PROCEEDINGS OF THE
MERCHANT MARINE COUNCIL
UNITED STATES COAST GUARD

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Proceedings of the

MERCHANT MARINE COUNCIL

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The
Merchant Marine Council
of the United States
Coast Guard

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COVER PICTURE

The Tulagi, a Defense Plant Corporation pusher type river towboat, is shown moving a heavy tow of a vast ordnance unit by pushing ahead. Towing by pushing ahead is best in the comparatively smooth waters found in rivers and small lakes from a maneuverability standpoint. These operations on our streams are becoming more prevalent as the defense effort increases.

Courtesy Waterways Magazine, Pittsburgh, Pennsylvania.

DISTRIBUTION (SDL 47):

A: a, aa, b, c, d, dd (2); remainder (1).
B: e (35); c (16); g (5); f (4); h (3); d (2); remainder (1).
C: All (1).
D: All (1).
E: m (1).
List 141M.

CAPTAIN R. F. FARWELL, USNR

While serving as a pilot on the SS *Aleutian*, Captain Raymond F. Farwell, USNR, 58, died on August 15, 1951, off the coast of Alaska. Captain Farwell was also a member of the Faculty of the University of Washington where he taught various subjects dealing with transportation.

During World War II, Captain Farwell was assigned to the Coast Guard by the U. S. Navy because of his wide experience and knowledge of the Pilot Rules. During his tour of duty with the Coast Guard, he was a special adviser to the Commandant and Chairman of the Coast Guard Rules of the Road Committee. During this time the statutory and regulatory rules of the road were greatly revised and in 1948 he was a member of the U. S. Delegation to the International Safety of Life at Sea Conference held in London, England, where he took an active part in the discussions, particularly in connection with the International Rules for the Prevention of Collisions.

PRACTICAL PREVENTIVE MAINTENANCE PROGRAM FOR DIESELS AND GAS DIESELS

Operators of Diesel engines often look to the engine builder for information and guidance in preparing their maintenance schedules. This is particularly true with new engines and new installations with which the competent operators have not yet become familiar. Although the engine builder realizes the necessity and importance of helping the operator, this obligation presents a very difficult problem. This is true because the type of service in the different installations varies so much that it is difficult to recommend a maintenance program flexible enough to fit all of them. Therefore, in the past the operator, to a certain degree, has been left on his own.

In addition to the above problem, the rapidly increasing rate of engine production has resulted in another difficulty; it has caused an acute scarcity of trained personnel. Therefore, it has been increasingly important for the purchasers of engines and

the engine builders to cooperate in formulating a maintenance program that will enable them to realize maximum life from engines and at the same time train personnel in engine "know-how."

In this article we will attempt to outline a program which it is hoped will assist in eliminating the above problems. The entire article is built around the following three points which will be used in an effort to sell the idea of practical preventive maintenance: (1) Why maintenance is more important today; (2) other maintenance programs and their disadvantages; (3) a practical preventive maintenance program for installations.

Courtesy, J. H. Caldwell, reprinted from Diesel Progress, September 1951

1. *Why maintenance is more important today.*—The successful operation of engines always has and always will depend upon at least four things: (1) The design must be right. (2) Correct materials have to be used in order to realize success from a good design. (3) The assembly, both in the shop and in the field, must be completed without error. (4) The engine must be maintained properly. In the past the four "musts" as listed above have had an equal amount of importance in the successful operation of engines. However, we would like to convince engine people that in regard to the modern engine something has happened to upset that equality of importance, and now maintenance plays a much more vital part in the successful operation of engines. Now, as to the reasoning behind the above statement, it is conceded that in the past few years the strides toward increased horsepower output have been amazing. Design and metallurgy have progressed by leaps and bounds to such a great extent that we are able to realize this phenomenal increase in horsepower output and with a great reduction in fuel economy. At the same time it is known that this modern high output engine is very capable of as trouble-free service as the engine of the past. On the other hand it is significant that any malfunctioning of key parts of this engine such as rings, bearings, etc., tends to lead the engine to destruction faster than the older, slower type speed engines. As an example, the piston rings on the older type engine could be permitted to blowby for a long time without overhaul and, in general, the engine could be run in bad condition for longer periods of time than the modern type engine. Therefore, in order to realize success, much more emphasis will have to be placed on maintenance than has been in the past. This means that the operator of today will have to be more vigilant and will have to keep ahead of his engines. In addition, engine builders will have to devote more time to customers' particular applications and vice versa so that better cooperation will be realized.

2. *Other maintenance programs and their disadvantages.*—(*a*) That form of maintenance in which the operator runs the engine to complete destruction before exercising any maintenance or adjustments. All will agree that this is absurd, but it is an actual fact that engines are receiving such treatment today. It is only for that reason that we mention it, plus the fact that we will use it as a point in selling the idea of preventive maintenance later in this article.

(*b*) *Progressive maintenance.*—It can best be explained by the following example. Assume that it has been determined by past experience that an eight-cylinder engine should be overhauled every 8,000 hours. The operator starts out by first stocking a complete subassembly unit; that is, cylinder head assembled, piston, rod with bearings, etc. After the engine has operated 1,000 hours, then No. 1 cylinder is completely dismantled and the spare unit is taken from the stockroom and installed. The engine is then started and, while running, the unit that was withdrawn is cleaned and thoroughly inspected for cracks or any signs of failure. At the end of the next 1,000 hours, the No. 2 cylinder is completely dismantled and the unit that was cleaned is installed. The assembly from cylinder No. 2 is then cleaned and inspected and set aside until the next 1,000 hours. The program is then completed until at the end of 8,000 hours all units have been overhauled. The advantage of this type of maintenance is that the maximum availability of the engine is realized, but the disadvantages far overshadow this advantage. In the first place, it is very costly because you do not obtain the maximum life out of the parts. For instance, if the piston rings are sluggish and it is felt the tension is not sufficient or near comparable to a new ring, the rings are thrown away. It is worth mentioning at this time that piston rings should never be removed from the piston, and if they are, they should be destroyed and new ones installed. Another disadvantage to this type of maintenance is that there is always one unit which is not mated in. It is a known fact that parts do not reach their maximum efficiency until they have been run together for a number of hours, so, in the case of piston rings, one cylinder would always be using an excessive amount of lubricating oil. However, the serious drawback with this program is that it does not guard against serious casualties caused by premature failure of some vital part.

(*c*) *Periodic inspection maintenance.*—In this type the assemblies constituting the engine are torn down, inspected, and cleaned after they have been run a specified number of hours. Although it has its advantages and is used extensively by some competent operators, it has many draw-backs. The first of these is needless disassembly of the vital parts of the engine. Removal and replacement of parts still in excellent condition, no matter how carefully done, frequently induces trouble. Perhaps this is caused by simply disturbing parts which have found their optimum running fit or finish. Furthermore, in tearing down assemblies on the engine, dirt is introduced during the operation. This is true even in the cleanest of installations. Likewise, in any engine during operation there is always an accumulation of carbon and dirt which collects in places where it is not doing any harm. However, in tearing into the assembly, this harmless dirt and carbon is moved to a place where it can do damage.

In setting up the inspection periods, the specified hours between them has been determined by an average established by engine builder's test or past performance. However, some small part deep down in the assembly might fail due to material weakness or previous faulty assembly. Failure of this small part leads to premature casualty for the entire assembly, so in this type of maintenance the operator is not free from disastrous casualties because, regardless of the amount of experience both the engine builder and operator has had with the engine, no one can predict how long a particular assembly is going to last. This type of maintenance is also very costly as it takes a large amount of materials such as gaskets and, as in the case of progressive maintenance, the parts do not reach their maximum life. The amount of labor involved in carrying out this type of maintenance also increases the cost. The claim is made that with this type of maintenance anyone without engine experience can disassemble and assemble an engine. Therefore, the labor can be done by low cost personnel, leaving the important inspections to the supervisor. This, they claim, eliminates the problem of training. To the writer this is a step in the wrong direction because any savings resulting from not training personnel, even down to the oiler, is false security. The big disadvantage of the above-mentioned programs is that they lack flexibility in that the engine builder cannot adopt any one

as standard and recommend it to all customers. Therefore, the engine builder, of all people, is left without any plan of maintenance.

3. *Practical preventive maintenance program for all installations.*—The ideal program would have everything that the previous mentioned ones lack, plus their advantages, which brings us to the main part of this article. In discussing the other forms of maintenance, two basic facts are brought out: (1) Certain vital parts last longer and operate better if not frequently taken apart; (2) operation until complete destruction is foolish and costly.

