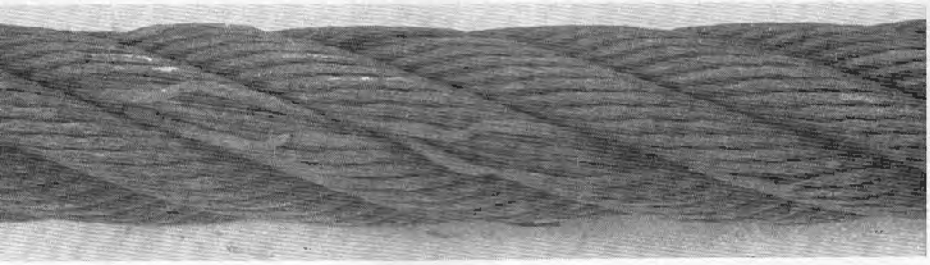


Figure 6.

crane. Wear is heavier than in the previous case and there are more broken wires, but both conditions are visible and permit the inspector to judge with fair accuracy the rope's true condition.

Quite often wear on the outer wires is not smooth and even, as shown in *Figure 5.* The rope here was used on a drum having multiple layer winding and the outside wires show characteristic peening or scrubbing which has caused some cold flow of the metal. Generally a condition such as this adds to the development of fatigue. However both factors of wear and broken wires are on the outside where they are clearly visible.

In another example of a rope which was scrubbed by drum winding, the greatest abuse was concentrated at a crossover point. In this case the user could have obtained much longer rope life by shifting the rope with respect to the winding and distributing this scrubbing over a greater distance.

So far we have discussed deterioration of one type or another found on ropes which have been properly protected and operated under fairly normal conditions. Naturally, if a rope has been damaged locally by being kinked or cut or burned, it should be removed at once, since there is no way of estimating its remaining strength, or judging how long it could operate with safety. A rope heated by a torch or burned by contact with an electrical wire can quickly be reduced to a fraction of its load-carrying capacity by destruction of the cold drawn structure of the wires.

Corrosion is another form of deterioration sometimes encountered, but when this is involved it becomes impossible to evaluate the true condition of the rope. It is regrettable that so many ropes are ruined by corrosion since, in many cases, this could have been avoided by proper lubrication in the field. Corrosion can, and generally does, attack from the outside, as in the case of the rope shown in *Figure 6*, and it is clear from this picture how seriously the outside wires have been eaten away. Corrosion on the outside can be seen when a rope is inspected, but it is practically impossible to estimate its remaining strength.

Corrosion can attack a rope from the inside, as in the case of the rope illustrated in these two cross sections. (*See Figure 7.*) Corrosion of this type is apt to occur if a heavy lubricant is used in the field which coats and protects only the outer surfaces, and does not have the ability to penetrate into the strands, or down to the core of the rope. The cross section shown on the left illustrates the drum end of the rope and shows its condition when new. The cross section on the right shows the section where the rope was corroded and eaten away next to the core, and it shows how the core itself has been greatly reduced in diameter.

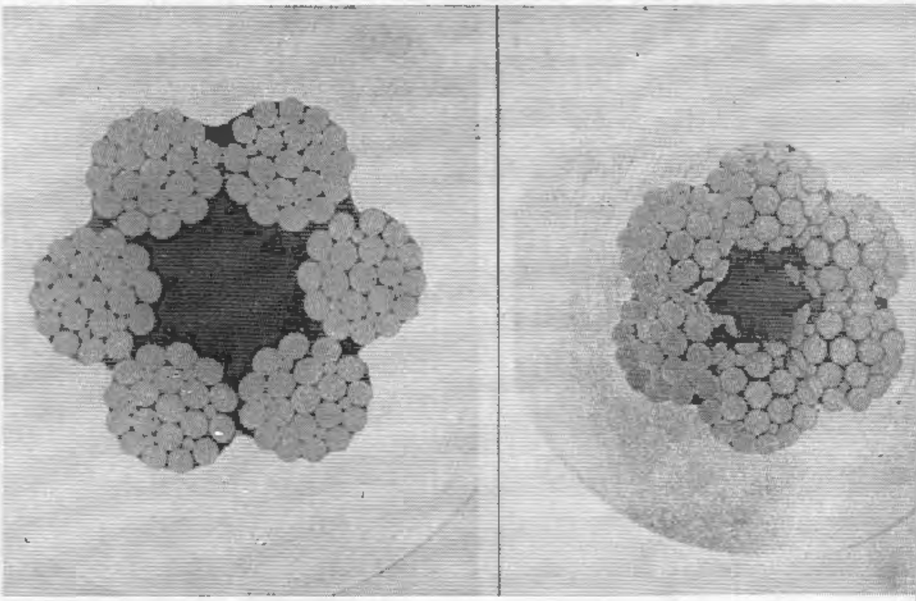


Figure 7.

