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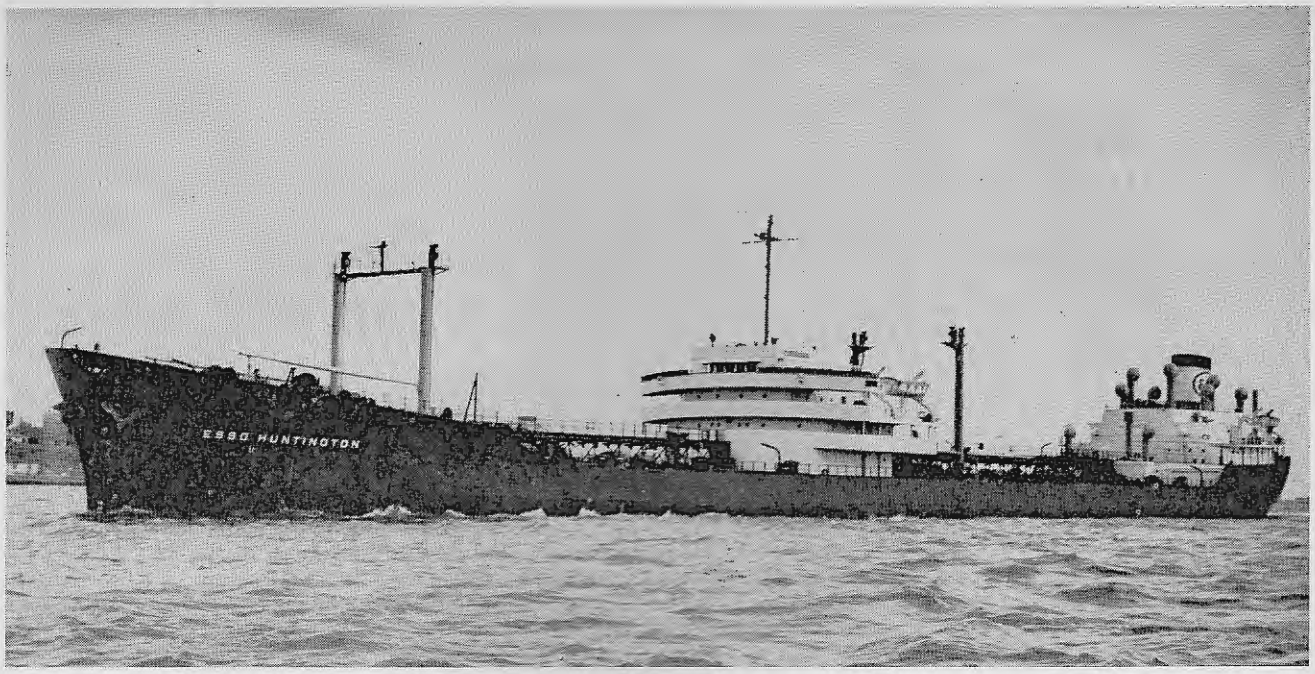

REMOTE CONTROL OF CARGO HANDLING

By Captain Isaac H. Vincent

Assistant Port Captain, Esso Tankers, Inc.

MANY THINK that revolutionary changes are necessary in order to produce a new scientific breakthrough in the automation of ships' systems. The word "automation" when used in conjunction with "revolutionary" stirs the imagination to bold new thoughts. But revolutionary experiments must be paid for in hard cash, and private industry has only a limited amount of funds available. Automation is an expensive proposition in its early stages and should not be rushed into blindly, although we agree that its pace should be and is being accelerated. Common sense dictates that we continue our orderly process of evolution. It is our belief that the development of automated systems will be evolutionary rather than revolutionary.

The history of the development of ships has been an excellent example of the evolutionary process. The first ships were propelled by hand (oars) and by the elements (winds, tides and currents). Steering was done manually by means of a steering oar or rudder and tiller, and direction was determined by noting the position of celestial bodies (the sun, stars, and planets).

With the advent of the steam engine and its development by Fulton and others for marine transportation, mechanization, which can generally be considered the replacement of human or animal power sources by machinery through the application of technology, entered the scene. Machine-operated paddle wheels or propellers drove the ship, and machine-operated steering engines moved the rudder to guide the ship, with direction being determined by means of a magnetic compass. Today we have enormous ships propelled at high speeds by steam turbines or large diesels with automatic controls located in the engineroom and in some cases on the bridge. A mechanized device, the gyrocompass, provides direction; a robot, the gyro pilot, steers the vessel; vision is provided by an electronic eye, the radar, in weather impenetrable by the human eye. The vessel's position is determined by electronic devices such as radar, loran, the radio direction finder and the electric log. Remote communication is provided by means of radio and radiotelephone. Even the galley is mechanized; electric stoves and ovens, mechanical mixers, juicers and other devices aid the cook in the streamlined preparation of meals.

The enginerooms of our vessels are partially automated at present with promise of total automation of the boilerroom in the near future. Humble Oil and Refining Company is now equipping a 27,000 d.w.t. vessel with additional automatic controls on boilers and boiler water feed pumps. Another logical step will be to move the engine controls to the bridge to allow direct engine operation by the officer on watch.

Our prime purpose in automating the cargo system of our large tankers is to reduce the arduous labor associated with cargo handling and to attain, with safety, high loading and unloading rates in addition to reducing operating costs through reduction of manpower.

Our large tankers now load at peak rates of 60,000 barrels per hour and discharge at rates up to 37,000 barrels per hour at modern terminals. When loading at these high rates a large number of cargo valves must be opened and closed rapidly to avoid overflows. With the relatively small number of men available, this becomes a tremendous task and introduces an element of danger. An oil overflow can result in fire or harbor pollution with the possibility of attendant fines.

When discharging at high rates with large centrifugal pumps a group of tanks are usually discharged simultaneously. When shifting from one group to another the cargo valves

must be opened and closed rapidly to avoid having the cargo pumps lose suction, overspeed and trip out.

At sea, ballasting, deballasting and tank cleaning often occur during bad weather. Dashing around a slippery deck covered with obstacles with the vessel rolling heavily while opening and closing valves can be extremely hazardous and requires agility beyond that possessed by many sturdy seamen. This hazard is compounded during the hours of darkness. Even during good weather the distance from the most forward tank to the after pumproom on our new large tankers has increased until even an agile seaman cannot efficiently cover the required territory if it is necessary to turn the cargo valves by hand.

Our 86,000 d.w.t. vessels will have 16-inch valves in the cargo tanks with 18- and 20-inch valves in the pumproom and discharge manifold. Obviously, mechanical assistance must be provided if high loading and discharge rates are to be maintained.

We are still definitely in the experimental stage in regard to automation of the entire system for the remote control handling of cargo. However, we feel we have advanced beyond this stage in regard to the major component—power-operated cargo valves. Our first experiment in this field dates back to 1959 when a decision was reached to mechanize the 12-inch main cargo valves of four of Creole Petroleum Corporation's 35,500 d.w.t. vessels.

The cargo valve actuator system installed on these vessels consists of a self-contained, automatically controlled, hydranlic power system, centrally located in a machinery room in the midship house. A power pack supplies fluid under high pressure (between 1,400 p.s.i. and 1,500 p.s.i) through pipes to deck stands located above the cargo tanks in which the cargo valves are located. Attached to the deck stands are hydraulic motors, actuated by fluid under pressure from the power pack. The hydraulic motors turn the cargo valve reach rods through a set of sparkproof gears in a watertight, lubricated gear case. In case of power failure the valves can be opened or closed by hand. Valve position is indicated mechanically by an indicator on the reach rod at the control stand. An adjustable throttling-device, using a governor, is installed on the deck stand and controls the speed of the motor so that full power and torque or a controlled speed can be obtained at will. A travel limit prevents the valve from jamming on the opening cycle and a torque limit allows more pressure on opening than when closing to prevent the valve from jamming closed. Hydraulic pressure indication is provided at each valve stand.

Hand controller on deck stand . . .

Photo courtesy Marine Engineering Log.

OPERATING LEVER for Controlex pneumatic valve system is simple, push-pull type knob with valve position indicator.

THE POWER PACK

The power pack consists of a simple, positive, operating arrangement. A standard marine electrical motor is started through a pressure-sensing switch that trips a typical magnetic starter when the pressure is 100 p.s.i. or more below operating pressure, which, in turn, starts the pump. When normal pressure is attained, the same pressure switch again trips the magnetic starter and stops the motor, maintaining the operating pressure at the required level. The power pack electric motor shaft is coupled to the shaft of a simple hydraulic pump, the housing of which is mounted on an extension of the motor housing, thus assuring and maintaining alinement. The pump receives hydraulic fluid from a prime reservoir tank, mounted above the pump, through an externally mounted filter that features a sight glass and an external mechanical indicator by which the condition of the removable and cleanable filtering element can be determined. This pump delivers fluid under pressure to the piping system of the power pack. Connected in parallel to the piping system is a bank of nitrogen, precharged, piston-type accumulators. These are used to store liquid under pressure between 900 p.s.i. and normal operating pressure. They thus serve to level out the pressure surges and to store a reserve of energy during the idle period of the fluid pump, while an in-series check valve isolates line pressure from the pump. A main shutoff valve is supplied to stop the flow of fluid to the field supply line so that the power pack may be placed in operation without pressurizing the entire field. A bypass valve placed in series with a return tube, between the power pack piping and the tank, is used to permit cycling of the power pack and circulation of the tank fluid when the main shutoff valve is closed. The same valve may be used to unload the entire system when the main shutoff valve is open and the electric power is secured. A gage is installed in the power pack system and registers the pressure being generated by the pump. A full-length sight glass is installed on the tank to indicate the level of the system fluid.