The above two facts represent the extremities of the situation. It is definitely poor policy to be constantly tearing the engine down for inspection; however, on the other hand, we cannot go to complete destruction before exercising some form of maintenance and adjustment. Inasmuch as maintenance is the most important factor in successful operation, an answer has to be found. In that regard, thousands upon thousands of hours of operation have proven to us that 99 percent of all failures are preceded by certain signs or conditions. This basic fact gives us a clue to the answer, which is practical preventive maintenance. This is a program whereby a series of very simple tests and observations are used to determine the condition of vital parts before they are taken apart or fail. One of the advantages is that it reduces to a minimum forced interruptions of service experienced in the other types of maintenance. It avoids unnecessary dismantling of the engine and, above all, is very economical in that maximum life of all the parts is realized. It also has the advantage over the other forms of maintenance as it lessens the chances for major casualties. All that is required in this type of maintenance are a few simple instruments which already are available in most installations. However, the key to the whole program is a daily log on important events. From that log, indicators, or let's call them pointers, are taken which are used in determining the condition of the engine. They are guides in determining the exact time that the engine should be overhauled or adjusted. Knowing the condition of the engine, serious engine casualities can be eliminated. The pointers are many and can be explained by referring to figure 1, which is a recommended log of events. It will be noted that this log is divided into two parts. The lower half is used for recording values of tests such as compression pressures, clearances, etc. Included are several daily checks which are not recorded but should be observed. The various tests are listed in periods at which they should be taken. However, the period at which each is taken is only a recommendation and the operator might want to change the frequency of the test to suit operating conditions and available personnel. It is possible that experience might indicate a necessary change.

Like all log sheets, the figures are there, but trends and signs of distress are hidden. It is like being unable to see the trees for the forest. Therefore, the key to this program is the top half of the log; that is, a series of curves which give the picture at a glance. The horizontal part is in time, such as days. The vertical part is used for the values of the tests. The upper left-hand curve is labeled compression pressure. The readings here have been taken every 30 days, and if the piston rings remain in good condition, this curve will be flat until the engine begins to approach the time for overhaul, at which time the curve will start to fall off. This then gives the operator an idea of ring condition. However, if, for example, conditions were not normal, the engine is headed for premature failure after only 120 days operation as noted by a decided compression pressure drop indicated by the dotted line. This would allow the operator to know that either the rings were beginning to wear or stick, or valves were not functioning, or a liner was beginning to score. Any change in the curve will indicate immediate attention is required. However, this one indicator or pointer is not the only one which will reveal the above symptoms of distress, so, before any action is taken, a quick study of the other curves will either confirm or deny the above conditions.

National Safety Council

The curve immediately below that of the compression pressure is for lubricating oil consumption, in brake horsepower hours per gallon. The consumption is figured every 30 days and plotted as shown. As in the case of the compression pressure, it will have the flat characteristic as long as the piston rings are sealing properly. This is particularly true with both the oil and compression rings, because if either fail to function properly, high lubricating oil consumption will result. This curve will have that flat characteristic until the rings begin to lose their life. At that point the curve will drop and eventually fall off to a point where it will be uneconomical to operate the engine without a re-ring job. It is significant to note that the downward trend in this curve begins at exactly the same time as the drop off in the compression pressure curve. This would confirm the fact that the rings are causing the low compression pressure. However, let us refer back to to the example where a premature failure took place at 120 days as noted by the drop in compression pressure, indicated by the dotted line. If the rings in any one of the cylinders begin to stick or scuff, then a decided drop in lubricating oil consumption (brake horsepower per gallon) will be noticed as shown by the dotted line in the lubricating oil consumption curve.

These two drops in the curves exactly at 120 days confirms the fact that the cylinder in question will have to be pulled because any further operation will result in a serious casualty.

Now, let us say for example that a decided drop was noticed in the compression pressure curve, but the lube oil consumption curve did not indicate a sudden drop, then the operator would know that compression rings were not the reason for the lowering of compression pressure but it would be very evident that valves were sticking or leaking very badly. Again, referring to the drop off in compression pressures at 120 days, the operator can also determine the cause of it by removing the crankcase doors and turning the engine over on air. If the rings are bad a decided hissing noise will be heard in the crankcase. It will also be possible to pick out the cylinder that caused the drop in compression pressure. However, if the noise in the crankcase is normal, then the operator will know that the low compression pressure is caused by valves functioning improperly.

The lower left-hand curve, crankcase pressure, is also an indicator of ring condition. As long as everything is normal, this curve will be flat;

however, it is natural that as the engine approaches the overhaul period, blowby will increase which then will result in higher crankcase pressure as noticed by the rise. It will be noticed that this curve starts to rise at exactly the same time as the lubricating oil consumption and compression pressure curves begin to drop, which again verifies the fact the ring job is necessary. Again, referring back to the case of premature failure as noted by the dotted lines at 120 days, there will be a very sudden increase in crankcase pressure at that time if any one cylinder fails to seal.

The fuel oil consumption curve shown in the upper right-hand corner is another indicator of general engine condition, particularly the fuel system and rings. However, the operators should be cautioned not to use this curve for determining condition of the fuel system, because the nozzle can begin to function improperly without much advance notice and if allowed to operate in that condition, serious damage will result. The color of the exhaust stack gases is the best indicator of fuel oil system conditions and corrective measures can be taken immediately.

The curve showing pressure drop across the lube oil filter illustrated in the middle right-hand side of the chart is not only very interesting but affords a great deal of information. This will be borne out in the explanation. This curve applies only to those filter installations that are full flow; that is, the type of filter through which all lubricating oil is passed. When the filter cartridges are cleaned, it will be noted that at zero days the pressure drop is only about 6 pounds. Each succeeding week, as noted by the small dots in the curve, the pressure drop increases until at the end of approximately 50 days the pressure drop reaches the maximum specified by the filter manufacturer which, in this case, was 22 pounds. At that point the cartridges are becoming clogged and will not pass sufficient lubricating oil; therefore, the filter had to be changed, which brought the pressure drop back to the original figure of 6 pounds as noted by the first arrow above the note "filter change." The pressure drop readings were then taken each week until the maximum specified figure was reached after the next 50 days, and at that time the cartridges were changed again which brought the drop back to 6 pounds. Therefore, this curve is a very good check as to the condition of the lubricating oil filter cartridges, which will allow the operator to obtain the maximum life from them without overcontaminating the lubricating oil. Thus the lubricating oil is always in the best of condition and yet all the available life has been realized from the elements. This point cannot be overemphasized because clean lubricating oil is very essential in successful operation.

Another important point revealed by this curve is that it will indicate to the operator if any dilution is present. It will be noted that after 280 days the pressure drop was slightly below 11 pounds; after the 290-day reading, or after an elapse of 10 days, the pressure drop was still 11 pounds. Under normal conditions the curve would have the rising characteristic but the lubricating oil became diluted and reduced the viscosity of the oil to such an extent that even with more contaminated cartridges, the pressure drop did not rise over the 10-day period. This indicates that dilution was present. Once noticing this dilution, the operator should immediately find the leak and correct it before any serious damage occurs.

This curve will also bring out another important indication; it will reflect general overhaul engine condition. Every engine accumulates or manufactures dirt or carbon at a certain rate, likewise, the filter cartridges will remove dirt at a certain rate; therefore, under normal conditions it will be noted that in the beginning the life of the cartridges was about 50 days before reaching the specified maximum pressure drop. However, after the engine begins to blow by and approach the period of necessary overhaul, the dirt rate of the engine increases. Inasmuch as the cartridges will remove dirt at a specified rate, then the life between changes is reduced considerably toward the approach of overhaul. This is noticed by the fact that after 300 days, the cartridge life between each succeeding filter change became less each time until at the 405-day period the engine was manufacturing dirt at such a fast rate that the cartridge life was only in the neighborhood of 12 days.

Cranking revolutions per minute of the engine has been plotted in the lower right-hand corner. This test should be made each time with the air tanks charged to the same pressure and when the engine is warm. The curve indicates condition of several parts before failure actually occurs. If starting valves are beginning to act sluggish, the cranking revolutions per minute will be less, which means the air starting system needs immediate attention. It might be a simple thing like dirt in one of the valves or moisture in the system. Nevertheless, the indicator has told the operator of this condition. Too often an engine has been allowed to reach that situation and when it is badly needed it won't start. A drop in revolutions per minute also indicates possible misalinement of the engine. Lacquer on pistons or bearings will cause a decrease in cranking speed.

The explanation of the above pointers has been long and, in getting into the details, we probably have forgotten by now the main idea of practical preventive maintenance, so it might be well to review it at this time. In carrying out the above inspection and using the pointers, it will be noted that no major assemblies have been dismantled to this point. Nevertheless, one will agree that by now we have a very good idea of the condition of the engine. This knowledge has been received without any forced interruptions and any dismantling of the engine, which experience has shown does decrease life of actual parts. The possibility of faulty reassembly and getting dirt into the engine has been eliminated. Likewise, we have not used any parts up to this time, staying ahead of the engine and receiving maximum life out of the parts.

It might be a good idea before proceeding to the remaining pointers as shown on the log, to say something about how the tests should be conducted. It should be remembered that in doing this work we are not attempting to reach Utopia in regard to engine adjustments, nor are we attempting to duplicate values as meticulously determined in laboratory tests during development of engines. In that regard actual values of the test mean little to us here but the important thing that we are looking for are any changes in the values. In taking the readings it is only essential to take all the tests under the same conditions each time they are recorded. Take for instance, the compression pressure test. This should be done at the most convenient condition. In the case of powerhouse engines, that probably would be at no load and full revolutions per minute when the engine is off the board. It might also be a good idea to take the readings as soon as possible after the engine has been taken off the line, when it will be near operating temperatures.