Figure 8.

As a result of the collapse of the core, the strands are no longer properly supported, and wear between the wires in the valleys is clearly evident. A rope such as this would show a marked reduction in diameter and the inspector would have to judge it on this basis. If, in any case, he finds the diameter reduced to a greater degree than can be explained by wear on the outside wires, he should suspect some internal deterioration, even though the outer wires at the crown positions may be clean and bright.

In one case there was some corrosion on the outer surfaces as well as internally. The section shown at the left did not show any corrosion. This was near the attachment end, and when this part of the rope was tested, it developed a strength 10 percent over the catalog strength. A worn section in the middle had not been corroded and in this case deterioration was due only to abrasion on the outer wires. When tested to destruction, this part of the rope developed a strength of 96 percent of catalog. In the corroded section, however, the fiber core had been reduced in diameter. Corrosion adjacent to the core was severe and wear in the valleys was extensive. A test of this section developed only 57½ percent of catalog strength.

Another type of deterioration sometimes encountered results from operation over extremely small sheaves where bending stresses are high. Where a rope is operated in this manner, fatigue is apt to cause breakage of the wires at a position in the rope structure, where they cannot be readily observed at the time of examination. Fatigue breaks of this nature develop at or near the valley positions and inspection is difficult because the breaks cannot be seen if the ends are held in position by the adjacent strands of the rope. *Figure 8* shows a rope which has operated under such conditions. Two of the wire ends have popped out to show that this type of fatigue is present, but unfortunately, many of the other wires, which appear to be intact in this picture, are broken at or near the valleys.

Figure 9 shows the same rope only about 12 inches from the place where *Figure 8* was taken. Here the rope has been bent sharply and it can be seen how many wires have popped out, indicating that they had already been broken in service.

If evidence of even one fatigue break of this type is found during a rope inspection, the rope should be condemned and removed from operation since undoubtedly further deterioration of this type has already occurred.

The point of attachment of a rope is quite often a point where fatigue can develop. It is here that vibrations are dampened and concentrated stresses can be encountered, and thus these positions should always be given careful examination. This is true whether it is the end attachment of an operating rope or sections adjacent to fittings on boom pendants and extenders. Some types of attachment withstand fatigue better than others, but even with the best, concentrated fatigue is apt to develop in time.

A swaged socket is far better able to withstand fatigue than a zinc poured socket, but in time the same condition may develop.

In summing up this story, it should be clear that wire rope is a safe, reliable product. When properly used, those factors which tend to wear it out and finally necessitate its replacement, can be evaluated at the time inspections are made. If it is abused or misused, inspections can become more difficult since all factors tending to wear the rope out may not be as clearly evident. In such cases ropes should be removed from operation on a more conservative basis.

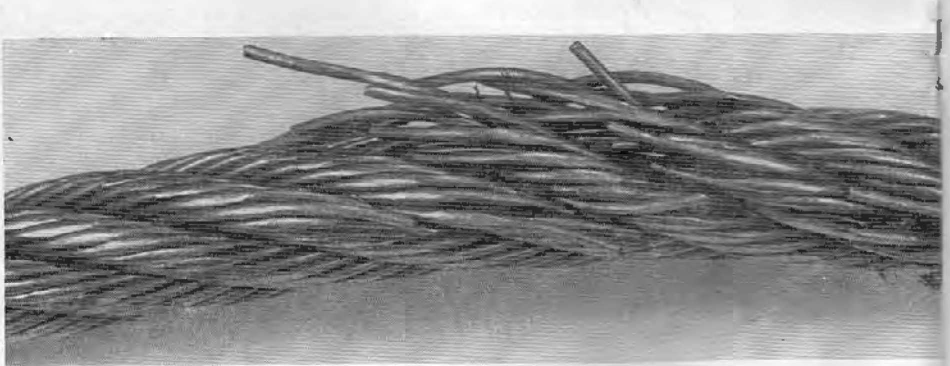


Figure 9.

nautical queries

DECK

Q. What is the forefoot of a ship?

A. Point of the stem where the keel rounds up to meet the stem piece.

Q. When lowering the flame safety lamp into a compartment, what is indicated if the flame increases in height and size?

A. If the flame increases in height and size, combustible gas is present.

Q. Bearing accuracy of radar may best be checked by:

(a) Comparing the radar and the visual bearing of a large nearby object.

(b) Comparing the radar and the visual bearing of a small distant object.

(c) Checking the radar heading against the master gyro.

(d) Comparing the radar "shadow sector" and the clear sector.

(e) Noting the visual bearing when the radar antenna appears to be directed at an object.

A. (b) Comparing the radar and the visual bearing of a small distant object.

Q. A bilge of a ship is:

(a) The waterway adjacent to the gunwale bar.