Auxiliary to the prime operating components of the power pack are a number of safety devices. A standby sensing switch, set for "cut out" at a pressure slightly higher than normal operating pressure, will stop the electric motor should the primary pressure-sensing switch fail to do so. However, either or both switches will cut in and start the electric motor at the same predetermined low pressure setting. In case either pressure-sensing switch fails to trip the magnetic controller of the electric motor, two pressure relief valves will function at slightly different pressure settings. At the same time, a loud warning horn will be sounded and will continue to sound until pressure has been reduced to normal. In the event the power pack is isolated from the field by the main shutoff, and a pressure buildup in the field is experienced due to thermal conditions, a third pressure relief valve will function by reducing pressure to normal, thereby protecting the entire system.

THE HYDRAULIC CARGO VALVE ACTUATOR

The power-operated deck stand is operated by merely moving the conveniently located knob of the directional control valve upward an inch from the neutral position to open the valve, and downward 1 inch from the neutral position to close the valve. The lever, when released, will return to neutral position by spring action. The only effort required to operate the lever is that which is required to overcome the spring tension.

The stand has but two conventional features, the stuffing box and the indicator, all other features being of unique design. A special spark-

Operates 12-inch butterfly valve in tank.

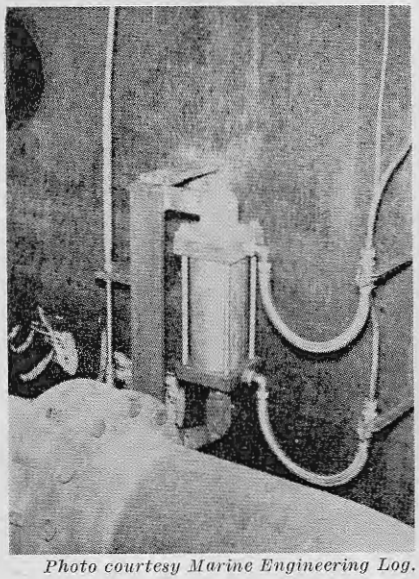

Photo courtesy Marine Engineering Log.

VALVE ACTUATOR on Keystone 12-inch butterfly valve in tank has speed-control device to prevent hydraulic shock.

proof travel-limit control is incorporated to prevent "over opening" of the cargo valves during the opening cycle. It automatically turns off the flow of the fluid and the consequent rotation of the deck stand spindle when the cargo valve is just short of being "full open." Full operating pressure resulting in maximum torque can be employed during the opening cycle to insure the "break away" of the most stubborn valves, using the adjustable governing device. The closing is completed with automatically reduced pressure and torque, assuring full closing without jamming. The operating torque is developed first in a reversible hydraulic motor by the fluid which is directed from the field supply line to the motor by the directional control valve. The motor is connected to a sparkproof, leakproof and lubricated gear case containing gears which multiply the initial torque to a value predetermined and selected for the particular type and size of cargo valve. The final torque is delivered to the spindle, which is connected to the conventional valve operating gear. Torque and speed within the limits of the design of the stand and system are controlled by merely turning a knob.

The total original cost, on a per-ship basis, for furnishing this hydraulic equipment, and for its installation, was approximately $70,000.

Each of the four Creole vessels normally lifts nearly 4,000,000 tons of cargo per year in the Lake Maracaibo/Aruba trade. By comparison a vessel of this class trading between the Caribbean and the East Coast of the United States would normally lift approximately 900,000 tons of cargo per year. This service has resulted in a severe and prolonged test of the hydraulic motor operated valves.

Some minor difficulties were originally experienced. Necessary adjustments were made and the system is now operating satisfactorily. It is important that the cargo valve actuator gears be designed to provide sufficient torque to open and close the valves at high loading rates.

In mid-1959 one of our European affiliates under the sponsorship of Jersey's Marine Testing and Improvement Program decided to motorize a section of the cargo system of one of their 26,000 d.w.t. tankers. Nine center tanks were chosen for this experiment.

A specification was prepared which called for the supply and installation of a power pack and either the conversion or replacement of the existing 10-inch cargo valves. This specification was circulated to various potential suppliers of hydraulic equipment who were invited to participate in the development, testing and installation of hydraulic actuators. This proposition was accepted by several manufacturers who wished to assess the behavior of new design equipment under the rugged conditions experienced on a tanker in service.

A power pack somewhat similar to the one installed on Creole's vessels was installed. Various makes and types of hydraulic motors and valves were installed in the cargo tanks with the actuators mounted upon or attached to the cargo valves, whereas on the Creole vessels the actuators were mounted on deck and attached to the valve reach rods. The valve controllers were located on deck at the cargo hatches of the tanks in which the valves to be controlled were located. Various hydraulic valve position indicators were installed based on the principle that the linear motion of the valve would cause a corresponding motion of a piston contained in a cylinder attached to the valve with the displacement brought about by the motion of the cylinder being transmitted hydraulically to a receiver near the operator and converted into a visual indication.

Types of hydraulic motor actuators consisted of various makes of ram, rotary and semirotary motors.

This installation has functioned with reasonable success except for the valve position indicators which were generally unsuccessful. Valuable experience has been gained and many lessons learned from this installation. Perhaps the most important was that meticulous cleanliness must be observed during the original installation to keep all dirt out of the hydraulic system.

Shortly after these experiments were started some of our other European affiliates, also working in conjunction with our Marine Testing and Improvement Program, experimented on a limited basis with motorized valves and have experienced generally satisfactory results.

As a result of these experiments it was decided to motorize the main cargo valves in the cargo tanks and pumproom of a 48,000 d.w.t. tanker, the *Esso Norway*. The actuators for these valves are rotary-type hydraulic motors. No valve position indication is provided. This vessel came into service in mid-1961 and valve operation has proved generally satisfactory to date although some troubles have been experienced.

Specifications for all our European affiliate's 77,000 d.w.t. and 86,000 d.w.t. tankers under construction now call for hydraulic motorized main valves. Esso Tankers, Inc., managed vessels in this class will have geared manually operated butterfly type valves in the pumproom and loading manifold. The gate valves in the cargo tanks will be actuated by rotary type hydraulic motors. Another affiliate's vessel will have ram/cylinder type actuators on wedge-type gate valves.

The *Esso Switzerland* has been equipped with 12-inch pneumatic, remote operated motorized butterfly cargo valves in two center tanks for test purposes. Instrument-quality compressed air will be used in this installation. Valve position indication will be provided by means of a special type stainless steel ribbon cable.

A control device will limit the speed of opening or closing valves to 8 to 15 seconds to prevent hydraulic shock to cargo systems. The operating lever will be the push-pull type, automatically returning to neutral position when released. We should mention here that a difference of opinion exists in regard to the relative merits of above-deck versus below-deck installation of valve actuators. Below-deck installations leave the deck area clear and provide direct valve operation, but make repairs difficult due to inaccessibility as the valve is impressed in cargo, ballast or a gaseous atmosphere. The above-deck unit is easier to repair and operate in case of a breakdown but has the disadvantage of con-

trolling the valve by means of a long reach rod. The twisting and erratic motion of this reach rod when starting to open valve and at the moment valve is completely closed causes shock torque resulting in excessive strain of the hydraulic motor.

A difference of opinion also holds in regard to valve position indication. Position indication of valves with below-deck actuators is expensive and has proved unreliable to date, whereas position indication with an above-deck unit is accurate and costs little.

However, experience gained from operation of the *Esso Norway*'s below-deck installation where no valve position indication is provided except by manually operated indicator devices has convinced us that positive valve position indication is unnecessary. We have concluded that below-deck installations will be more efficient and that manually operated indicator devices will prove satisfactory for valve position indication.

Our first experience in the integration and operation of the various components of a remotely controlled electronic-pneumatic-hydraulic cargo system from a console is being undertaken on the 35,000 d.w.t. tanker, the *Esso Panama*.

This installation will mark a milestone in that we will use "intrinsically safe" electrical devices in areas and spaces of a tank vessel which are subject to the accumulation of petroleum vapors provided final approval is obtained from the U.S. Coast Guard and the American Bureau of Shipping.

These "intrinsically safe" device circuits will be physically and electrically isolated from other shipboard electric systems and certified by a recognized testing authority to be so constructed that when installed and operated under the conditions specified, any electrical sparking that may occur, either in the apparatus or its circuit, will be incapable of causing an igmition of the prescribed inflammable gas or vapor as described in Coast Guard regulations. An energy level of less than 0.2 milli-joules is generally considered safe for a methane-air mixture.

The British Ministry of Power has approved an electronic tank gage as "intrinsically safe" as defined in British Standard 1259–1958 with respect to inflammable gas or vapor. This device has Underwriters Laboratory approval for installation in Class 1, Group D atmosphere.

Securing the approval of the appropriate regulatory agencies, including the Underwriters Laboratory, for these electric units has presented a large problem. We are endeavoring to obtain approval for these devices from the U.S. Coast Guard and the American Bureau of Shipping and hope to receive assurances that devices and/or systems that meet these requirements will be accepted for installation and operation.