It would be ideal in describing the pointers or indicators to elaborate a little more on each subject, such as dilution, because it is so important; but that would make this article very lengthy and would be digressing from the original intention, to form a practical preventive maintenance schedule. In regard to other indicators listed in the lower half of the log, many are self-explanatory and several already have been covered, so

for the sake of brevity the more important ones will be explained. Each indicator is numbered and those numbers will be referred to in explaining the log.

Indicators 1 through 8 are included under the block titled, "Remarks on Daily Readings." Inasmuch as this log covers events over a period of 1 year, it would be impossible to include actual values of daily and hourly readings on this log; yet, they reflect so much on engine condition that a space has been provided below these eight indicators for notes on any changes that took place throughout the year. Therefore, the ordinary daily log sheets will be kept separate and some of the values taken from them are to be transferred to this engine maintenance log which has the expressed purpose of giving engine condition at a glance. This log is made out for a four-cycle, turbocharged engine, but two-cycle engines will be included in the discussion for the sake of making this article a general engine maintenance setup.

Indicator No. 1; namely, exhaust temperatures, is always taken by means of a pyrometer. The pyrometer is a very valuable instrument in detecting faulty nozzles, fuel oil pumps, exhaust valves, etc., but we strongly recommend that they should not be used in balancing engines. We say this because, in the case of four-cycle turbocharged engines, in which the cylinders are exhausting into separate tubes which are of different lengths, it is impossible to have all cylinders recording the same exhaust temperatures even when the engine is in balance. Therefore, the individual fuel oil pumps, as in the case of jerk pumps, or distributing valves in the case of other fuel systems, should be set to deliver exactly equal quantities of fuel. Inasmuch as the quantity of air to each individual cylinder is fixed and no adjustments can be made for it, then equal distribution of the fuel will result in as close a balance as possible.

In the case of two-cycle engines, the pyrometer when used for balancing has resulted in a great deal of trouble. For example, suppose the exhaust temperature of one particular cylinder starts to rise. The operator, thinking this cylinder overloaded, then reduces the amount of fuel to that cylinder. What he does not realize is that the ports are clogging up causing a reduction in air and, therefore, increasing the exhaust temperature without any increase in load. As the ports further clog up in this cylinder he, in various stages, will reduce the amount of fuel to the cylinder until he has removed a great deal of its load and, since the engine is required to carry a rated load, the lack in horsepower has to be carried by the remaining cylinders. Each time the operator reduces the fuel to the cylinder in question, he puts additional load on the remaining cylinders to such an extent that they go to destruction. This has happened many, many times and pistons, rings, cylinders, etc., have been unduly condemned because of this practice.

Indicators 2 to 5, inclusive, under "Daily remarks" are self-explanatory. Indicator No. 6; namely, amount of vapor from crankcase breather, is merely a check or confirmation of piston ring condition as indicated by compression pressure, lube oil consumption; and crankcase pressure. Indicator No. 7; that is, color of exhaust, is well understood by all engine operators; therefore, we need not elaborate on it.

Indicator No. 8, sound of engine, is one of the most important in this scheme of practical preventive maintenance. It has much significance and will eliminate casualties if its importance is stressed to all personnel from the superintendent down to the oiler. Each day someone should spend at least 10 minutes around the engine to get the feel or normal beat of engine noises. This person should stand by each cylinder and actually try to follow the piston up and down. A tight piston or piston pin, a main or connecting rod bearing knock can be detected if the normal sound has previously been determined. A few minutes should be spent listening to the blower, cross heads, auxiliary drive, lube oil pump, etc. Once a person has the feel of his engine, he can readily pick out defects by paying this little daily visit.

Indicators Nos. 10 through 13 are included as weekly readings. The actual values should be recorded each week, and the date should be written in column 9 under which are 26 spaces, but since this log is made to cover an entire year, the readings for the last half should be put into the 26 spaces under column 9, prime to 13 prime. Indicator No. 10; pressure drop across the lube oil filter, has already been described. Air manifold pressure (indicator No. 11) in the case of four-cycle turbocharged engines will reflect turbocharger conditions, as well as the cleanliness of the air filter. Reductions in this air manifold pressure will result in a dirty exhaust; therefore, its value should be recorded each week. In the case of two-cycle engines, the scavenging air pressure is probably more important because any increase in this pressure will be a certain sign that the ports are beginning to clog. Likewise, a decrease in scavenging air pressure will be caused by faulty suction or discharge scavenging valves as well as a clogged air filter. Crankcase pressure has already been described. Indicator No. 13; that is, check for leaks, cannot be included as an actual value; however, each week a check mark should be placed in that column which indicates that the operator has checked over the engine.

Indicators 15 through 24, inclusive, are included in the block for monthly readings. In regard to indicator 15, enough has already been said about compression pressures; however, as the curve, as previously mentioned, was an average of all cylinders for each particular period, it is important to record in column 15 the actual compression pressure value for each cylinder.

Indicator No. 16, valve tappet clearance, should always be maintained as specified by the engine builder. It is not necessary to record the tappet clearance for each valve; however, it is important that they be checked and if found off they should be corrected. When the tappet clearance of all the valves has been checked, a check mark can be placed under item 16. If an operator discovers that it is necessary to adjust the tappet of any particular valve too often, that should indicate to him that there is some wear taking place in the valve-operating mechanism between the camshaft and the tappet. This includes ball and joints, etc. A faulty push rod cross head bushing can be detected by any change in clearance as well as scuffed cams or rollers. This can all be determined without any dismantling; if the tappet clearance remains constant, then the operator can be assured that everything is satisfactory.

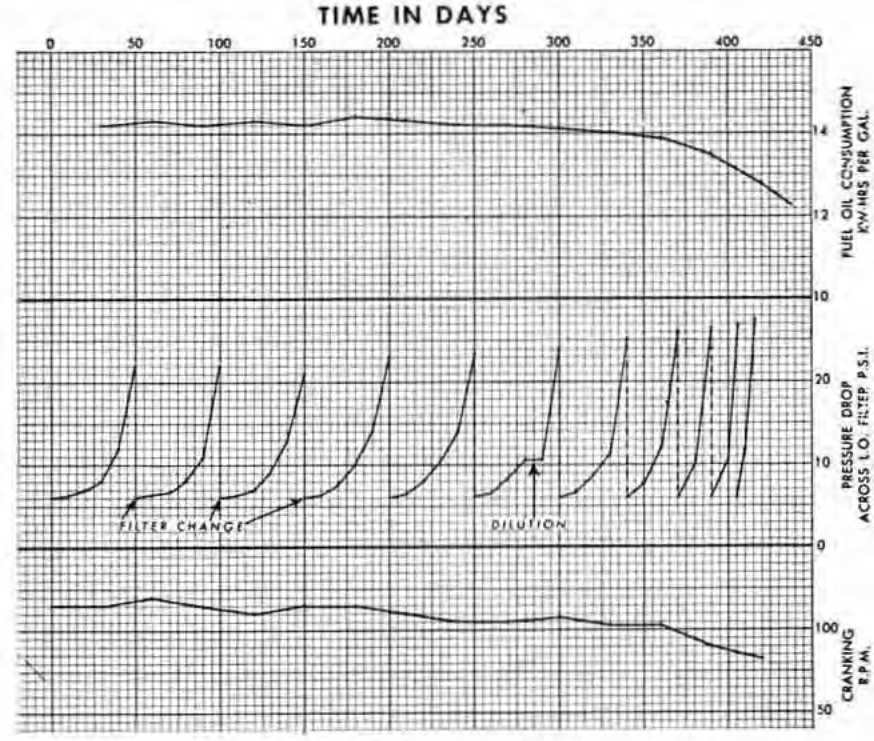
Indicator No. 17 is used for recording actual value of lube oil consumption in brake horsepower hours per gallon, for plotting the curve as previously explained. In order to keep the curve from changing direction each month and in order to make the curve show a flat characteristic for normal operating conditions, it is important that each time the value is figured, the lubricating oil level in this sump should be brought to the same place at the end of each month. This will give an accurate reading rather than an erratic curve.

The remaining indicators in this block; namely, 18 through 24, have been either described before or are self-explanatory, except item 21; that is, send lube oil sample to laboratory. This is very important. An engine in poor operating condition will soon break the oil down. Likewise, a bad batch of lubricating oil will break down and destroy a good engine in

short order. A complete report on the condition of lubricating oil will also confirm the findings of the other indicators included in this log. Although any lab will include remarks in their report, it is advisable for operators to study the booklets distributed by every oil manufacturer in order to familiarize himself with such tests as neutralization number, precipitation number, viscosity, etc.