(b) Generally any lower space where waste water collects for pumping out.

(c) Failure of the ship to pass its acceptance trial.

(d) A narrow void space between riveted bulkheads.

(e) The pantry urn for making coffee.

A. (b) Generally any lower space where waste water collects for pumping out.

ENGINE

Q. What is meant by combustion at constant volume; at constant pressure?

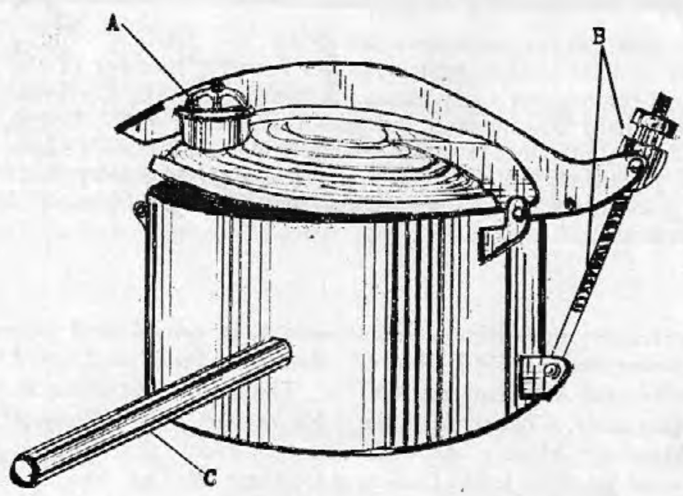
A. When combustion takes place very rapidly, as in a gasoline engine, the entire pressure increase takes place while the piston is at top center or, in other words, while the volume of the combustion chamber remains constant or nearly so. Under constant pressure conditions, as in a diesel engine slow burning fuel is injected in just sufficient quantities so that the pressure due to its combustion will keep the pressure even or constant until the fuel is cut off and while the volume is increasing above the piston.

Q. What precaution would you take in topping off a tank when loading gasoline on an oil tanker?

A. See that the valve on the next tank is partly opened and in working condition so that it can be readily opened when the tank is topped off. If on the last tank to complete loading, notify man on dock to stand by to stop pumps. Pumps should be slowed down when topping off.

OIL

Q. Sketched is a typical tank top arrangement on a tank vessel. Name and state the purpose of A, B, and C.



A. A. ULLAGE PLUG, which may be lifted in order to gage the amount of liquid in the tank.

B. LIFTING SCREW, for lifting the tank top (hatch top) for access, cleaning, etc.

C. VENT LINE to header providing venting for tank.

SS McKINLEY WINS GALLANT SHIP AWARD

Participants in the ceremony honoring the Gallant Ship *President McKinley* include (left to right): James Fanseen, member of the Federal Maritime Commission; Congressman Edward Garmatz, Chairman of the House Merchant Marine and Fisheries Committee; J. W. Gulick, Acting Maritime Administrator; Howard Adams, American President Lines; Nesbitt Mitchell, Jr., member of the crew of the *President McKinley;* and Admiral Willard J. Smith, Commandant, U.S. Coast Guard. (*Courtesy, Maritime Administration.*)

In a ceremony in Baltimore Harbor on November 30, 1967, Representative Edward A. Garmatz (Democrat, Maryland), Chairman of the House Merchant Marine and Fisheries Committee, and J. W. Gulick, Acting Maritime Administrator, U.S. Department of Commerce, made the presentation of the Gallant Ship Award to the SS *President McKinley,* which is owned and operated by American President Lines, Ltd.

The award was given to the ship for its part in the rescue of 10 survivors from the sinking Chinese freighter *Kwong Shun.* A plaque honoring the vessel was accepted by her master, Captain John F. Bohle. He also accepted unit citations and ribbon bars for himself and the entire crew, in recognition of each man's participation in the rescue. Captain Bohle received a Merchant Marine Meritorious Service Medal recognizing his outstanding leadership and skill as master of the vessel.

The *President McKinley's* heroic rescue took place off Luzon Island in the Philippines. On the morning of January 5, 1967, the SS *Kwong Shun* sent out a distress call stating that she was listing heavily and in danger of sinking from the flooding of a forward hold. The *President McKinley* received the call, immediately altered course, and reached the stricken vessel the following morning.

The *Kwong Shun's* crew began abandoning ship, but a lifeboat capsized while being launched, spilling men into the sea. Survivors scrambled aboard the stern of their ship and huddled on deck. The Master of the *President McKinley* maneuvered his ship close to the stern of the *Kwong Shun,* despite heavy seas made extremely hazardous by floating logs adrift from the stricken vessel's deck load. Survivors jumped from the *Kwong Shun* and attempted to swim to life rings and lines rigged over the side of the rescue vessel. The *President McKinley* drifted close to the men in the water, while crewmembers descended Jacob's ladders and pulled the survivors safely aboard.