Six cargo tanks of the *Esso Panama* will be fitted with rotary type hydraulic actuators attached directly to the suction valve spindles. Several liquid level gaging devices consisting of mechanical, pneumatic and electronic types will be located in the various tanks fitted with power operated valves. One of the cargo gaging devices will have an attachment to provide remote reading of cargo temperature at the console. An electric draft gage will be installed with probes for reading draft forward, aft and amidship.

Remote manual and automatic controls for the valves and remote readout units for the gaging and draft devices will be on the remote control console located in a nonhazardous location—a room in the midship house. Attached to the cargo liquid level gages will be devices that will cause the motorized cargo valves to open or close when the cargo reaches a predetermined ullage by the level of the liquid itself, which in turn will open or close another predetermined valve. In this manner the loading, discharging and ballasting will be programed and executed. Visual and audible signals will indicate cargo level in tanks nearly full.

A talk-back loudspeaker will provide communication between the remote control room and deck areas. We are attempting to get permission to install a loudspeaker in the pumproom. If permission is not granted we are considering other means of communication with the pumproom.

At this point we should explain why it has been necessary to include remote reading automatic draft and cargo liquid level gages with temperature indication in the system for remote control of cargo handling.

Ship's tanks are usually gaged by a gager from ashore assisted by a ship's officer who records the ullages and temperatures. Each tank is hand-dipped by the gager who usually holds a flashlight in one hand and gaging tape in the other. Temperature is obtained by lowering a thermometer into the cargo, allowing it to remain for a sufficient interval and then withdrawing it. If the cargo is crude or residual fuel the thermometer must first be wiped before reading same.

After all of the tanks are gaged, the gager proceeds to the Chief Mate's room or ship's office and transposes the readings from the notebook to an ullage sheet. All this is time consuming, cumbersome and can result in inaccuracies. With automatic gages and remote readouts it will only be necessary to sit at the console and copy the readings. This method should be accurate and rapid. The amount of time saved and increased accuracy obtained in gaging by means of electronic or mechanical gages rather than by the antiquated, manual method should eventually pay for the cost of purchasing and installing such equipment. Additional time will be saved by having remote readout of these gages at a centrally located point and will make remote control of cargo handling possible.

Recent static electricity studies have indicated a potential hazard may exist from hand gaging cargo tanks immediately after loading certain products. Tests have indicated the existence of static fields over the cargo of sufficient strength to distort the field to sparking level if a severe spark-promoting device such as a conductive gaging tape is lowered into the tank before sufficient time elapses for charge relaxation. If a flammable mixture is present combustion could occur. Mechanical or electronic gages could circumvent this hazard.

Mechanical and electronic gages are not presently approved by Petroleum Inspectors for custody transfer. We hope such approval will be forthcoming.

Three of our tankers, the enlarged *Esso Switzerland* and *Esso Panama* and the 35,500 d.w.t. *Esso Chile* will be

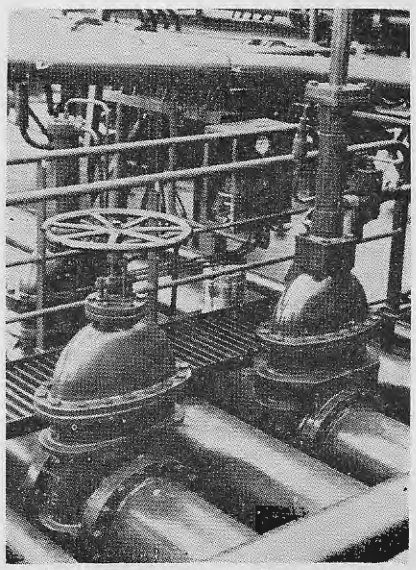

Photo courtesy Marine Engineering Log.

EASY AND HARD WAY: Hand-operated (left) and hydraulic deck valves (right).

equipped with an experimental smokestack flue-gas system for blanketing the entire cargo system with inert gas as an integral part of the cargo system for various reasons of safety. Since such a system will be a "closed system," automatic gaging devices will be a necessity.

An electronic draft gage will provide more accurate draft readings with greater ease resulting in fewer cargo deadweight shortages due to errors in reading or attempting to read the draft by sight. Wave action, lack of good visibility and dock construction make draft reading by sight an inexact science, particularly on large tankers. On many occasions it is necessary for the Chief Officer or Officer on watch of a tanker to hang over the stern from the end of a swaying pilot's ladder, at night, and attempt to read the draft with the aid of a flashlight. If the exact amount of fresh water, fuel and stores are known, and if the exact gravity of the cargo to be loaded is known, the deadweight can be computed and the vessel loaded accordingly. This is often done. However, an error in the computed gravity or amount of fuel, water and stores causes a corresponding error in the deadweight with the possibility of a fine if the vessel is overloaded or the possibility of dead freight if vessel is underloaded. It is evident that draft gages for tankers are long overdue.

THE DRAFT GAGE

The draft gages will consist of capacitance-type electronic probes designed to be removed, cleaned or replaced by the tanker's crew. Each will be within a well that penetrates the hull below the light load line with a sea valve fitted at the shell. Near the upper end of the well a connection to the fire line or sanitary system will provide a method of flushing the well and of insuring that the water in the well is of the same specific gravity as that in which the ship is floating. The probe will be centered by special designed devices and will be supported at the upper end of the well. Test circuits will insure proper functioning of all probes and will immediately indicate open circuits, shorts or malfunctions. Each probe will electronically drive a dial type gage calibrated to indicate draft in feet and inches with visual read-out at the control console. All circuits will be encased in watertight enclosures.

THE CARGO LIQUID LEVEL GAGE

The ultrasonic probe liquid level gaging device consists of a hermetically sealed unit in which the sensitive surface is vibrating at an inaudible ultrasonic frequency when exposed to air. The instant the probe surface is damped the probe will cease to oscillate. The vibrating sensitive surface generates a feedback voltage which is impressed across a subminiature relay. The instant the probe is damped the relay switches to the de-energized position. The controller has a sensitivity control which permits the system to only actuate when the probe touches a true liquid level and does not operate when in contact with foam, froth, clinging droplets, scale, or film formation.

Should the probe cable inadvertently become severed, the controller will indicate that the probe is not operative. A dangerous condition will not exist as the energy level is said to be below that required to ignite the most explosive mixtures. The probe is so constructed that it is said to be practically immune to damage from high thermal shock.

ADAPTATION OF FLOAT GAGES

A conventional float type gage has been adapted for remote reading by means of a pneumatic system and also by means of a Double Selsyn system, available in an approved, explosionproof adapter, readily attached to existing tank gages.

The pneumatic system consists of a bead-chain/tape-sprocket device attached to a conventional float gage that trips limit valves thus supplying signal air to actuate a remote read-out at the console panel.

The Double Selsyn system employs two motors in each transmitter, connected to a chain-sprocket device, and a pair of motors in the receiver. The inch motor is directly coupled to the tape through a sprocket and shaft and makes a complete revolution for each foot of change in tank level. The foot motor is equipped with antibacklash gears which reduce its travel to one revolution for the full tank height. Both motors on deck are installed in explosionproof enclosures. This system is energized when a gage reading is to be taken. Pressing the spring-loaded energizing switch will cause the foot and inch needles on their respective dials to immediately register the depth reading to within one-eighth of an inch. Any number of tanks may be connected to a single switch.

A problem remains in regard to the total automation of the cargo system—the stripping system, which is actually a duplication of the main cargo system, but smaller. If total automation of the system is to be achieved, it will be necessary to mechanize the stripping system valves or integrate both systems by developing new stripping techniques.

We are also working on the problem of tank cleaning through development of new tank washing and cleaning techniques in order to reduce the large amount of manual labor associated with this operation. Consideration is being given to coating the lower portions of the tanks of our large new crude carriers with improved zinc silicate coatings. The resultant smooth surfaces, in addition to retarding corrosion, would prevent the buildup of sludge—a mixture of scale, sediment and oil that now clings to the rusty, rough surface of the bottom of cargo tanks.

Thought is also being given to the development of a remotely controlled cargo tank washing system through installing of fixed tank cleaning machines, consisting of rotating nozzles in optimum locations of the tanks. The only manual labor that would be required in such a tank cleaning operation would be the removal of a reduced amount of sediment from the bottom of the cargo tanks.

One of the outstanding obstacles to automation is the lack of rugged, reliable, electronic, and mechanical equipment priced within reason.

We believe this obstacle is far greater than is generally realized. With equipment approaching the durability and reliability of the well known gyrocompass, the number of crew members of our vessels today could be reduced substantially, providing no maintenance work were contemplated and if manning regulations were waived. However, some of the available equipment does not meet these standards. The corrosiveness of salt water in conjunction with oxygen in exposed locations and in enclosed spaces where air-conditioning is not available, coupled with the shock experienced by a vessel from wave action at sea, all take a tremendous toll in regard to equipment. Because of inherent problems associated with the application of a closed loading system such as the infrequent use of the mechanism on long voyages and more particularly because of the inaccessibility of the valve actuators and ullage devices, we consider that simplicity of design and installation must be coupled with reliability of operation and ruggedness of equipment to insure successful operation of the system. Maintenance work on the system in the cargo tanks can only be performed when tanks are gasfree. This condition will only prevail during normal trading operations, at sea, where no expert advice will be available. Consequently, the equipment must be capable of functioning reliably under extreme weather condi-

tions for long periods of time with little or no maintenance, and whatever maintenance is required must be simple enough to be performed by ship's crew. Little savings will be realized if it is necessary to have highly paid machine and instrument specialists make voyages in order to maintain the equipment in operating condition.