Indicators 25 through 30, inclusive, are included in the block for semiannual readings. In regard to indicator 25, rod bearing clearances, the practice of determining this value by use of leads or by means of inspections is not recommended because the bearing has to be dismantled, which is against the policy of preventive maintenance. It is the opinion of the writer that a great deal of bearing failures have been caused by faulty assembly, such as improper entering of dowels, introduction of dirt, either behind the bearing or on its surface, or by not tightening the bolts correctly. A bearing that is designed properly will not show wear or fatigue over long periods of time when good lubricating oil is used. However, the best mechanics have slipped in the assembly of bearings, particularly in the case of larger engines, because it is a very difficult job to actually see how the bearing is being mated when drawing up the cap. Nevertheless, in view of the fact that the bearings are a very critical part of the engine, maintenance has to be practiced. A noticeable drop in lubricating oil pressure gives an indication of excessive main bearing clearances, this is also true, to a lesser degree, in the case of connecting-rod bearings. In the case of larger engines and thicker bearings, examination of lube oil strainers and filters for foreign material, such as babbit, will alert the operator to any bearing failure before damage to the shaft begins. However, the practice of putting a dial indicator on the rod and resting the button against the engine frame or crankshaft and barring the rod up and down, and noting bearing clearances, is a sure indication of bearing condition. Some will argue that this method does not give a true reading of clearance—which is true—but, even so, this does not make any difference because it is merely a change in reading that is significant. In some cases of bearing fatigue where the metal spalls off and builds up in one spot, the clearance as noted by this method actually will decrease, indicating to the operator that the bearing is in distress. If the reading increases above the normal figure, then the operator will have to dismantle the bearing for inspection. The above method covers connecting-rod bearings. In the case of main bearings, taking strain gage readings at each crank web is a very true means of detecting their condition, and this value should be recorded in column 26.

The remaining indicators as shown in the semiannual block are self-explanatory; but, something should be said of crankcase inspection. A very



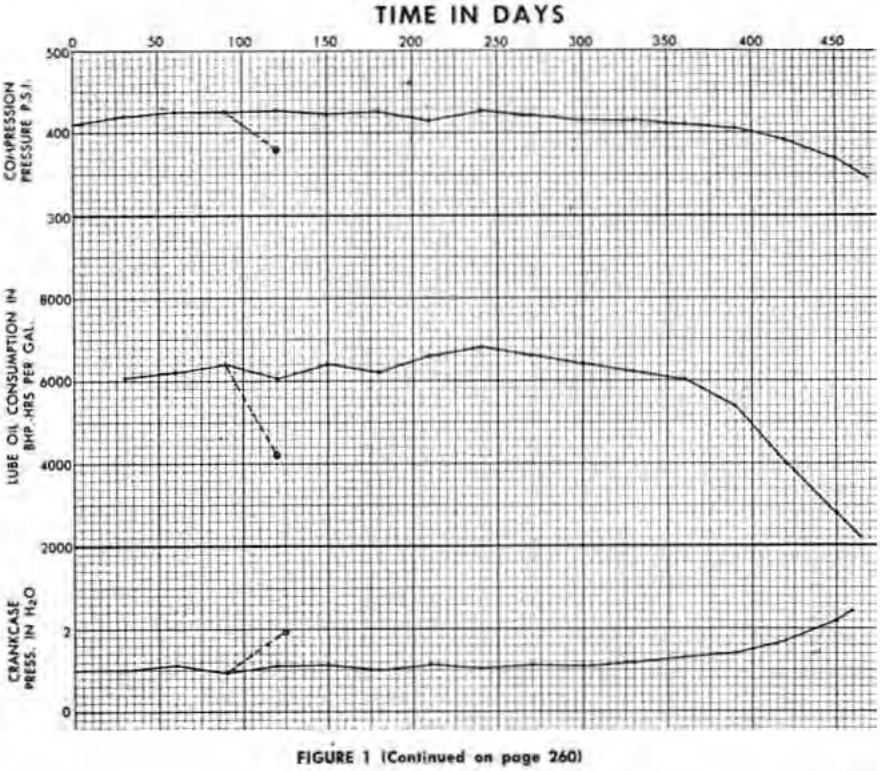


FIGURE 1 (Continued on page 260)

REMARKS ON DAILY READINGS

IF ANY CHANGES ARE NOTED IN FOLLOWING READINGS INCLUDE THE REMARKS BELOW. 1—EXHAUST TEMP., 2—PRE TURBO TEMP., 3—WATER TEMP. TO & FROM ENGINE 4—LUBE OIL TEMP. TO & FROM COOLER, 5—LUBE OIL PRESS. 6—AMT. VAPOR FROM CRANKCASE BREATHER, 7—COLOR OF EXHAUST, 8—SOUND OF ENGINE

ENGINE MAINTENANCE LOG FOR

.....COMPANY. .....STATION UNIT NO.

WEEKLY READINGS

DATE	PRESSURE DROP ACROSS L.O. FILTER	AIR MFLD PRESSURE	CRANK CASE PRESSURE	CHECK FOR LEAKS	DATE	PRESSURE DROP ACROSS L.O. FILTER	AIR MFLD PRESSURE	CRANK CASE PRESSURE	CHECK FOR LEAKS
9	10	11	12	13	9	10	11	12	13

MONTHLY READINGS

DATE	COMPRESSION PRESSURES 1	2	3	4	5	6	7	8	VALVE TAPPET CLEARANCE	L.O. BHP HRS PER GAL	HOURS OPERATED THIS MONTH	TOTAL HOURS	CRANKING R.P.M.	SEND L.O. SAMPLE	CHECK SAFETY DEVICES	DRAIN MOIST FROM F.O. & AIR TANKS	F.O. CONSUMPTION KWH GAL	REMARKS
14				15					16	17	18	19	20	21	22	23	24	

SEMI-ANNUAL READINGS

DATE	ROD BEARING CLEARANCES 1	2	3	4	5	6	7	8	CRANK WEB DEFLECTIONS 1	2	3	4	5	6	7	8	CRANK SHAFT THRUST	CRANK CASE INSPECTION	CHECK CHAIN TIGHTNESS	CHECK F.O. & VALVE TIMING	REMARKS
				25								26					27	28	29	30	

FIGURE 1 (Continued from page 259)

thorough check on the condition of the crankcase has eliminated many a serious casualty. All bolts, nuts, cotter keys, and oil lines should be checked for tightness. The backs of all crank doors should be carefully checked, because if a bushing or bearing has failed, the particles will be thrown out against the door. The bottom of the oil sump in wet sump engines, as well as the dry sump, should be checked for foreign material. A portion of the liner and piston can be checked for scoring by placing the piston at top dead center when inspecting liners, and bottom dead center for inspection of the lower part of the piston skirt. Rods and piston pins can also be checked for discoloration due to heat.

The writer is positive that engine operators could elaborate on this article and add many indicators. Much more could have been said regarding the value of each indicator. In that regard, an entire book could be written about the subject of engine maintenance. Such a book would be valuable to many of the younger operators that we have today who lack valuable experience.

The appearance of the log (fig. 1) and the amount of detail used here in the attempt to sell practical preventive maintenance might give one the impression that it is too complicated for practical use. This is not the case because the readings and checks are simple and can be used to train all personnel in how an engine functions. It can also be used to keep supervisors in the main offices well informed on conditions of the engine, and not as much time will be used as in the case of most maintenance programs with lengthy reports.

TO PLOT OR NOT TO PLOT—

THAT IS THE QUESTION

(Extracts from the notes of the editor of The Log—"To plot or not to plot" was prepared with a view toward stimulating consideration of a question we feel may develop into a major controversy in the immediate future. The success of our plan may be judged from the immediate response to this article by a number of practical navigators—We feel that the suggestions are well worth your serious consideration and represent exactly the type of reasoned approach required to integrate these new electronic navigational aids into an effective system for enhancing the safety of life at sea and improving the over-all efficiency of marine operations.) Reprinted from the April and June, 1951 issues of The Log, 370 Lexington Ave., New York 17, N. Y., and 121 Second St., San Francisco 5, Calif.

The question of whether or not merchant officers should plot information seen on a radarscope in order to avoid collision is one which requires fullest consideration by all segments of the industry. Moreover, this consideration must be given now as a decision must be reached soon. Pressure for plotting is very strong from the United States Coast Guard, insurance companies and admiralty lawyers. The testimony in admiralty court cases and the few decisions thus far rendered in collision cases where radar was involved are all tending to increase the pressure.

We are speaking in this article from the standpoint of an electronics expert so our aim is not to tell the navigator how to navigate nor shipping company executives how to direct their operations. Instead we hope to give those people some of the basic technical facts involved and explain how they affect the application of radar to the navigational problem. Certainly an understanding of the capabilities and limitations of the equipment itself is paramount to reaching an intelligent answer to the question at hand.

WHAT'S IN A NAME?

First, let's find out just what radar can give a skipper in the way of information which can aid him to avoid a collision. Perhaps we had better emphasize the very important fact implicit in the previous statement by restating it. Radar cannot avoid collision. It's usefulness lies in the fact that it can supply information which can help an officer to avoid a collision. Now, for the purpose of this discussion we must assume that the radar will be used. In one often quoted collision case the ship's master was censured for failure to use his radar on the premise that the information it could have given him would have permitted him to avoid the collision.