The designation of Gallant Ship is the highest award the U.S. Government can bestow upon a merchant ship, and the SS *President McKinley* is only the 24th vessel to be accorded the honor since 1939, and the 15th to be so designated for actions subsequent to World War II. ⚓

Dunnage Adrift

During a biennial inspection of a large tank vessel at one of the Gulf ports some 12 life preservers were condemned by the Coast Guard inspector and destroyed by the vessel personnel. The remnants of the life preservers were aboard the vessel when it departed.

Several hours after the departure of the tank vessel, the boatswain, in an effort to clear the vessel's deck, threw some dunnage and the discarded life preservers overboard.

Several hours later another tank vessel passing the area sighted the debris and life preservers and alerted the 8th Coast Guard District Rescue Coordination Center. Coast Guard planes and vessels searched the area for several hours, before it was learned that no vessel was in distress.

The above incident indicates the costly problems that may result from carelessly throwing material of this sort into the sea. ⚓

SNAME Celebrates 75th Birthday

1968 marks 75 years of achievement in the arts of naval architecture, ship building, and engineering for The Society of Naval Architects and Marine Engineers. Founded in 1893, SNAME is today one of the foremost technical societies in the world maritime fraternity. Numerous special events have been scheduled to celebrate this anniversary year. Topping the slate of activities will be the Society's 4-day Diamond Jubilee International Meeting commencing June 18 in New York City. ⚓

REAR ADM. CHARLES P. MURPHY ELECTED

At a meeting in London on March 11, Rear Adm. Charles P. Murphy was elected chairman of the Maritime Safety Committee of the Intergovernmental Maritime Consultative Organization (IMCO). Admiral Murphy, the first American to be elected to this important position, will serve for a 1-year term and will be eligible for reelection next year.

Admiral Murphy is currently serving as Chief, Office of Merchant Marine Safety at Coast Guard Headquarters and as chairman of the Merchant Marine Council.

A native of Syracuse, N.Y., Admiral Murphy was graduated from Webb Institute of Naval Architecture in 1935 and served in the Bureau of Marine Inspection and Navigation. When the Bureau was absorbed by the Coast Guard in 1942 he was commissioned as a lieutenant commander in the Coast Guard Reserve and advanced to the rank of commander in the regular Coast Guard in 1948.

Admiral Murphy served as Chief of the Naval Architecture Section at Headquarters until 1946. He next served as Assistant Chief of the Merchant Marine Technical Division and then as chief of that division until 1959, when he became Deputy Chief, Office of Merchant Marine Safety. He assumed his present duties at Headquarters in June of 1964.

Admiral Murphy has served on numerous technical committees throughout his career, in addition to his regular duties. His current work with IMCO is the most recent example of such service. Previously, he was adviser to the U.S. delegation at the International Conference on Safety of Life at Sea, which convened in London in 1948 and again in 1960. He has served as cochairman of the Atomic Energy Panel of the Society of Naval Architects and Marine Engineers, and has logged longtime memberships in the American Bureau of Shipping Committee on Naval Architecture, the U.S. State Department Shipping Coordinating Committee, and the U.S. Committee for studying Maritime Tonnage Admeasurement.

Admiral Murphy, who now resides in Rockville, Md., is also a member of the Society of Naval Architects and Marine Engineers and of the National Fire Protection Association. ⚓

Maritime Books

Waldo C. M. Johnston, director of the Marine Historical Association, Mystic, Conn., has announced that the association and Wesleyan University Press, a department of Wesleyan University, will publish jointly a series of major publications in maritime history to be known as "The American Maritime Library."

Willard A. Lockwood, director of Wesleyan Press, said that the books, "the first of which is expected next year, will be welcomed not only by scholars and historians but by all those who are interested in the sea, in ships, and in the men who built and sailed them." ⚓

LIFEBOAT

A victory ship was undergoing biennial inspection and the crew had been stripping No. 2 motor lifeboat. Having completed their task for the day, the boat was hoisted into position and secured in the gravity davits by the ship's crew. The following day, a holiday, the vessel had a skeleton crew aboard to load stores under the direction of the Boatswain. The ship's crew had not been in the vicinity of No. 2 lifeboat during the holiday. Yard repair personnel were required to work on the aft davit of No. 2 lifeboat that day and in order to accomplish the repair it was necessary to release the falls from the boat. Work on the davit was completed and the yard repairmen removed all of their equipment and placed the fall blocks on the hooks of the Rottmer gear in an upright position but failed to close the releasing gear. The following morning, the Boatswain was directed by the Chief Mate to lower No. 2 lifeboat to the rail and restow the provisions. The Boatswain proceeded to the boat deck and observed that the gripes were in place and the falls appeared to be hooked; however, it was noted that the preventers were not in place. The Boatswain then ordered an AB into the boat to clear the gripes when they were released. An order by the Boatswain to release the forward gripe was accomplished and within seconds the No. 2 lifeboat fell, striking the gangway davit and was left suspended by its gunwale. The AB aboard the lifeboat made a dive into the water in an attempt to clear the boat and was struck on the head by what is believed to have been a strongback. Luckily, the AB received only a minor injury to his head and suffered no disability.