Actually the savings realized in reduced manpower may not be equal to the cost of completely automating some systems. As a matter of fact we find the placing of an exact cost figure on the automation of the cargo system is as complex as the many components of this installation. Also, costly damage may be incurred by errors in setting up a completely automated system, but such a system can be altered so that the same mistake is never repeated. This cannot be said of human beings.

In view of the foregoing it appears a pioneer will have to pay a cash penalty when automating some new systems. This penalty may be very high if the rush to automate is not tempered with moderation. New equipment necessary for automation must be thoroughly tested and proven satisfactory under actual operating conditions before acceptance and installation on a large scale. This testing requires the utmost in cooperation between the manufacturer, the development personnel and the supervisory operating personnel, with perhaps the greatest responsibility resting on the shoulders of the ship's crew.

FUTURE PLANS

Our future plans for the further development of a remote control cargo system call for additional controls in the remote control cargo room that will permit remote operation of the cargo and ballast pumps.

Remote readouts will be provided for cargo pump tachometers and cargo loading and discharging pipeline pressure gages.

At the control console will be a mimic diagram of the cargo system with lights at each valve location indicating valve position—open or closed. Communication with dock will be by telephone or portable talkback loudspeaker.

Cargo pumps will be under automatic control after starting depending on suction head and will be synchronized to utilize maximum possible pump capacity and speeded or slowed as necessary. A sensing device will reduce the pump turbine revolutions to idling speed when insufficient product is being moved to properly cool and protect the liquid end of the pump. An automatic vent will vent the pump and pump speed will automatically increase when sufficient product is being moved, making possible the reduction of cargo stripping time to a minimum. We are working on an improved suction bellmouth design for more efficient and effective oil flow to the suction valve.

Various warning devices, audible alarms and red lights will indicate malfunction of equipment and actuate emergency shutoff devices aboard ship when discharging, and ashore when loading.

We are exploring the possibility of computor control of various cargo handling operations. A particular operation would be programed and executed. The deck officers would monitor the entire operation from the remote control cargo room and reprogram if necessary due to unforeseen circumstances.

DISCUSSION OF CAPTAIN VINCENT'S PAPER "REMOTE CONTROL OF CARGO HANDLING"

By CAPTAIN A. W. JOHNSEN, U.S.C.G.
Chief, Merchant Marine Technical Division, Headquarters

THE AUTHOR is to be congratulated for a very informative and interesting paper on the Automation of Cargo Systems on Tankers.

The development of automated ships cannot be considered to be revolutionary at this stage of the game. The Coast Guard has been operating automated diesel-electric ice breaking vessels for over 20 years and turbo-electric A.C. synchronous drive cutters for almost 20 years. I might add that at one time there was some consideration being given to installing a steam pressure gage on the bridge of the automated steam vessels to prevent an embarrassing loss of steam pressure at some critical time.

My own experience with three different classes of automated vessels leads to the following conclusions:

1. Automated systems should be designed with a greater reserve factor than nonautomated systems. Automation will not tolerate the nursing along of tired inadequate systems.

2. The reduction in personnel you will realize from automation will not live up to your expectations. Automation requires more control equipment and more equipment requires more maintenance.

The author has mentioned the physical limitations of man. Not only is his strength limited, but his speed or reaction time has definite limitations.

The machinery now in use, not only in the marine field, but in industry in general, is such that it is beyond the capability of human beings to directly control without the help of numerous control aids. Such devices as voltage regulators, feed water regulators and speed governors are examples of very successful control devices which are used to extend the supervisory control of man over machines.

One recent casualty review indicated that 96 percent of all casualties were the result of human failures and 4 percent were due to material failures. If these figures speak the truth and there is no apparent reason to doubt them, it would seem that the ends of safety would be served by placing the direct control of many fast moving repetitive operations into the hands of well engineered control devices.

On the other hand, one of the main obstacles to automation is "The lack of rugged and reliable electronic and mechanical equipment priced within reason." The author notes that this obstacle is far greater than generally realized.

I heartily agree with the author that cleanliness is vital to the successful operation of any hydraulic system. Dirty oil, and other impurities in the system will usually result in faulty servomechanisms and control valves. In some cases, post installation hydrostatic tests in the hydraulic piping assemblies and associated hydraulic equipment components have resulted in the introduction of impurities. Although the Coast Guard Marine Engineering regulations normally require hydrostatic tests for piping systems, we have recognized that such tests in hydrostatic piping could be more harmful than beneficial.

In lieu of the required hydros at the time of installation, the regulations now permit such hydraulic assemblies

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to be shop-tested by the manufacturer and so certificated by him. When shop-tested at the manufacturer's plant, the hydraulic equipment and piping need only be tested after installation by stalling the driven unit in a safe and satisfactory manner and by blowing the relief valves.

Resilient-seated butterfly valves are being considered more and more as replacements for the conventional gate or plug valves in cargo piping systems because of their space and weight savings, lower initial cost and suitability for remote control. The use of resilient-seated butterfly valves should provide tighter closures under normal service conditions. However, when subject to fire exposure, the results may be less than satisfactory. Under fire conditions, the resilient material for the valve seat could deteriorate rapidly, resulting in cargo leakage. The Coast Guard has permitted the installation of remote-controlled butterfly valves inside cargo tanks and in pump rooms under conditions where the valve is not always subjected to a head pressure from the cargo tanks. In such cases cargo pipe line integrity has been protected with conventional root or master valves.

The use of "intrinsically safe" electrical devices in areas and spaces of a tank vessel where electrical devices are prohibited by Coast Guard Tank Vessel regulations brings up some interesting points. First the definition—What is "intrinsically safe"? The author goes to the British definition which qualifies the limitation of energy in electrical sparks as that being incapable of causing ignition *when installed and operated under the conditions specified.* The United States definition given in National Electrical Code Article 500–1 is: "Intrinsically safe equipment and wiring is incapable of releasing sufficient electrical energy *under normal* or *abnormal* conditions to cause ignition of a specific hazardous atmospheric mixture." The United States "Intrinsically Safe" definition appears to offer the best protection and is being used.

The Coast Guard's position on "intrinsically safe" is that we do not wish to arbitrarily rule out devices that are reasonably safe. We have participated in meetings with members of the American Petroleum Institute Committee on Tank Vessels, American Bureau of Shipping and Underwriters' Laboratories, Inc., discussing "intrinsically safe" installations in tank vessels. The Coast Guard has asked the American Petroleum Institute Committee on Tank Vessels for their recommendation on the use of intrinsically safe electrical devices in tank vessels.

NATIONAL SAFETY COUNCIL AWARD

FRONT ROW, left to right, Tom Connors, MEBA representative; Francis H. Wilson, Electrician; Robert Lee O'Dell, Jr., 3d Mate. Standing, left to right, L. F. Lorah, M & R Division, Lykes Lines; C. E. Biggers, Marine Division, Lykes Lines; Charles Pearson, Jr., Vice President, Metropolitan N. O. Safety Council; Frank Newton, Chief Engineer; Ervin R. Jones, Master; E. G. Denys, Marine Division, Lykes Lines.

Frank Newton, chief engineer on the new *Zoella Lykes,* was recently awarded the President's Medal of the National Safety Council for his role in saving the life of a fellow crewman. Third Mate Robert L. O'Dell, Jr., was awarded a Certificate of Assistance by the National Safety Council for assisting in the life-saving act while the Lykes vessel was at sea en route from Korea to Formosa on October 24, 1961.

The man whose life was saved is Francis H. Wilson, chief electrician on the vessel, who would have died of electrical shock had it not been for the prompt and effective action by Newton, O'Dell, and other members of the ship's company.

Wilson was on his knees on the deck of the emergency generator room brushing dust from behind the electrical control panel when the mishap occurred. The ship rolled and Wilson's head came in contact with the electrical panel. He was rendered unconscious immediately.

Everett B. Fresh, the ship's second electrician, tried to free Wilson from the electrical panel with a leather belt, fearful that he, too, would be electrocuted if he touched Wilson. Unable to move Wilson, Fresh ran to the engine room for help. Chief Newton immediately pulled the switch to the emergency generator panel and with Fresh's assistance, pulled Wilson free.

Wilson was no longer breathing and Newton began administering mouth-to-mouth resuscitation. Newton restored Wilson's breathing after working on him 5 minutes and continued the mouth-to-mouth resuscitation and other means of artificial respiration with the help of O'Dell, Third Assistant Engineer David A. Walker and Chief Mate E. R. Jones.

After approximately 9 minutes Wilson was able to breath without assistance. Since the Lykes vessel had no doctor aboard, O'Dell continued to treat Wilson for shock, receiving medical advice by radio from a physician aboard the S.S. *Canton,* another vessel in the Pacific. When the Lykes vessel reached Keelung, in Formosa, the victim was examined by a doctor who found that he had recovered sufficiently to be allowed to remain on the ship. The doctor also stated that only the prompt and efficient action by Newton could have saved Wilson's life.