The full story of radar's capabilities is found, oddly enough, in its name. "*RA*dio *D*irection *A*nd *R*anging." We feel many people have gone overboard in crediting radar with ability far beyond actuality. Radar can supply only what its name claims for it—direction, in terms of bearing, and range or distance away. If you will firmly establish in your mind that radar is limited to giving an observer only the range and bearing of objects relative to his own vessel then you will be well equipped to judge its proper relationship to any given piloting or navigational situation.

The range and bearing of all objects within the navigator's horizon is certainly most useful information but it is far from a complete picture. The objects are not identified and indeed even the most qualified radar observer will be hard put to always distinguish vessels from buoys, rocks, or other things just by inspection of the radar screen.

Even if the observed object (we are always tempted to use the more common phrase "target" in speaking of radar images but we strongly urge a change in words as all too often a radar observed object becomes a target) must obviously be another vessel there is no convenient little tag on its image noting its heading and speed. Further, from your radar screen you have no means of knowing if the observed vessel has sighted you or heard your fog signals or if she is completely ignorant of your proximity. Last but not least, marine radar has not yet been equipped with a mind-reading device to deduce whether the observed vessel is going to hold course and speed or if she is going to perform some wild maneuver that might be creditable to a woman driver.

RELATIVE ACTION

To reiterate our basic point—all observations of a radarscope will give you is the bearing and range of any object it detects. By observing this data at periodic intervals and recording it we have at our disposal information which can be of considerable added value if we use it wisely. The first, and to our mind, most vital piece of information is with respect to bearing. If the bearing of an observed object remains the same over a number of periodic observations *you are on a collision course with that object.*

This is axiomatic. If all masters and navigational officers would keep this one fact in mind we believe there would be far fewer gray hairs on radar-equipped bridges. From analysis of the changes in range of an object we can determine whether we are getting closer to it or further away.

Incidentally, when we spoke of recording range and bearing data we did not have plotting in mind. This recording can be done either by simply marking the position of the object on the glass face of the indicator with China crayon at each observation or making a simple tabulation on a rough log of time or observation, range, and bearing. From an inspection of the series of dots over the scope face denoting the various positions of the object or from an analysis of the tabulated readings an experienced observer should be able to deduce with reasonable accuracy the relative action of the object.

First, he can assure himself whether he is on or nearly on a collision course, he can determine whether the object is closing or drawing away and he should be able to decide what sort of situation confronts him as regards the rules of the road; i. e., whether he has a meeting, an overtaking, or a crossing situation.

PLOTTING

What additional information can we glean by plotting? Suppose we draw our course line to a convenient scale for our speed and then mark the position of the observed object at the proper distance and bearing for the first observation. At the next observation we mark our own position along our own course line and then mark the object at the new range and bearing. This is plotting.

We will find after three or four observations are plotted that we can draw a line through the marks indicating the various positions of the observed object which will be his course line. Measuring along this line to scale we can determine his speed. If our two course lines intersect we can also by measurement find out how far we will clear. That sounds like all the information anyone could possibly ask for to aid him in collision prevention. Just so that we will have the facts clearly in mind let us review our findings:

1. Inspection of the radar scope will advise us of the presence of objects and will permit us to determine their range and bearing relative to our own position.
2. Recording or tabulation of ranges and bearings of an object at periodic intervals will tell us if we are on or close to a collision course with that object, whether the range is opening or closing and what sort of navigational situation faces us.
3. Plotting of range and bearing of an object will, in addition, permit determination of its course and speed and its distance away at the point of closest approach.

These statements, we believe, represent all of the information and benefits that are available from the various types of radar observations we have discussed. Now let us consider the problems and disadvantages.

AN UNSOUND ASSUMPTION

First, all the conclusions we have drawn, particularly with respect to plotting, are based on the somewhat unsound assumption that the object you are observing is going to maintain its course and speed. If either course or speed are changed you immediately lose the ability to determine from plotting course, speed, and point of closest approach until enough periodic observations have been made to ascertain that the new course or speed is being held.

The recording and tabular approaches hold good insofar as unchanging bearings still mean collision course and simple inspection of the scope always gives you range and bearing regardless of the object's maneuver's so long as it stays in range and does not get into a position where it is obscured by other signals or gets within the minimum range.

On the subject of minimum range we believe that with modern radars where objects can be seen in to within 75 yards or less it should be an established principle that no object is ever approached close enough to be lost in the minimum range circle unless that object can also be seen without the aid of radar. With older units having minimum range of 200 yards or more the bridge officer

should proceed as if he had no radar at all when for some reason it is necessary to approach an object close enough so that it merges into the minimum range circle.

ESTIMATING RANGE

A definite limitation to accurate and reliable plotting is inability to read ranges to close limits. Bearings can be read easily and accurately to one degree but ranges must either be interpolated from fixed range marks or read from a range counter after setting a variable range mark to coincide with the object. With radars having only fixed range marks about the best one can do in the way of interpolation is one-quarter of the distance between range marks. This means that on a 4-mile scale where markers are customarily 1 mile apart the best you can do in the way of reading range is within a quarter of a mile.

Range counters permit closer readings but they are usually set to read in miles and tenths of a mile. By interpolation you may set up a plot that is good to within about half of a tenth or 300 feet, but at close ranges in poor visibility is it wise to depend on a plot that is only accurate to within 300 feet?

Another major draw-back to effective use of plotting as an anticollision measure on merchant vessels becomes evident in crowded areas where traffic is heavy (and where danger of collision is probably greatest). The Navy, during the last war, had trained personnel available to do nothing but plot radar observations. They equipped these plotters with the finest facilities, special rooms, automatic equipment, and made the job as simple and easy as possible, yet they found that one person couldn't hope to effectively carry on a plot of more than three or four objects at once.

What of the poor merchant officer who must con the ship on a busy bridge, listen for fog signals, keep an eye on the radar screen and consider a dozen other problems simultaneously?

We told you at the outset that this article would not resolve the question of whether merchant vessels should plot radar observations or not. We hope that an explanation of some of the principles and problems involved will help you in considering the question we raised in our heading. Radar is becoming a strong force in marine operations and questions such as this one on plotting face everyone in the industry. By intelligent consideration and concerted action the industry must supply the answer to these questions in order that the limitations of our marvelous electronic aids be recognized and their advantages be given full play to make our merchant marine profitable, strong, and safe.

THIS IS THE ANSWER

Hazards of fog navigation can be greatly minimized if we know these three factors: distances, courses, and bearings of all ships in the vicinity. Radar can supply only what its name claims for it—direction in terms of bearing, and range or distance away. It does not give you the course of an approaching vessel—one of the three most important factors to know. Theoretically some vague idea of the course could be obtained by continuous plotting of the postion in relation to your own ship based on radar distance and bearings. In practice however, this method is not only dangerous but cannot be used for the simple reason that the rules of the road prescribe to stop the engines and navigate with caution when a fog signal is heard forward of the beam. Variable speeds and courses will result and all plotted positions, no matter how accurate, will be misleading as to actual course and speed. Any such information would be worse than no information at all.

At this point, it must be made clear that the danger of collision in fog will always be present even between ships equipped with radar. There are several reasons for that:

1. Radar does not give you the course of an approaching vessel nor can it convey to other ships your course or any change of the course.
2. There is no practical way to let the other ship know the fact that you have radar and that you "see" the other vessel or what you intend to do.
3. Passing signals in fog such as short blasts by the whistle are prohibited for the simple reason that any change of the course cannot be so indicated as long as the course itself is uncertain.
4. There is no "right-of-way" in a fog and you are not "in sight of each other." Both ships are free to act in a situation of "free for all" without any practical way of signaling what one intends to do in order to avoid a collision.

This grave situation will exist until a practical way will be found and put in use not only to broadcast continuously the ship's course but also to transmit at once to all ships in the area any change of the course which may take place in fog. All these, of course, in addition to the information obtained by radar.

DON'T SCUTTLE THE SHIP'S WHISTLE

Sound signals as given by means of a ship's whistle serve many useful purposes in fog and also in clear weather. Due to the simplicity of operation and reception many important messages can be readily transmitted by the navigator and received with ordinary human means by another navigator direct from bridge to bridge. According to the rules of the road, a whistle or siren must be used to indicate the following:

1. A whistle blast indicates presence of a ship.
2. Gives you proximity and bearing.
3. Prolonged blast indicates that she is under way.
4. Prolonged blast with two short blasts indicates tow.
5. One short blast indicates that she is changing her course to the right (port-to-port passage).
6. Two short blasts indicate that she is changing her course to left (starboard-to-starboard passage).
7. Three short blasts—my engines are going full speed astern.
8. Four or more short blasts—danger signal.
9. One long blast is given when approaching a bend or backing out from a dock.
10. Two prolonged blasts—ship has no headway.

There are many other uses where the ship's whistle serves very well in spite of its limited range and normal vagaries of sound.