Upon examination of the lifeboat it was determined that the releasing gear handle had been left in the open position by yard repair personnel and that the position of the handle had not been checked prior to releasing the forward gripe. The Boatswain, knowing that the lifeboat had been properly secured by ship's personnel the day before the holiday, labored under the false assumption that all had remained in a static position since that time.

Although the AB suffered only superficial injuries, the potential for loss of life existed. The lifeboat, however, was nearly demolished and resulted in a costly delay in the vessel's sailing.

The combination of unwitting neglect by repair personnel and failure to carry out adequate safety checks by ship personnel caused this casualty. ⚓

AMENDMENTS TO REGULATIONS

Title 46 Changes

SUBCHAPTER A—PROCEDURES APPLICABLE TO THE PUBLIC

PART 1—ORGANIZATION, GENERAL COURSE AND METHODS GOVERNING MARINE SAFETY FUNCTIONS

SUBCHAPTER K—MARINE INVESTIGATIONS AND SUSPENSION AND REVOCATION PROCEEDINGS

PART 137—SUSPENSION AND REVOCATION PROCEEDINGS

Appeals and Review of Examiners' Decisions

In suspension and revocation proceedings involving licenses, certificates, documents, and registers issued to individuals by the Coast Guard or predecessor agencies, the Commandant, U.S. Coast Guard, has delegated to the examiners the power to make initial decisions on the record subject to conditions and limitations set forth in 46 CFR Part 137. The Commandant is charged with the responsibility for the uniform administration of marine safety laws, rules, and regulations, which include suspension and revocation proceedings. Under the delegations of authority in 49 CFR 1.4(a) by the Secretary of Transportation and in 14 CFR Part 400 by the National Transportation Safety Board, the Commandant, U.S. Coast Guard, has the final authority in all cases arising under the suspension and revocation proceedings in 46 CFR Part 137 other than when his decisions sustain the revocation decisions of examiners. The Commandant's final decision in a revocation of a license, certificate, document, or register in a suspension or revocation proceeding under 46 CFR Part 137 may be appealed to the National Transportation Safety Board in accordance with the rules of procedure in 14 CFR Part 425.

The purpose of this document is to bring the rules and regulations up-to-date by amending or adding to them as follows:

(a) Amend appeal procedures so that the notice of appeal by a person charged will be filed with the examiner who heard the case rather than with the District Commander who forwards it to such examiner.

(b) Add rules regarding appeals in revocation cases, including references to the applicable rules of procedure in 14 CFR Part 425 of the National Transportation Safety Board.

(c) Add rules stating the Commandant's decisions on appeals or review are public records and available for reading purposes in certain Coast Guard offices.

Since the amendments and new rules and regulations in this document relate to Coast Guard's policies, procedures, and practices, the law provides that notice and public procedures thereon are not required and they may be made effective in less than 30 days after publication in the Federal Register (Administrative Procedure Act, 5 U.S.C. 553).

By virtue of the authority vested in me as Commandant, U.S. Coast Guard, by section 632 of Title 14, U.S. Code, and the delegation of authority in 49 CFR 1.4(a)(2) (32 F.R. 5606), to promulgate rules and regulations in accordance with the laws cited with the rules and regulations below, the following amendments and new rules and regulations are prescribed and shall be effective 30 days after the date of publication of this document in the Federal Register, but prior to that effective date may be followed in lieu of existing requirements.

The complete text of these changes has been published in the Federal Register of March 30, 1968.

Circulars

NVIC 0–68

The annual listing of navigation and vessel inspection circulars in force, and cancellation of others has been made in Navigation and Vessel Inspection Circular 0–68.

Copies of this circular may be obtained at the local marine inspection office or by writing Commandant (CAS–2) U.S. Coast Guard, Washington, D.C. 20591.

NVIC 2–68

This circular provides instruction and guidance for the effective and orderly implementation of subsection (c) of R.S. 4400 which pertains to passenger vessel fire safety standards effective on 2 November 1968.