THE OLD BAY LINE

(End of an Era)

From an Article by Helen D. Bentley

Maritime Editor, Baltimore Sun

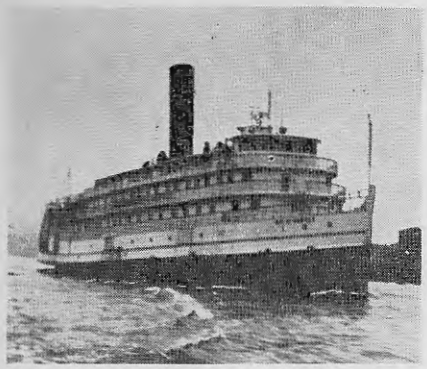


Photo courtesy Baltimore Sun

The steam-packet *City of Norfolk* said good-by recently in the best tradition of the sea.

As the old bay steamer pulled out of the port of Baltimore on her final voyage, she was saluted from shore by automobiles and in the water by small craft.

Capt. Patrick L. Parker, skipper of the boat—the last of an era in the entire United States—was visibly moved as he responded to the greetings with the traditional three toots of the sea.

A "FUNERAL"

Only a few minutes before she pulled away from Pier 3, Pratt Street, Captain Parker said sadly he was "losing my home."

The night before, Capt. S. Boyd Chapman, master of the steamer *City of Richmond*, said he felt like he was "going to the funeral of one of my closest relatives."

The 49-year-old *City of Richmond* had sailed out of Baltimore on her last voyage en route to Hampton Roads. On her return, she was made fast to the pier for the last time.

The *City of Norfolk* has also completed the last round trip of her 52-year career sailing between Hampton Roads and Baltimore.

93 YEARS OF SERVICE

With that the Old Bay Line—formally known as the Baltimore Steam Packet Company—has ceased its steamship operations.

Captains Chapman and Parker have 93 years of service between them. Captain Chapman's 51 years has practically all been on the *City of Richmond*, owned by the Chesapeake Steamship Company before it merged with the Old Bay Line.

Each estimated that between the crew members on his vessel, there was more than 1,000 years of sailing up and down Chesapeake Bay.

LETTERS FROM "ALL OVER"

Like all the other crew members, they said the sudden announcement April 2 that the Old Bay Line would cease its service today was like a bombshell.

"It's sad, yes, it's sad," Captain Chapman remarked. "It was sad when we canceled out the passenger service 'for the winter' last fall. I never thought we'd be canceling out the freight service too."

The 68-year-old skipper said he constantly received letters from people in New Jersey, Florida, New York, Michigan, "and all over," who have sailed on the Old Bay Line at one time or another. Most of them are return passengers.

"They all wanted to know when we were returning passenger service," he mused. "Now there is nothing."

FAREWELL DINNERS

Typical of the regular passengers who were distressed over the demise of the Bay Line was Spencer Marsellis, of Montclair, N.J., who drove down to have a final meal with both Captain Chapman and Captain Parker.

"I've been sailing on these ships since I was a youngster," said the "fortyish" man.

He has numerous maritime collections—"almost like a museum"—in bis home at Montclair.

A native of North Carolina, Captain Parker began his sea-going career aboard a Coast Guard buoy tender in 1920. After six years on the lightships and tenders in the inland waters of Maryland, Virginia and North Carolina, he decided to become a merchant seaman and joined up with the Old Bay Line.

"DANCE" IN THE CHANNEL

"I have many pleasant memories. We've had all kinds of nice people from every walk of life aboard here over the years. The people enjoyed our hospitality. We enjoyed them."

It was probably some of "these people" who stood out in the pouring rain to take final photographs and to honk their horns in salute to the *City of Norfolk* when she began her final trip.

Her final twenty minutes were spent in her usual graceful "dance" as the Captain maneuvered the 297-foot-long vessel back and forth until she was turned around in the limited channel.

Then she headed down the upper branch of the Patapsco River into Chesapeake Bay on her lonely last journey.

AMVER

At present, the ratio of vessel passages plotted from AMVER messages versus passages plotted without the benefit of AMVER messages is approximately 3 to 1. Passages plotted from non-AMVER sources require a tremendous amount of additional research and can severely limit the accuracy of the plot. We estimate that passages plotted in this manner require 30 times as long to initiate as those plotted from AMVER messages. We urge the entire maritime community to help us to improve the speed and accuracy with which AMVER supplies search and rescue information to fellow mariners in distress, by transmitting AMVER reports.

OPERATIONS—AUGUST 1962

Passages Plotted:	
From AMVER messages	4,142
From non-AMVER data	1,251
Total	5,393
Separate Vessels Plotted:	
From AMVER messages	1,670
From non-AMVER data	705
Total	2,375
Vessels on Plot Daily:	
Average	779
Maximum Day	847
Vessels Newly Participating in AMVER System	17
Surpics Furnished:	
Medicos	22
Aircraft Alerts	21
Disabled or Missing Vessels	9
Miscellaneous	17
Total	69

The 5,393 passages plotted for the month set a new record for AMVER. The average daily plot size of 779 vessels indicated a slight decrease as compared to July, but this can be attributed to an increase in the number of short voyages.

Although 69 surface pictures were furnished, it was necessary for very few vessels to depart from course. In most cases, radioed medical advice was sufficient, or military Search and Rescue forces were favorably situated to assist.

MARITIME SIDELIGHTS

The ferry vessel *Taku,* the second of three ferries being built for service in Alaska, was christened recently at Puget Sound Bridge & Drydock Co., Seattle, Wash. The ferries will carry passengers, cars, and freight between Prince Rupert, British Columbia, and Haines, Alaska, stopping at Ketchikan, Wrangell, Petersburg, Sitka, Juneau, and Skagway. The *Taku* will have 14 staterooms.

⚓ ⚓ ⚓

The National Cargo Bureau, Inc., New York, has published a new 126-page booklet, "General Information for Grain Loading." It includes Coast Guard regulations for bulk grain cargoes and Chapter VI of the International Convention for the Safety of Life at Sea.

The new booklet contains 18 color diagrams on grain stowage for standard vessels and illustrations of Coast Guard rules, as well as U.S. grain standards, stowage factors, stability calculations and other useful information.

Copies may be obtained from the National Cargo Bureau, 99 John Street, New York 38, N.Y.

⚓ ⚓ ⚓

The National Cargo Bureau has issued a 20-page booklet describing the bureau's comprehensive role in the safeguarding of ships, crews, and cargo.

⚓ ⚓ ⚓

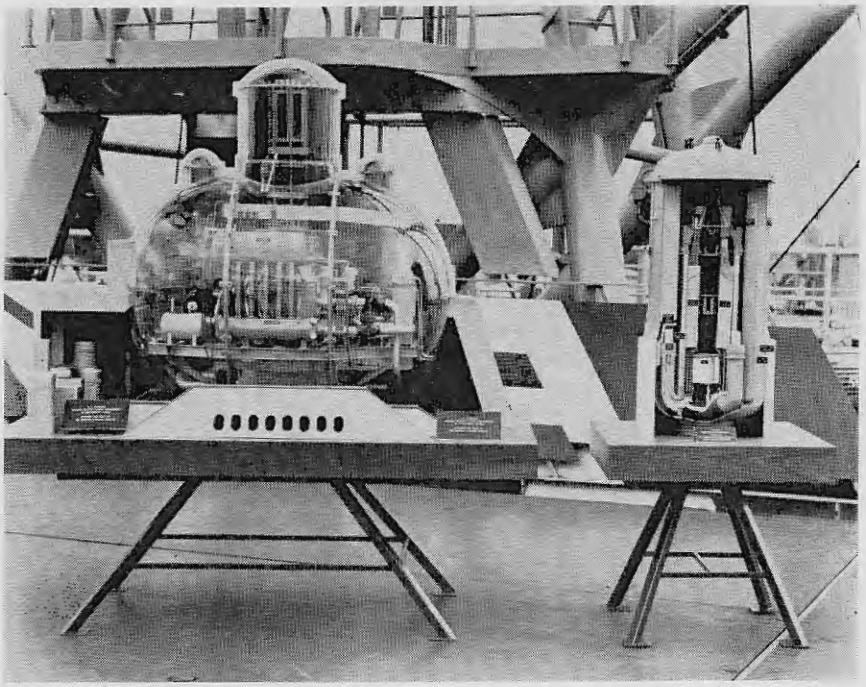
Coast Guard Officer Candidate School applications are now being accepted for the Coast Guard Officer Candidate School which will convene at Yorktown, Va., on February 11, 1963. A subsequent class for Officer Candidates will convene in September 1963.

Applicants must be between the ages of 21 and 26 and hold a baccalaureate degree from an accredited college or university at the time of selection for this school.

Upon completion of 17 weeks indoctrination at the Officer Candidate School, graduates are commissioned Ensign in the U.S. Coast Guard Reserve and required to serve on active duty for three years.

For further information write Commandant (PTP–2), U.S. Coast Guard, Washington 25, D.C.

NEW MARINE REACTOR DESIGNED



Courtesy Atlantic Marine News.

SHOWN on the right is a scale model of a new Babcock & Wilcox marine reactor compared to a model of B&W's *Savannah* power plant on the left. The new reactor will weigh approximately 685 long tons as compared with 2452 long tons for the *Savannah*. The new design calls for an improved pressurized water reactor with the core and steam generator in the same pressure vessel. It is anticipated that the new reactor will fit into the same area that conventional oil fired marine boilers presently occupy.

There were 885 vessels of 1,000 gross tons and over in the active oceangoing U.S. merchant fleet on October 1, 1962. This is 22 less than the number active on September 1, 1962, according to the Maritime Administration.