BROADCASTING BY WHISTLE

Any signal whether it be light, sound, or radio impulses can be utilized in two ways:

The length of the impulse can be a signal as for instance the prolonged or short blasts of a whistle or

STATE OF VIETNAM RECOGNIZED BY UNITED STATES

Since March 8, 1949, Vietnam has been recognized by many nations, including the United States of America, as a free State within the French Union. It has been noted that American vessels continue to fly the French national flag at the masthead while at anchor in Vietnamese ports. In view of the recognition extended by the United States to the State of Vietnam as a free and independent country, all United States of America merchant vessels should fly the Vietnamese flag while at anchor in the ports of that country.

The frequency of reoccurrence of a signal such as whistle blast. Lighthouse service often uses the frequency of reoccurrence of light or sound signals for distinction.

The international rules of the road prescribe that all ships when under way, in fog must give a blast by ship's whistle or siren, of 4 to 6 seconds duration at intervals not to exceed 2 minutes without any change of the rules of the road. Usefulness of a ship's whistle can be extended in a way that the frequency of reoccurrence of the prolonged blast will be set to go off automatically at time intervals corresponding to the course she is steering.

In international waters, length of the interval would be anywhere between 1 and 2 minutes, as the course also may be anywhere between 0° and 360° true. A very distinct double tone (low—high—low—high) whistle is used to indicate that the ship continuously broadcasts its course with each blast.

An ordinary stop watch with a compass card on its dial serves as a course receiver. This is done simply by starting the stop watch at the end of any blast and stopping at the end of the next blast. A direct reading gives the course of the ship you are observing without any plotting or calculation.

Before advent of the radar the method of course broadcastings by frequency of reoccurrence of the whistle blasts was given an elaborate test by the United States Coast Guard. "The Division Commander observed these tests from on board the *Chelan*, and is of the opinion that this system for broadcasting the course of a vessel in a fog has great merit, and would help materially to avoid collisions in a fog between vessels equipped with this device. It is recommended that Headquarters seriously consider equipping vessels of the Coast Guard with this device."

—H. D. HINCKLEY

It is a simple matter to connect the automatic whistle timer with radar and then by a simultaneous operation of both, the navigator would know from the double tone blast that the ship is broadcasting its course and radar is in use also would have at his disposal all three factors: The course, the distance, and the bearing. Then, and only then, all ships when in a fog would be "in sight of each other," and passing signals could be given according to the rules of the road, in order to avoid a collision.

LESSONS FROM CASUALTIES

AUTOMATIC PILOTS OR NOT—LOOKOUTS ARE A MUST!

LATE one evening, in midsummer, a small boat, equipped with an outboard motor, departed from the mainland and headed downstream, carrying 3 persons. A speed of approximately 10 statute miles per hour was being maintained. The course downstream was irregular at first, close to the bank, and then angling toward the ship channel. It was shortly after the motorboat was proceeding parallel to the ship channel, that the operator observed the starboard side light of a powerboat on his port bow only a short distance away. The powerboat was approaching rapidly. Immediately the operator of the motorboat altered his course to the right in a frantic attempt to avoid collision; however, the action was not taken soon enough. Without any change of course or speed the powerboat struck the outboard motorboat amidships; throwing its occupants in the water. Either at the time of the collision, or while maneuvering after the collision, two of the three occupants in the water were struck by the powerboat's propeller, rendering severe injuries and their subsequent deaths. Shortly thereafter the operator was rescued from the water by the crew of the powerboat, given first aid and attention and later placed ashore unharmed.

From the investigation that followed it was learned that prior to the collision the small outboard motorboat was equipped with a lighted all-round white light aft together with a combination red-green running light at the bow; that all efforts had been made to comply with the regulation governing the operation of motorboats. It was further learned from the investigation that the powerboat, some 40 feet in length, was being conned by an automatic pilot and proceeding at approximately 13 statute miles per hour. Although there were a number of other occupants aboard the powerboat, just prior to the casualty, no assistance was given the operator in the operation of the powerboat (moreover, no lookout was being maintained).

National Safety Council

From the number of casualties that have occurred there is a very strong indication that the pilots or navigators who have an automatic pilot at their disposal are inclined to allow themselves to become careless by overlooking the fact that the automatic pilot is only required to steer and not to perform the duties of a lookout.

A TIMELY WARNING

The Ninth Coast Guard District office calls attention to a recent incident which occurred aboard one of our Great Lakes cargo carriers where a man lost his life through disregard of simple safety rules.

A staging was rigged from a 5-foot section of 2- by 12-inch board with two 1- by 2-inch battens as crosspieces. The staging was lowered on two lengths of 2¾ inch manila line and a ladder was dropped over the bow with the lower end in the water. The purpose of the staging was to examine bolts in a fitting on the stem, used in the operation of towing.

In attempting to ascend the ladder, one man lost his footing and was drowned.

No life lines were used on the staging; the ladder was not stayed or braced; neither man wore a life preserver and no one was stationed on deck with a ring buoy. Safety committees should review this incident and insure proper precautions on their own vessels.

—Courtesy The Bulletin, Lake Carriers' Association

PAINTING HOT SURFACES

If the wiper were able to talk sensibly through the pain which racked his flaming body, a determination may have been made regarding the initial cause of the flames which shortly thereafter resulted in his death.

The proper sequence seems to be as follows: The wiper was beginning his third day at painting the starboard boiler. The preceding 2 days, he and another wiper had completed painting the back, side, and top of the D-type boiler with aluminum paint plainly marked "high heat-resistant." On the fateful day, our wiper started out by himself on the front, on a 6-foot ladder, painting in way of the superheater access doors. The first manifestation of disaster was in the form of a flaming paint brush, tossed by the wiper to the work bench below. The fireman-watertender on watch quickly extinguished this fire, looked up in time to see a bucket of burning paint splash about the boiler front, heard the wiper's cry as he descended the ladder, his clothing in flames. The clothes were stripped from the wiper by the fireman, chief engineer, and first assistant, a feat deserving of much praise, but unfortunately too late to prevent the fatal burns.

It is believed that the aluminum paint in the paint brush caught fire originally and the fire transferred to the paint in the bucket then to the wiper. The surface being painted may well be the hottest part of the boiler casing. Or perhaps the rag used to wipe down the boiler front before painting ignited, starting the chain. It is conceivable that the bucket of paint spilled around the superheater access door. But why should high heat-resistant aluminum paint catch fire in the first place? The heat-resisting quality of the paint is in evidence when it has been applied to a cold surface and allowed to set; only then may the heat be applied. A rag saturated with a sample of this paint was found to be highly inflammable.

The lesson to be learned might be "Never Paint a Boiler While It Is Hot," and similar casualties would be eliminated. But this rule is too all-encompassing and if followed, many boilers would go without their recommended maintenance. Rather, save the very hot surfaces until the boiler cools and beware of the limitations of "high heat-resistant" paint.

A beacon is an obsolete term, formerly referring to a shore aid to navigation. The term is still used by maritime interests outside the Coast Guard.

"ALL WORE LIFE PRESERVERS"

The following item appeared in the Boston Daily Globe on Friday, September 14, 1951:

Newburyport, September 13.—A Malden couple and their 4-year-old son were rescued by the Coast Guard today within 10 minutes after their motorboat swamped in heavy seas at the mouth of the Merrimac River.

Pulled from the water were Arthur Hanson, 50; his wife, Christine, 28, and their son, James, 4, of 21 Summer St. All wore life jackets and were in no immediate danger.

A lookout at the Coast Guard station on Plum Island saw the accident at 3:30 p. m. At 3:40, a 36-foot lifeboat was at the scene and had the Hansons aboard.

The Hanson craft, a 26-foot converted Navy whaleboat, capsized when it hit treacherous rip tide currents on the way into Newburyport Harbor.

In the boat that picked them up were Boatswain's Mate 1c Sylvester E. Andrews and Seamen 1c, James G. Martin and Eugene James.

A cursory reading of this article would indicate little other than an alert Coast Guard lookout observed the accident in time to effectuate a prompt rescue. However, one sentence stands out and should have been capitalized and printed in red letters

"ALL WORE LIFE PRESERVERS AND WERE IN NO IMMEDIATE DANGER"

What would have happened had these fortunate people not worn life preservers? In the rough waters of the bar at the entrance to the Merrimac River, the probability is that they would have all been drowned.

No discussion will be made of the dangers involved in trying to navigate a small boat in heavy seas, as the outstanding lesson in this case is the fact that all wore life preservers and all were saved.

It cannot be too strongly recommended that all occupants of small boats don life preservers when entering upon rough waters. Spray or water coming over the rails or violent rocking of the boat or other causes may cause the engine to stop and the boat to broach to and swamp or capsize. The records of the Coast Guard will show many instances where small motorboats, particularly outboards, have been found with no one aboard and often with the engine running, the inference being that the operator has fallen overboard and has been unable to swim to or to overtake his rapidly drifting vessel.

Everyone engaged in the operation of motorboats should take heed from this lesson and when moving about in small boats or when in rough water wear a life preserver or have immediately at hand a buoyant cushion or ring buoy.