After several disasters occurred aboard foreign passenger ships, Congress deemed it to be in the public interest that all U.S. citizens who sail from U.S. ports receive improved protection related to operator financial responsibility and adequate vessel fire-prevention standards. Subsection (c) of R.S. 4400 requires that certain foreign and domestic passenger vessels may not depart a U.S. port with passengers who are U.S. nationals and who embarked at that port if the Secretary of the Department in which the Coast Guard is operating finds that such vessels do not comply with the standards of the SOLAS 60 Convention as modified by the amendments proposed by the 13th session of the Maritime Safety Committee of the Intergovernmental Maritime Consultative Organization contained in annexes I through IV of the Note Verbale of the Secretary General of the organization dated 17 May 1966, No. A1/C/3.07 (NV.1). The proposed amendments (1966 Fire Safety Standards for Passenger Vessels) were adopted without substantial change by the General Assembly of IMCO on 30 November 1966 as Resolution A.108 (ES.III). Subsection (c) of R.S. 4400 becomes effective when the proposed amendments to SOLAS 60 come into force (12 months after the date on which the amendment is accepted by two-thirds of the contracting governments including two-thirds of the governments represented on the Maritime Safety Committee), but in any case not later than 2 November 1968.

The necessary acceptances were not made by signatory nations in sufficient time to bring the fire safety standards into force internationally by 2 November 1968. Therefore, since these amendments will not, by that date, form a part of SOLAS 60, it will be incumbent upon the Coast Guard under the provisions of R.S. 4400(c) to actually verify compliance on and after 2 November 1968.

Regulations implementing the 1966 fire safety standards for U.S. flag passenger vessels were published in the Federal Register of 20 December 1967 (32 F.R. pages 19179–19183). The changes are not extensive since existing regulations pertaining to these vessels include most of the proposed SOLAS amendments.

INSTRUCTIONS

(a) On and after 2 November 1968 no foreign or domestic passenger vessel of over 100 gross tons having berth or stateroom accommodations for 50 or more passengers will be permitted to depart any U.S. port with passengers who are U.S. nationals and who embarked at that port unless it has been verified by the U.S. Coast Guard that the vessel complies with the 1966 fire safety standards for passenger vessels.

(b) To provide for an orderly assessment and verification of compliance of passenger vessels with the required standards, all U.S. Coast Guard Officers in Charge, Marine Inspection, will at the earliest opportunity informally discuss with those affected passenger-ship owners or operators in their respective zones Coast Guard plans for verifying compliance with the 1966 fire safety standards. These discussions should develop the owners' or operators' plans for their particular vessel(s) and lay the groundwork for subsequent examination for verification.

(c) The extent and degree of examination for compliance will vary dependent upon the date of keel laying and subsequent history of the vessel as indicated in the paragraphs below. In any event verification should be planned and coordinated so as to minimize inconvenience and interruption of schedules. No effort will be made to force increased verification examinations prior to 2 November 1968. However, it will be in the interest of owners and operators of all passenger vessels subject to the requirements to accomplish any necessary alterations as soon as possible. Planned cooperative efforts by all concerned prior to the effective date will minimize inconvenience.

(d) For passenger vessels, the keels of which were laid on or after 26 May 1965 and which were constructed and subsequently maintained to the standards for new vessels set forth in SOLAS 60, an examination will be accomplished to verify that those requirements of the 1966 fire safety standards which are over and above those of 1960 have been met.

(e) For passenger vessels, the keels of which were laid on or after 19 November 1952 and which were constructed and subsequently maintained to the standards for new vessels set forth in SOLAS 48, an examination will be accomplished to verify that those requirements of the 1966 fire safety standards which are over and above those of SOLAS 48 have been met.

(f) For passenger vessels, the keels of which were laid before 19 November 1952, sufficient examination will be made to insure that the requirements of the 1966 fire safety standards have been met. This verification may necessitate a degree of plan review, removal of panels, ceilings, etc., in addition to the testing of construction materials. In the event initial structural examination indicates noncompliance, inspection may be extended to additional areas.

(g) As an alternative to the verification procedures outlined above the U.S. Coast Guard will consider acceptance of a written statement of compliance issued by the home government of vessels registered in countries the governments of which are signatory to SOLAS 60 and have deposited formal acceptance of the proposed amendment (1966 fire safety standards).

(h) When a foreign-flag passenger vessel is found to be in compliance with the 1966 fire safety standards a statement containing the date and port of the verification will be entered on a new control verification for foreign vessel, Form CG-4504, which will be issued by the cognizant U.S. Coast Guard Officer in Charge, Marine Inspection. All control verification for foreign vessel forms issued before compliance with the 1966 fire safety standards has been verified will be prepared with an expiration date of not later than 1 November 1968 and the final paragraph on the Form amended accordingly. Following verification the expiration date will coincide with that shown on the vessel's safety certificate.