There were 24 Government-owned and 861 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.

CORRECTION

In the October issue an item on the "Sidelights" page reported a startling cargo salvage operation whereby the seagoing tug *Salvage Chief* employed a "bi-line" transfer system to remove cargo from the stranded freighter *Chickasaw,* said operation being conducted in a little over a "minute's" time. While the tug is noted for its rapid and efficient service, it must be admitted that the item should have shown the use of a "hi-line" system which removed the cargo in something over a "month's" time.

nautical queries

DECK

Q. A vessel has a Moment to Change Trim One Inch of 800 ft/tons and a Tons per Inch Immersion (TPI) of 40 tons. Her draft is 18'00" forward and 20'00" aft. If 200 tons is loaded in #2 hatch, 50 feet forward of the tipping center (Center Of Flotation, which is assumed to be at the vessel's midlength), what will the draft then be?

A. $\frac{200\times 50}{800}=12\frac{1}{2}$ or 12.5" total trim

$\frac{200}{40}=5$" increase in draft

Forward:	18'00"
	(+) 06.25"
	18'06.25"
	(+) 05"
	18'11.25"
Aft:	20'00"
	(−) 06.25"
	19'05.75"
	(+) 05"
	19'10.75"

Q. What precautions must be taken to avoid harbor pollution when taking fuel oil or petroleum cargoes?

A. When taking on fuel oil or petroleum cargoes the following precautions should be taken against harbor pollution:

1. Scuppers should be plugged to prevent any overflow going overboard.

2. Drip pans should be provided under hose connections, vent pipes, etc.

3. Mooring lines should be carefully tended and hose should be of proper length to allow for any motion of the vessel alongside dock.

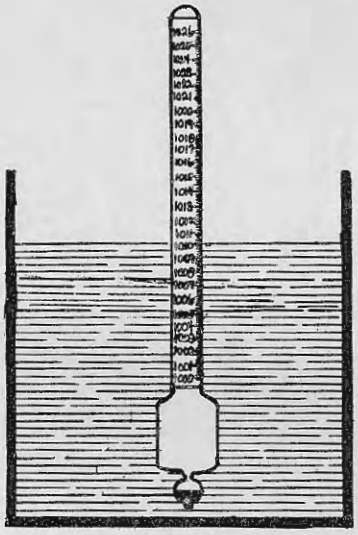
4. Hose should be in good condition, connections properly made, with efficient gaskets, and properly suspended to avoid kinking or crushing between ship and dock.

5. Proper signals should be arranged between ship and dock to stop the flow of oil when necessary.

6. Hoses should be carefully drained before being disconnected, and blanked off if necessary to prevent any oil remaining in the hose dripping.

7. Ballast discharge valves should be tightly closed and lashed or sealed if necessary.

Q. A vessel has a fresh water allowance of 6 inches. A hydrometer reading is taken in a sample of the water in which she is floating with results as sketched. How far below her salt water draft may she load due to allowance for fresh water?



A. $\frac{15\times 6}{25}=\frac{90}{25}=3.6$"

Vessel may load 3.6" below her salt water mark due to allowance for fresh water.

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8. Topping off of tanks should proceed at a reduced rate with care to prevent spill.

9. Sawdust, rags, and on tankers, nonsparking tools should be available for cleaning decks in event of any spillage.

Q. The marking on the hand lead line indicating seven fathoms of water is:

(a) Two strips of leather
(b) Three strips of leather
(c) White cotton rag
(d) Red wool rag
(e) Leather with a hole in it

A. (d) Red wool rag

Q. A typical shipboard binocular is described as a 7 x 50. The 7 refers to the:

(a) Length
(b) Field
(c) Magnification
(d) Diameter of eyepiece
(e) Size of prisms

A. (c) Magnification

ENGINE

Q. Describe the construction of a balanced piston type throttle valve.

A. In the construction of the balanced piston type throttle valve, a loose-fitting piston formed integral with the valve disc contains a small pilot valve which is attached to the stem. The rising stem opens the pilot valve in advance of the main valve and equalizes the pressure above the piston and below the main valve, thus little effort is required to open the main valve; at the same time the pilot valve answers the same purpose as a bypass.

Q. What are the two principal functions of the main and auxiliary condensers?

A. The primary function of the condensers is the production and maintenance of a low exhaust pressure, thereby increasing the work delivered by the engine. A secondary function is the conservation of the ship's supply of fresh water by returning the steam used in the engineering plant to the condensate system.

Q. (a) For what purposes are manometers usually used?
(b) How do you read a U tube manometer
(c) How is a manometer connected?

A. (a) Manometers are usually used to indicate small differences of pressure such as draft pressures in a furnace or uptake of a boiler.

(b) The difference in pressure between two points is registered by the difference in the water level of the two tubes and is read on the graduated scale in inches or fractions of an inch.

(c) One of the two upper ends of the U tube is connected to the boiler stack, or to any other point where it is desired to measure draft pressure, while the other end of the tube is open to the atmosphere.

Q. Which of the following types of packing would be used on a refrigeration system employing freon 12 as refrigerant:

(a) Graphite type
(b) Asbestos
(c) Rubber
(d) Oil impregnated
(e) All of the above

A. (b) Asbestos

TABULATION OF UNSAFE PRACTICES

January through June 1962

	Atlantic	Great Lakes and rivers	Gulf	Pacific	Total
A. Access to Vessel					
Gangways, accommodation ladders, etc.	1	2	----	1	4
1. Length, width, strength, etc., inadequate	8	38	8	4	58
2. Rigged or secured improperly	15	42	15	14	86
3. Angle too steep	9	33	17	1	60
4. Not clear at either end	4	20	3	----	27
5. Water discharging onto	1	7	----	----	8
6. Hand ropes or rails not provided or inadequate	10	39	8	14	71
7. Insufficient number	3	2	1	----	6
8. Lifeboat or other object suspended over access	1	1	----	2	4
9. Ring life buoy with lanyard not provided or inadequate	10	38	34	11	93
10. Other	31	12	13	4	60
B. Access to Spaces on Board Vessel					
Ladders	----	2	----	----	2
11. Rigged improperly	2	----	2	3	7
12. Rungs, steps or treads missing or loose	13	15	23	8	59
13. Deteriorated or weakened	15	6	16	16	53
14. Hand rails missing or inadequate	5	8	19	8	40
15. Doors or passages cluttered	9	8	----	6	23
16. Escape means blocked or locked	9	2	2	10	23
17. Other	4	7	----	3	14
C. Deck and Hull Openings					
18. Hatch covers, dangeronsly piled or placed	3	1	2	6	12
19. Hatch covers, missing or defective	3	7	8	6	24
20. Hatch covers, securing means defective	8	20	10	8	46
21. Hatch beam locking lugs missing or defective	3	1	1	2	7
22. Lifelines, chains, rails or guards missing or inadequate	23	9	12	17	61
23. Other	11	8	6	6	31
D. Decks and Platforms					
24. Slippery due to oil, grease, etc	34	54	30	32	150
25. Cluttered	16	14	11	33	74
26. Floor plates or gratings loose or not in place	15	24	2	16	57
27. Rails and guards missing or inadequate	11	21	17	13	62
28. Other	10	8	6	2	26
E. Cargo Handling					
29. Safe load not marked on booms	3	1	2	4	10
30. Guys, falls, booms, etc., improperly rigged	----	1	1	----	2
31. Overloading gear	----	----	----	----	----
32. Jury rig winch controls	1	----	----	----	1
33. Failure to use guards and gates of cargo elevators and escalators	----	----	1	----	1
34. Using defective cargo gear	5	5	----	----	10
35. Smoking prohibition disregarded	3	----	2	2	7
36. Stowage or handling of cargo or gear	1	----	1	2	4
37. Other	----	4	----	2	6
F. Lifesaving Equipment					
38. Not ready for use	34	26	15	21	96
Lifeboats—					
39 Hoisting fully loaded	----	----	1	2	3
40. Personnel riding to fully stowed position	3	----	1	2	6
41. Preventive lashings not used when working in boat	1	----	----	2	3
42. Winch power not shut off when using hand crank or performing maintenance	1	----	----	2	3
43. Starting engine without ventilating	----	----	----	----	----
44. Bypassed safety devices	1	----	----	2	3
45. Tricing and frapping lines improperly used	2	3	1	----	6
46. Davit span life lines not ready for use	2	----	6	1	9
47. Other	18	11	21	12	62
G. Fire Fighting Equipment					
48. Not ready for use	40	59	20	99	185
49. Fire screen doors blocked	4	----	----	3	7
50. Other	31	28	19	18	96
H. Ventilation					
51. Neglect to observe safety precautions prior to entering	----	----	----	----	----
52. Use of toxic solvent in confined spaces	2	----	----	----	2
53. Grease, dust, litter in ventilation system	4	8	3	9	24
54. Cowls, mushrooms, etc., frozen	5	3	7	7	22
H. Ventilation—Continued					
55. Insufficient ventilation	3	11	2	9	25
56. Other	11	15	10	7	43
I. Electrical					
57. Extension cords defective	24	19	6	20	69
58. Portable equipment not grounded	33	54	6	37	130
59. Overfused circuits	39	4	8	18	69
60. Jury rigged circuits	70	40	23	35	168
61. Caps for receptacle outlets not in place	58	56	55	105	274
62. Switch and fuse box panels in passenger spaces left unlocked	1	7	2	9	19
63. General alarm bells muffled or dampened	24	8	14	21	67
64. Vapor globes and guards not in place	111	84	60	95	350
65. Use of defective equipment in hazardous spaces	11	5	1	1	18
66. Other	38	17	10	22	87
J. Machinery					
67. Failure to take safety precautions in lighting-off boiler	3	----	6	2	11
68. Spring loaded valves on sounding pipes secured in open position or not in place	22	1	8	24	55
69. Machinery guards not in place or defective	29	20	18	21	88
70. Failure to block or safeguard steam valves when working on steam lines or inside a boiler, evaporator, etc	----	----	1	----	1
71. Other	32	32	32	12	108
K. Welding, Burning, Heating or Riveting					
72. No gas-free certificate for "hot work" where required	2	1	7	6	16
73. Inadequate fire watch	2	3	----	----	5
74. Ventilation insufficient	----	----	----	1	1
75. Personnel protective equipment inadequate	----	5	----	----	5
76. Other	2	1	----	----	3
L. Tank Vessels					
77. Ullage holes or expansion trunk openings open without flame screens	4	56	18	2	80
78. Vent header drains left open	----	----	----	1	1
79. Deck battens or wooden gratings not provided where needed	----	13	1	----	14
80. Failure to comply with "Declaration of Inspection Prior to Bulk Cargo Transfer"	----	----	----	----	----
81. Other	12	102	27	1	142
M. Ferry and Excursion Vessels					
82. Vehicles not properly secured during navigation	----	5	----	4	9
83. Vehicle motors not turned off during navigation	2	----	----	3	5
84. Insufficient clearance between vehicles for egress of passengers in emergency	----	----	----	----	----
85. Barricades and gates opened prior to docking	----	----	----	----	----
86. Passenger supervision inadequate	1	1	----	----	2
87. Other	1	7	----	----	8
N. Miscellaneous					
88. Job supervision inadequate	9	7	----	8	24
89. Lack of supervision in maintenance of equipment	12	21	----	9	42
90. Lack of supervision in conducting drills	----	11	1	12	24
91. Lack of sufficient personnel	3	2	----	2	7
92. Oil, fuel and/or debris in bilges	52	13	9	59	133
93. Stoves, ranges, heaters, hot plates, lanterns, etc., not secured against vessel's movement	1	4	----	1	6
94. Inadequate deck, gangway, passageway, lighting	1	2	----	3	6
95. Unsanitary conditions	5	11	----	6	22
96. Chain falls improperly used	1	----	1	----	2
97. Lack of precautions while effecting repairs (including warning notices, etc.)	2	2	3	2	9
98. First Aid equipment not ready for use (medicine chest, litter)	4	1	1	1	7
99. Stowage of ship's stores improper	3	6	3	7	19
100. Access over deckloads	----	2	----	1	3
101. Other	11	18	7	19	55
Grand total	1,087	1,265	707	989	4,048