HEROIC ACTION SAVES LIFE OF PAINTER

During the 65-year history of the yard numerous lives have been saved by the quick thinking of our employees. Another of these incidents occurred on July 24. On that date at about 7:45 a. m. Ezell Hanberry of the Painters' Department was touching up paintwork on the starboard side of the liberty ship, S. S. *Bowdoin*, which was secured to the south side of Pier 1. Hanberry was on the outside of the accommodation ladder which was in the stowed position. The storage area for the accommodation ladder on the *Bowdoin* is an indented area in the bulwark of the ship. It was necessary for Hanberry to get on the outside to reach between the ladder rungs to touch up the exposed area of the bulwark. While executing this operation he lost his footing, but in an effort to prevent a fall into the water he reached for a piece of chain. The chain, however, was a little slack and Hanberry, feeling it give and thinking it was not secure, released his hold on the chain and fell overboard into the water. The distance from his position on the ship to the water was about 25 feet.

F. H. Verell, a supervisor in the Yard Rigger's Department, saw the incident and immediately telephoned to the Rigger's Department to dispatch a launch to the scene. A rope was lowered to Hanberry, but apparently he was unable to do more than barely keep his head above the water. Verell then went over the side of the ship with other workmen lowering him on a rope to the water, but for some unknown reason the lowering stopped and Verell's weight carried him quickly down the rope inflicting severe burns on the palms and fingers of his hands. Shortly after he reached Hanberry the shipyard launch put in an appearance and pulled both men to safety. Both men were taken to the clinic but were uninjured except for the burns on Verell's hands. No time was lost by either of the men and both went back to work after their clothing was dried.

—Courtesy Shipyard Bulletin, July–August 1951

A ballast ball is an iron ball of various sizes used as a counterweight on standard-type unlighted buoys and some bell buoys. It is not necessary if the weight of mooring chain is sufficient to maintain the buoy upright.

APPENDIX

Amendments to Regulations

TITLE 33—NAVIGATION AND NAVIGABLE WATERS

Chapter I—Coast Guard, Department of the Treasury

[CGFR 51-42]

BASIS FOR REJECTION OR DENIAL OF SECURITY CLEARANCE

The purpose of the following amendments to 33 CFR 121.13 (d) and 125.29, regarding basis for rejection or denial of security clearance, and the new regulation, designated as 33 CFR 125.30, regarding basis for temporary withholding of a Coast Guard Port Security Card, is to revise and clarify the regulations so that they will be in agreement with Executive Order 10173, dated October 18, 1950 (15 F. R. 7005–7008, 3 CFR, 1950 Supp.), as amended by Executive Order 10277, dated August 1, 1951, and published in the Federal Register dated August 2, 1951 (16 F. R. 7537, 7538). Since the security interests of the United States call for the application of Executive Order 10173, as amended by Executive Order 10277, at the earliest practicable date and because of the national emergency declared by the President, it is found that compliance with the notice of proposed rule making, public rule making, procedure thereon, and effective date requirements of the Administrative Procedure Act is impracticable and contrary to the public interest.

By virtue of the authority vested in me as Commandant, United States Coast Guard, by Executive Order 10173 (15 F. R. 7005, 3 CFR, 1950 Supp.), as amended by Executive Order 10277 (16 F. R. 7537), the following amendments to the regulations are prescribed which shall become effective on and after date of publication of this document in the Federal Register:

Subchapter K—Security of Vessels

PART 121—SECURITY CHECK AND CLEARANCE OF MERCHANT MARINE PERSONNEL

Section 121.13 (d) is amended to read as follows:

§ 121.13 *Application for security clearance.* * * *

(d) *Basis for rejection.* The Commandant will deny a security clearance to any person, unless upon full consideration, he is satisfied that the applicant's character and habits of life are such as to authorize the belief that the presence of the person aboard vessels of the United States would not be inimical to the security of the United States; and in making the above determination the Commandant may consider whether on all the evidence and information available, reasonable grounds exist for the belief that the individual:

(1) Has committed acts of treason or sedition, or has engaged in acts of espionage or sabotage; has actively advocated or aided the commission of such acts by others; or has knowingly associated with persons committing such acts; or,

(2) Is employed by, or subject to the influence of, a foreign government under circumstances which may jeopardize the security interests of the United States; or,

(3) Has actively advocated or supported the overthrow of the government of the United States by the use of force or violence; or,

(4) Has intentionally disclosed military information classified confidential or higher without authority and with reasonable knowledge or belief that it may be transmitted to a foreign government, or has intentionally disclosed such information to persons not authorized to receive it; or,

(5) Is or recently has been a member of, or affiliated, or sympathetically associated with, any foreign or domestic organization, association, movement, group, or combination of persons (i) which is, or which has been designated by the Attorney General as being totalitarian, fascist, communist, or subversive, (ii) which has adopted, or which has been designated by the Attorney General as having adopted, a policy of advocating or approving the commission of acts of force or violence to deny other persons their rights under the Constitution of the United States, or (iii) which seeks, or which has been designated by the Attorney General as seeking, to alter the form of the Government of the United States by unconstitutional means: *Provided*, That access may be granted, notwithstanding such membership, affiliation, or association, if it is demonstrated, by more than a mere denial, that the security interests of the United States will not thereby be jeopardized.

Subchapter L—Security of Waterfront Facilities

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

1. Section 125.29 is amended to read as follows:

§ 125.29 *Basis for denial.* The Commandant will deny a Coast Guard Port Security Card to any person unless, upon full consideration, he is satisfied that the applicant's character and habits of life are such as to authorize the belief that the presence of the person on waterfront facilities and port and harbor areas, including vessels therein, would not be inimical to the security of the United States; and in making the above determination the Commandant may consider whether, on all the evidence and information available, reasonable grounds exist for the belief that the individual:

(a) Has committed acts of treason or sedition, or has engaged in acts of espionage or sabotage, has actively advocated or aided the commission of such acts by others; or has knowingly associated with persons committing such acts; or,

(b) Is employed by, or subject to the influence of, a foreign government under circumstances which may jeopardize the security interests of the United States; or,

(c) Has actively advocated or supported the overthrow of the government of the United States by the use of force or violence; or,

(d) Has intentionally disclosed military information classified confidential or higher without authority and with reasonable knowledge or belief that it may be transmitted to a foreign government, or has intentionally disclosed such information to persons not authorized to receive it; or,

(e) Is or recently has been a member of, or affiliated or sympathetically associated with, any foreign or domestic organization, association, movement, group, or combination of persons (1) which is or which has been designated by the Attorney General as being totalitarian, fascist, communist or subversive, (2) which has adopted, or which has been designated by the Attorney General as having adopted, a policy of advocating or approving the commission of acts of force or violence to deny other persons their rights under the Constitution of the United States, or (3) which seeks, or which has been designated by the Attorney General

as seeking, to alter the form of the Government of the United States by unconstitutional means: *Provided*, That access may be granted, notwithstanding such membership, affiliation, or association, if it is demonstrated, by more than a mere denial, that the security interests of the United States will not thereby be jeopardized; or,

(f) That such person is otherwise not a suitable and safe person to have access to such waterfront facilities and port and harbor areas, including vessels therein, by reason of:

(1) Having been adjudged insane, having been legally committed to an insane asylum, or treated for serious mental or neurological disorder, without evidence of cure;

(2) Having been convicted of any of the following felonies, indicative of a criminal tendency potentially dangerous to the security of such waterfront facilities and port and harbor areas, including vessels therein: arson, unlawful trafficking in drugs, espionage, sabotage, or treason.

(3) Drunkenness on the job or addiction to the use of narcotic drugs, without adequate evidence of rehabilitation.

(4) Illegal presence in the United States, its territories or possessions; having been found finally subject to deportation order by the United States Immigration and Naturalization Service.

2. Part 125 is amended by adding a new § 125.30 reading as follows:

§ 125.30 *Basis for temporary withholding.* The Commandant will withhold issuance of a Coast Guard Port Security Card to any person with respect to whom administrative or judicial proceedings are currently pending to determine the existence of factors stated in § 125.29 until such time as those proceedings are finally resolved.

(40 Stat. 220, as amended; 50 U. S. C. 191. E. O. 10173, Oct. 18, 1950, 15 F. R. 7005; 3 CFR, 1950 Supp.)

Dated: September 10, 1951.