(i) Verification of compliance with the 1966 fire safety standards by U.S.-flag passenger vessels will be entered on the vessel inspection record, Form CG-2832, and on MVI vessel inspection record, Form CG-3821, which will be prepared by the cognizant U.S. Coast Guard Officer in Charge, Marine Inspection.

Copies of this circular with enclosure (1) may be obtained at the local marine inspection office or by writing Commandant CAS-2, U.S. Coast Guard, Washington, D.C. 20591.

STORES AND SUPPLIES

Articles of ships' stores and supplies certificated and canceled from March 1 to March 31, 1968, 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

Pilot Chemical, Inc., 860 West 44th St., Norfolk, Va. 23508: Certificate No. 793, dated March 5, 1968, PILOT DSF; Certificate No. 794, dated March 5, 1968, PILOT FOT-W;

Alken-Murray Corp., Executive Offices, 111 Fifth Ave., New York, N.Y. 10003: Certificate No. 795, dated March 7, 1968, ALKEN SOLVIT; Certificate No. 796, dated March 7, 1968, ALKEN O.S.D.; Certificate No. 797, dated March 8, 1968, ALKEN FIRESIDE TREATMENT; Certificate No. 798; dated March 8, 1968, ALKEN EVEN-FLO 910 E.

Harco Chemical Co., 338 North Ave., E, Cranford, N.J. 07018: Certificate No. 799, dated March 13, 1968, HARCOITE STABILIZER WITH COMBUSTION CATALYST.

CANCELED

Pennsalt Chemicals Corp., Three Penn Center, Philadelphia, Pa. 19102: Certificate 347, dated April 19, 1965, PENNSALT 3022 LATEX CLEANING COMPOUND; Certificate 575, dated September 26, 1963, PENNSALT 3028 SOLVENT DEGREASER; Certificate 580, dated October 25, 1963, PENNSALT 3013 OIL SIDE CLEANER; Certificate 632, dated September 8, 1965, PENNSALT 3026 HEAVY-DUTY ALKALINE CLEANER.

AFFIDAVITS

The following affidavits were accepted during the period from February 15 to March 15, 1968:

Rockwell-Brodie Co., Division of Rockwell Manufacturing Co., Post Office Box 450, Statesboro, Ga. 30458, VALVES.

Everlasting Valve Co.,[1] Post Office Box 422, Cranford, N.J. 07016, VALVES.

[1] Change of address.

MERCHANT MARINE SAFETY PUBLICATIONS

The following publications of marine safety rules and regulations may be obtained from the nearest marine inspection office of the U.S. Coast Guard. Because changes to the rules and regulations are made from time to time, these publications, between revisions, must be kept current by the individual consulting the latest applicable Federal Register. (Official changes to all Federal rules and regulations are published in the Federal Register, printed daily except Sunday, Monday, and days following holidays.) The date of each Coast Guard publication in the table below is indicated in parentheses following its title. The dates of the Federal Registers affecting each publication are noted after the date of each edition.

The Federal Register may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Subscription rate is $1.50 per month or $15 per year, payable in advance. Individual copies may be purchased so long as they are available. The charge for individual copies of the Federal Register varies in proportion to the size of the issue but will be 15 cents unless otherwise noted in the table of changes below. Regulations for Dangerous Cargoes, 46 CFR 146 and 147 (Subchapter N), dated January 1, 1968, are now available from the Superintendent of Documents, price: $2.50.