MERCHANT MARINE PERSONNEL STATISTICS

MERCHANT MARINE OFFICER LICENSES ISSUED

QUARTER ENDING 30 SEPTEMBER 1962

DECK

Grade	Original	Renewal
Master:		
Ocean	28	452
Coastwise	10	25
Great Lakes		13
B.S. & L.	21	100
Rivers	5	50
Radio officer licenses issued	17	80
Chief mate:		
Ocean	26	104
Coastwise		1
Mate:		
Great Lakes		
B.S. & L.	1	9
Rivers	7	20
Second mate:		
Ocean	44	93
Coastwise		1
Third mate:		
Ocean	146	78
Coastwise		
Pilots:		
Great Lakes	2	8
B.S. & L.	49	17
Rivers	120	49
Master: Uninspected Vessels	17	15
Mate: Uninspected Vessels	4	2
Motorboat operators	272	809
Total	769	1,926
Grand total	2,695	

ENGINEER

Grade	Original	Renewal
STEAM		
Chief engineer:		
Unlimited	29	451
Limited	2	92
First assistant engineer:		
Unlimited	35	136
Limited	2	14
Second assistant engineer:		
Unlimited	55	182
Limited		1
Third assistant engineer:		
Unlimited	203	252
Limited	1	4
MOTOR		
Chief engineer:		
Unlimited	6	76
Limited	25	122
MOTOR—continued		
First assistant engineer:		
Unlimited	3	15
Limited	12	20
Second assistant engineer:		
Unlimited	2	14
Limited		1
Third assistant engineer:		
Unlimited	141	127
Limited	1	
Chief engineer: Uninspected vessels	20	20
Assistant engineer: Uninspected vessels	11	2
Total	548	1,529
Grand total	2,077	

WAIVER OF MANNING REQUIREMENTS

Waivers	Atlantic coast	Gulf coast	Pacific coast	Great Lakes	Total
Deck officers substitnted for higher ratings					
Engineer officers substituted for higher ratings		1			1
Ordinary seamen for able seamen		1			1
Wiper or coalpassers for qualified member engine department					
Total waivers		2			2
Number of vessels		2			2

ORIGINAL SEAMEN'S DOCUMENTS ISSUED

Type of document	Atlantic coast	Gulf coast	Pacific coast	Great Lakes and rivers	Total
Staff Officer	52	9	23	9	93
Continuous Discharge Book	240	4	12		256
Merchant Mariner's Documents	1,497	683	950	769	3,899
AB any waters unlimited	157	59	80	29	325
AB any waters, 12 months	37	28	26	40	131
AB Great Lakes, 18 months	4			12	16
AB Tugs and Towboats, any waters	1	5	4		10
AB Bays and Sounds	1				1
AB Seagoing Barges	1	3			4
Lifeboatman	399	7	57	11	474
Q.M.E.D.	314	62	84	35	495
Radio Officer	5	1	3		9
Certificate of service	1,458	640	893	710	3,701
Tankerman	16	83	11	51	161
Total	4,182	1,584	2,143	1,666	9,575

INVESTIGATING UNITS

Coast Guard Merchant Marine Investigating Units and Merchant Marine Details investigated a total of 5,185 cases during the third quarter of 1962. From this number, hearings before examiners resulted involving 63 officers and 206 unlicensed men. In the case of officers, 1 license was revoked, 4 were suspended without probation granted, 15 were suspended with probation granted, 9 cases were dismissed after hearing, and 3 were closed with admonition. Of the unlicensed personnel, 14 documents were revoked, 14 were suspended without probation granted, 82 were suspended with probation granted; 24 cases were dismissed after hearing, and 13 hearings were closed with admonition. Thirteen licenses and 100 documents were voluntarily surrendered.

SHIPBOARD CARGO GEAR REGULATIONS

The shipboard cargo gear regulations promulgated by the Coast Guard were published in the Federal Register dated 23 November 1961. For new vessels, these regulations became effective 1 January 1962. For existing vessels, the effective date is that of the first inspection for certification after 1 January 1963. The regulations apply to all inspected vessels fitted with cargo gear.

The Coast Guard cargo gear regulations are equivalent to, or exceed, the Code of Practice recommended by International Labor Organization Convention No. 32. Valid cargo gear registers and certificates are accepted as prima facie evidence of compliance with the regulations. Cargo gear registers and certificates are not issued by the Coast Guard, however. The Commandant has recognized four organizations or associations as competent to issue registers and certificates of cargo gear. These are:

American Bureau of Shipping
45 Broad Street
New York 4, N.Y.

The International Cargo Gear Bureau, Inc.
17 Battery Place
New York 4, N.Y.

National Cargo Bureau, Inc.
99 John Street
New York 38, N.Y.

Universal Cargo Gear Survey and Certification Bureau, Inc.
149 Broadway
New York 6, N.Y.

The Department of State has informed the embassies of all foreign maritime countries that these four organizations or associations were recognized by the U.S. Government as competent to issue certificates and registers of cargo gear.

AMENDMENTS TO REGULATIONS

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

TITLE 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

[CGFR 62–27]

REVISION OF SUSPENSION AND REVOCATION PROCEEDINGS

In the June 30, 1961 issue of the Federal Register (26 F.R. 5881–5897) and the Merchant Marine Council Agenda Supplement (CG–249, June 30, 1961) notice was given to interested persons of opportunities to present written comments, views or data regarding the revision of the rules and regulations dealing with suspension and revocation proceedings of licenses, certificates and/or documents issued to individuals by the Coast Guard. After careful consideration of the information presented pursuant to this notice, I hereby adopt the revision of these suspension and revocation proceedings published June 30, 1961, with the changes described in this document, and the approved rules and regulations are set forth in this document.

This document contains the first complete revision of the rules and regulations governing suspension and revocation proceedings published October 14, 1947 (12 F.R. 6742), after the Administrative Procedure Act required the hearings to be under control of civilian hearing examiners. This revision will replace the rules and regulations now published as 46 CFR Parts 1 and 137, while related regulations which are no longer considered necessary are canceled or replaced with appropriate cross references, e.g., 46 CFR 4.05–1 to 4.05–35 (disciplinary proceedings), 136.03–35 (definition of examiner), and 187.30–1 to 187.30–15 (action against licenses as operators or ocean operators of small passenger vessels).

(Federal Register of Oct. 5, 1962, Part II.)

TITLE 33—NAVIGATION AND NAVIGABLE WATERS

Chapter I—Coast Guard, Department of the Treasury

SUBCHAPTER A—GENERAL

[CGFR 62–29]

PART 2—GENERAL DUTIES AND JURISDICTION

Navigable Waters of the United States in 17 States

The purpose for this document is to publish the determinations made by the Commandant, United States Coast Guard with respect to certain navigable waters of the United States in California, Idaho, Illinois, Kentucky, Louisiana, Maine, Montana, New Hampshire, New York, Oklahoma, and Wisconsin; as well as determinations that certain waters are considered to be non-navigable waters of the United States which are in Alabama, California, Kentucky, Louisiana, Michigan, Mississippi, and New Jersey. In the administration and enforcement of various navigation and vessels inspection laws, rules and regulations, it was necessary to determine whether or not certain bodies of waters are in fact navigable waters of the United States and subject to laws administered by the Coast Guard. The information in this document is intended also to further the development, use and enjoyment of all the navigable waters within the United States, and to clarify responsibility with respect to laws, rules, and regulations intended to promote safety of life and property on these waters as further described in 33 CFR 2.10–5 and 2.15–1.

Because the rules in this document are interpretations, it is hereby found that the Coast Guard is exempt from compliance with the Administrative Procedure Act (respecting notice of proposed rule making, public rulemaking procedures thereon and effective date requirements.

(Federal Register of Oct. 2, 1962.)

TITLE 33—NAVIGATION AND NAVIGABLE WATERS

Chapter I—Coast Guard, Department of the Treasury

SUBCHAPTER C—AIDS TO NAVIGATION

[CGFR 62–32]

PART 62—UNITED STATES AIDS TO NAVIGATION SYSTEM

PART 66—PRIVATE AIDS TO NAVIGATION

PART 67—PRIVATE AIDS TO NAVIGATION, OUTER CONTINENTAL SHELF AND WATERS UNDER THE JURISDICTION OF THE UNITED STATES

PART 72—MARINE INFORMATION

Miscellaneous Amendments

The purpose of the following amendments to the regulations is to:

(a) Make certain miscellaneous corrections.

(b) Define with greater particularity certain Electronic Aids to Navigation.

(c) Amend the description of the location of private aids to conform with 14 U.S.C. 83.

(d) Amend the description of the procedure for testing fog signals for use on the Outer Continental Shelf to agree with actual practice.

(e) Amend the regulations to permit the installation of obstruction lights, on Class B structures on the Outer Continental Shelf, more than 60 feet above mean high water without changing their required arcs of visibility.

(f) Amend the regulations to require notification to the District Commander of the commencement of work on the site of certain structures located on the Outer Continental Shelf.

(g) Amend the regulation to indicate the present practice of issuing Weekly Notices to Mariners.

(Federal Register of Oct. 13, 1962.)

TITLE 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

SUBCHAPTER B—MERCHANT MARINE OFFICERS AND SEAMEN

[CGFR 62–31]

PART 10—LICENSING OF OFFICERS AND MOTORBOAT OPERATORS AND REGISTRATION OF STAFF OFFICERS

Pilots' Licenses, Engineers' Licenses, and Statutory Authorities for Regulations

To show more clearly that the required examination for an extension of a pilot's route should not be as comprehensive as that for an original pilot's license or for an initial endorsement on a master's or mate's license, the text of 46 CFR 10.05–43(a) is made specifically applicable to the applicant for an original license or for an initial endorsement on a master's or mate's license as pilot, while §10.05–43(b) is made specifically applicable to an applicant for an extension of a pilot's route. The amendment to 46 CFR 10.05–43 is to remove from practice a strict application placed on this regulation which has required certain applicants to be examined repetitiously on certain subjects, which is neither necessary nor desired. When the applicant applies for an extension of a pilot's route he is requesting authority for additional pilotage and therefore the ex-

amination should be directed toward determining the competence in this area rather than to require a complete examination and review of the applicant's knowledge of pilotage.

The modernization of marine power plants used on board vessels and the changes in traffic patterns of commercial vessels occasioned by the expansion of the Great Lakes' trade have resulted in a need for evaluating experience gained by licensed engineers through service on vessels with limited horsepower propulsion plants. The provisions in 46 CFR 10.02–15, regarding lifting of limitations, are silent with respect to service requirements of engineers holding limited licenses but who have served on vessels of 4,000 horsepower or over. The new regulation designated 46 CFR 10.10–6 is prescribed and sets forth procedures to be followed when holders of limited engineers' licenses apply for changes to raise or remove horsepower limitations as a result of services performed on vessels of 4,000 horsepower or over.

The statutory authorities cited in 46 CFR Part 10 are amended to bring them up to date or to refer to specific sections in the U.S. Code rather than set forth the Revised Statutes of the United States so that they may be included in the contemplated issuance of a revision, as of January 1, 1963, of the Code of Federal Regulations volume containing Parts 1 to 145 of Chapter 1 of Title 46.

Because the amendments in this document set forth policy, proceedures, or editorial changes, it is hereby found that compliance with the Administrative Procedure Act (respecting notice of proposed rule making, public rule-making procedures thereon, and effective date requirements thereof) is deemed to be unnecessary.

(Federal Register of Oct. 4, 1962.)

ARTICLES OF SHIPS' STORES AND SUPPLIES

Articles of ships' stores and supplies certificated from 1 October to 31 October 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

Panther Chemical Co., Inc., P.O. Box 711, Fort Worth, Tex., Certificate No. 549, dated 15 October 1962, PANTHER HD–25.

The Perolin Co., Inc., 350 Fifth Ave., New York 1, N.Y.;

Certificate No. 536, dated 10 October 1962, PERO-KLEAN DRY ACID CLEANER NO. 809.

Certificate No. 537, dated 10 October 1962, FORMET WATER SYSTEM TREATMENT NO. 304.

Certificate No. 551, dated 19 October 1962, PEROLIN FUEL OIL TREATMENT NO. 656–RD.

Texas Refinery Corp., P.O. Box 711, Fort Worth, Tex., Certificate No. 550, dated 15 October 1962, BIG RED.

Turco Products, Inc., 24600 So. Main St., Wilmington, Calif.:

Certificate No. 538, dated 11 October 1962, TURCO TRANSPO.

Certificate No. 539, dated 11 October 1962, TURCO R.R. #5.

Certificate No. 540, dated 11 October 1962, TURCO ALBRITE MEDIUM.

Certificate No. 541, dated 11 October 1962, TURCO BLU-FAX.

Certificate No. 542, dated 11 October 1962, TURCO ALKALINE RUST REMOVER.

Certificate No. 543, dated 11 October 1962, TURCO BORZIN.

Certificate No. 544, dated 11 October 1962, TURCO DESLUDGIT.

Certificate No. 545, dated 11 October 1962, TURCO DY-CHEK PENETRANT.

Certificate No. 546, dated 11 October 1962, TURCO DY-CHEK REMOVER.

Certificate No. 547, dated 11 October 1962, TURCO LIQUI-SPRAY.

Certificate No. 548, dated 11 October 1962, TURCO LAB 4819–1.

AFFIDAVITS

The following affidavits were accepted during the period from 15 September 1962 to 15 October 1962:

Western Affiliated Engineering Co., Inc., 368 W. 7th South, Salt Lake City, Utah, VALVES

Elteco, Inc., Suite 4220, 500 Fifth Ave., New York 36, N.Y., FITTINGS

MIPCO Division of Associated Valve Co.,* 337 W. Walnut St., North Wales, Pa., VALVES

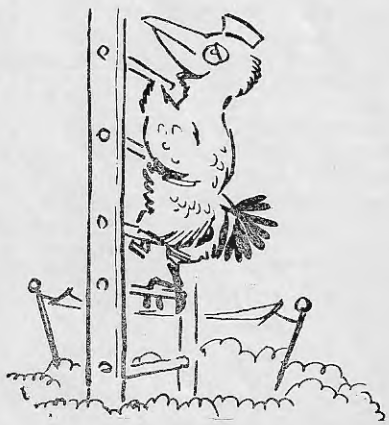
*Currently listed in Equipment Lists, CG–190 dated 2 April 1962 under former name of Associated Valve Company.

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 October 4, 1962 (CGFR 62–30), and Federal Register dated October 30, 1962 (CGFR 62–33). Copies of these documents may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.]

ANNUAL INDEX—VOLUME 19

SOFT-PATED PUFFIN



THIS TYPE is unable to fly—yet persists in going aloft without a safety belt. Has a very short lifespan. Its habitat is usually the deck compartment.

G. Seal

MERCHANT MARINE SAFETY PUBLICATIONS

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

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

Official changes in rules and regulations are published in the Federal Register, which is printed daily except Sunday, Monday, and days following holidays. The Federal Register is a sales publication and may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D.C. It is furnished by mail to subscribers for $1.50 per month or $15 per year, payable in advance. Individual copies desired may be purchased as long as they are available. The charge for individual copies of the Federal Register varies in proportion to the size of the issue and will be 15 cents unless otherwise noted in the table of changes below.

CHANGES PUBLISHED DURING OCTOBER 1962

The following have been modified by Federal Registers:
CG–190, Federal Registers, October 4, and October 30, 1962.
CG–191, Federal Register October 4, 1962.
CG–200, Federal Register October 5, 1962, Part II.

The Merchant Marine Council gratefully acknowledges the many constructive suggestions and helpful ideas from its readers during the past year which have assisted in the improvement of our publication.

Merry Christmas and a Safe and Happy New Year.

U.S. GOVERNMENT PRINTING OFFICE:1962