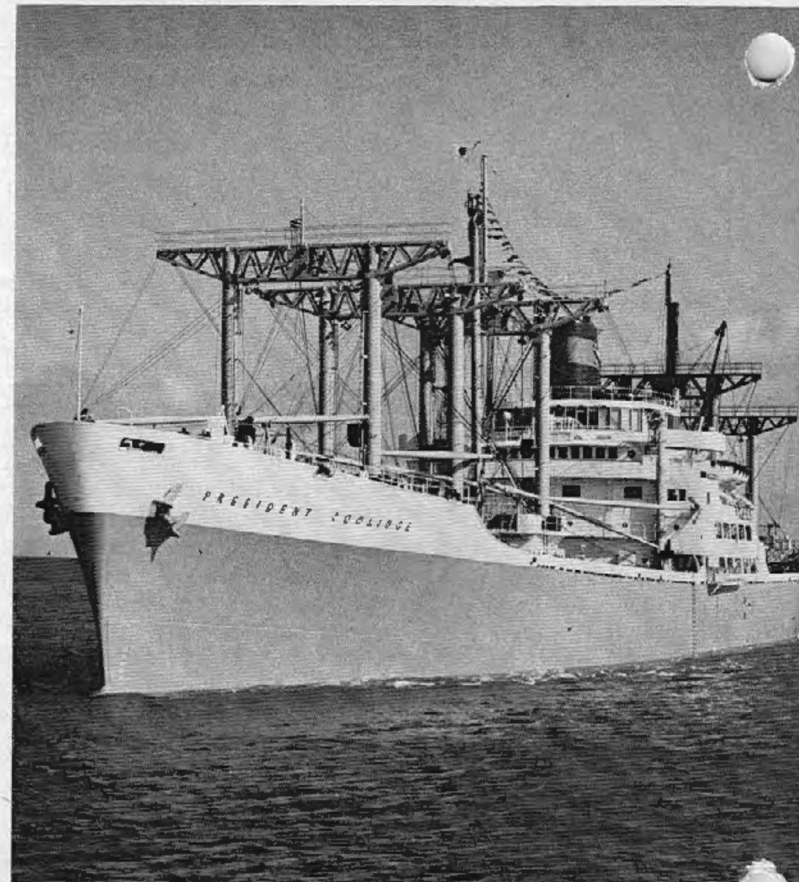
CG No.	TITLE OF PUBLICATION
101	Specimen Examination for Merchant Marine Deck Officers (7–1–63).
108	Rules and Regulations for Military Explosives and Hazardous Munitions (8–1–62).
115	Marine Engineering Regulations and Material Specifications (3–1–66). F.R. 12–6–66, 12–20–67.
123	Rules and Regulations for Tank Vessels (5–2–66). F.R. 12–6–66, 12–9–67, 12–27–67, 1–26–68, 1–27–68, 2–10–68.
129	Proceedings of the Merchant Marine Council (Monthly).
169	Rules of the Road—International—Inland (9–1–65). F.R. 12–8–65, 12–22–65, 2–5–66, 3–15–66, 7–30–66, 8–2–66, 9–7–66, 10–22–66, 12–23–67.
172	Rules of the Road—Great Lakes (9–1–66).
174	A Manual for the Safe Handling of Inflammable and Combustible Liquids (3–2–64).
175	Manual for Lifeboatmen, Able Seamen, and Qualified Members of Engine Department (3–1–65).
176	Load Line Regulations (1–3–66). F.R. 12–6–66, 1–6–67, 9–27–67.
182	Specimen Examinations for Merchant Marine Engineer Licenses (7–1–63).
184	Rules of the Road—Western Rivers (9–1–66). F.R. 9–7–66, 12–23–67.
190	Equipment Lists (8–1–66). F.R. 9–8–66, 11–18–66, 2–9–67, 6–6–67, 6–14–67, 6–30–67, 8–29–67, 10–7–67.
191	Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel (2–1–65). F.R. 2–13–65, 8–21–65, 3–17–66, 10–22–66, 12–6–66, 12–13–66, 6–1–67, 11–16–67.
200	Marine Investigation Regulations and Suspension and Revocation Proceedings (5–1–67). F.R. 3–30–68.
220	Specimen Examination Questions for Licenses as Master, Mate, and Pilot of Central Western Rivers Vessels (4–1–57).
227	Laws Governing Marine Inspection (3–1–65).
239	Security of Vessels and Waterfront Facilities (3–1–67). F.R. 3–29–67, 12–23–67.
249	Merchant Marine Council Public Hearing Agenda (Annually).
256	Rules and Regulations for Passenger Vessels (5–2–66). F.R. 12–6–66, 1–13–67, 4–25–67, 8–29–67, 12–20–67, 1–27–68.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (1–3–66). F.R. 4–16–66, 12–6–66, 1–13–67, 12–9–67, 1–26–68, 1–27–68, 2–10–68.
258	Rules and Regulations for Uninspected Vessels (3–1–67). F.R. 12–27–67, 1–27–68.
259	Electrical Engineering Regulations (3–1–67). F.R. 12–20–67, 12–27–67, 1–27–68.
266	Rules and Regulations for Bulk Grain Cargoes (11–1–66).
268	Rules and Regulations for Manning of Vessels (5–1–67).
270	Rules and Regulations for Marine Engineering Installations Contracted for Prior to July 1, 1935 (11–19–52). F.R. 12–5–53, 12–28–55, 6–20–59, 3–17–60, 9–8–65.
293	Miscellaneous Electrical Equipment List (4–1–66).
320	Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf (10–1–59). F.R. 10–25–60, 11–3–61, 4–10–62, 4–24–63, 10–27–64, 8–9–66.
323	Rules and Regulations for Small Passenger Vessels (Under 100 Gross Tons) (1–3–66). F.R. 12–6–66, 1–13–67, 12–27–67, 1–27–68.
329	Fire Fighting Manual for Tank Vessels (4–1–58).

CHANGES PUBLISHED DURING MARCH 1968

The following has been modified by Federal Register:
CG–200, Federal Register, March 30, 1968.

U.S. GOVERNMENT PRINTING OFFICE: 1968

National Transportation Week May 12–18



National Maritime Day May 22