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

[F. R. Doc. 51-11071; Filed, Sept. 13, 1951; 8:52 a. m., 16 F. R. 9312—9/14/51]

Report your wounds without delay: Save your skin and get your pay

Skin that's clean is rarely sick. A bath a day will do the trick

TITLE 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

Subchapter O—Regulations Applicable to Certain Vessels During Emergency

[CGFR 51-41]

PART 154—WAIVERS OF NAVIGATION AND VESSEL INSPECTION LAWS AND REGULATIONS [1]

NATIONALITY OF CREWS OF NON-SUBSIDIZED MERCHANT VESSELS

The purpose for the following amendment to 46 CFR 154.11 is to reinstate the general waiver order regarding nationality of crews of non-subsidized merchant vessels as it applies to able seamen, which expires September 1, 1951, and to extend its application to qualified members of the engine department. This waiver order modifies certain statutory requirements regarding nationality of crews as set forth in section 5 of the Act of June 25, 1936, as amended (46 U. S. C. 672a), to the extent that the percentage of citizens required in the crew of non-subsidized merchant vessels is reduced in the amount necessary to permit one-half the number of able seamen and one-half the number of qualified members of the engine department required on such vessels to be alien seamen who hold currently valid United States certification as able seamen and qualified members of the engine department. This waiver is also published in 33 CFR 19.11 and the change made in 46 CFR 154.11 shall likewise be made in 33 CFR 19.11. Because of the urgency of providing general waiver authority in the interest of national defense, it is hereby found that compliance with the notice of proposed rule making, public rule making procedure thereon, and effective date requirements of the Administrative Procedure Act is impracticable and contrary to the public interest.

LEGS—NOT BACK!

By virtue of the authority vested in me as Commandant, United States Coast Guard, by an order of the Acting Secretary of the Treasury, dated January 23, 1951, identified as CGFR 51-1, and published in the Federal Register dated January 26, 1951 (16 F. R. 731), the following waiver order is promulgated and § 154.11 is amended to read as follows, which shall become effective on and after September 1, 1951:

§ 154.11 *Nationality of crews of non-subsidized merchant vessels*—(a) *Waiver.* I hereby waive compliance with the provisions of section 5 of the act of June 25, 1936, as amended (sec. 5, 49 Stat. 1935, as amended; 46 U. S. C. 672a) to the extent that the percentage of citizens required in the crew of non-subsidized merchant vessels is reduced in the amount necessary to permit one-half the number of able seamen and one-half the number of qualified members of the engine department required on such vessels to be alien seamen who hold currently valid United States certification as able seamen and qualified members of the engine department. I hereby find that the waiving of the provisions of section 5 of the act of June 25, 1936, as amended (sec. 5, 49 Stat. 1935, as amended; 46 U. S. C. 672a) is necessary in the interest of national defense.

(b) *Terms and conditions.* The number of properly certificated able seamen and qualified members of the engine department, respectively, who are aliens and who are employed under this waiver shall not exceed one-half the total number of able seamen and one-half the total number of qualified members of the engine department required on a non-subsidized vessel. The employment of properly certificated able seamen and qualified members of the engine department shall be permitted only to the extent of the nonavailability of properly certificated able seamen and qualified members of the engine department who are citizens of the United States as determined after reasonable efforts made by the master, owner, and others concerned to obtain properly certificated able seamen and qualified members of the engine department. The alien able seamen and qualified members of the engine department shall be able to speak and understand the English language to the extent required by their shipboard duties including emergency duties.

(c) *Penalties.* The failure of the master of any vessel sailing with a deficiency in the required complement

[1] This is also codified in 33 CFR Part 19.

of able seamen and qualified members of the engine department to comply with the conditions required by this waiver shall be considered misconduct within the meaning of R. S. 4450, as amended (46 U. S. C. 239), and shall constitute grounds for suspension or revocation of the license of such master; and shall subject him and the owners to all other penalties provided by law. No penalty shall be imposed as a consequence of any waiver made effective pursuant hereto.

Effective date. This order shall be in effect on and after September 1, 1951.

Termination date. The terms of this waiver shall be in effect indefinitely.

(Pub. Law 891, 81st Cong.)

Dated: August 31, 1951.

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

[F. R. Doc. 51-10777; Filed, Sept. 6, 1951; 8:55 a. m., 16 F. R. 9093—9/7/51]

Equipment Approved by the Commandant

DEPARTMENT OF THE TREASURY

NOTICES

United States Coast Guard

[CGFR 51-36]

APPROVAL OF EQUIPMENT

By virtue of the authority vested in me as Commandant, United States Coast Guard, by Treasury Department Order No. 120, dated July 31, 1950 (15 F. R. 6521), and in compliance with the authorities cited below, the following approvals of equipment are prescribed and shall be effective for a period of five years from date of publication in the Federal Register unless sooner canceled or suspended by proper authority:

LIFE PRESERVERS, KAPOK, ADULT AND CHILD (JACKET TYPE)

Approval No. 160.002/38/0, Model 2 adult kapok life preserver, U. S. C. G. Specification Subpart 160.002, manufacturtured by The Safegard Corp., Box 66, Station B, Cincinnati, Ohio.

Approval No. 160.002/39/0, Model 6 child kapok life preserver, U. S. C. G. Specification 160.002, manufactured by The Safegard Corp., Box 66, Station B, Cincinnati, Ohio.

(R. S. 4405, 4417a, 4426, 4488, 4491, 4492, 35 Stat. 428, 49 Stat. 1544, 54 Stat. 164, 166, 346, and sec. 5 (e), 55 Stat. 244, as amended; 46 U. S. C. 367, 375, 391a, 396, 404, 481, 489, 490, 526e, 526p, 1333, 50 U. S. C. 1275; 46 CFR 160.002)

BUOYS, LIFE, RING, CORK OR BALSA WOOD

Approval No. 160.009/37/0, 30-inch balsa wood ring life buoy, Dwg. No. 5-10-51, manufactured by Atlantic-Pacific Manufacturing Corp., 124 Atlantic Avenue, Brooklyn 2, N. Y.

(R. S. 4405, 4417a, 4426, 4482, 4488, 4491, sec. 11, 35 Stat. 428, 49 Stat. 1544, 54 Stat. 164, 166, 346, and sec. 5 (e), 55 Stat. 244, as amended; 46 U. S. C. 367, 375, 391a, 396, 404, 475, 481, 489, 526e, 526p, 1333, 50 U. S. C. 1275; 46 CFR 25.4-1, 33.01-5, 59.56, 60.49, 76.53, 94.53, 113.46, 160.009)

CONTAINERS, EMERGENCY PROVISIONS AND WATER

Approval No. 160.026/12/2, container for emergency provisions, Dwg. No. 203-P, dated July 3, 1951, and Specification 203-S-1, dated July 5, 1951, manufactured by Globe Equipment Corp., 30-32 Gold Street, Brooklyn 1, N. Y. (Supersedes Approval No. 160.026/12/1, published in the Federal Register of June 1, 1951.)

(R. S. 4405, 4417a, 4426, 49 Stat. 1544, 54 Stat. 346, and sec. 5 (e), 55 Stat. 244, as amended; 46 U. S. C. 367, 375, 391a, 404, 489, 1333, 50 U. S. C. 1275; 46 CFR 33.15-1, 59.11)

LIFEBOATS

Approval No. 160.035/89/1, 16.0' x 5.7' x 2.3' steel oar-propelled lifeboat, 12-person capacity, identified by general arrangement and construction Dwg. No. 49R-1612, dated August 27, 1950, and revised November 8, 1950, manufactured by Lane Lifeboat and Davit Corp., 8920 Twenty-sixth Avenue, Brooklyn 14, N. Y. (Supersedes Approval No. 160.035/89/0, published in the Federal Register dated July 31, 1947.)

Approval No. 160.035/174/1, 22' x 7.5' x 3.17' steel, motor-propelled lifeboat without radio cabin, 28-person capacity, identified by construction and arrangement Dwg. No. 22-2B, dated September 18, 1947, and revised May 18, 1951, manufactured by Marine Safety Equipment Corp., Point Pleasant, N. J. (Supersedes Approval No. 160.035/174/0, published in the Federal Register December 2, 1948.)

Approval No. 160.035/204/1, 20.0' x 6.0' x 2.5' steel, oar-propelled lifeboat, 18-person capacity, identified by construction and arrangement Dwg. No. 20-I, dated October 29, 1947, and revised June 4, 1951, manufactured by Marine Safety Equipment Corp., Point Pleasant, N. J. (Supersedes Approval No. 160.035/204/0, published in the Federal Register April 1, 1948.)

(R. S. 4405, 4417a, 4426, 4481, 4488, 4491, 4492, 35 Stat. 428, 49 Stat. 1544, 54 Stat. 346, and sec. 5 (e), 55 Stat. 244, as amended; 46 U. S. C. 367, 375, 391a, 396, 404, 474, 481, 489, 490, 1333, 50 U. S. C. 1275; 46 CFR 33.01-5, 59.13, 76.16, 94.15, 113.10, 160.035)

BOILERS, HEATING

Approval No. 162.003/116/0, Model M-500 heating boiler for steam or hot water service, all welded plate construction, Dwg. No. DAB-24912, dated June 20, 1951, and revised July 11, 1951, approved for a maximum design pressure of 30 p. s. i., 184,000-B. t. u. per hour or 184 pounds per hour. Approval limited to bare boiler. Manufactured by York-Shipley, Inc., York, Pa.

(R. S. 4405, 4417a, 4418, 4426, 4433, 4434, 4491, 49 Stat. 1544, 54 Stat. 346, and sec. 5 (e), 55 Stat. 244, as amended; 46 U. S. C. 367, 375, 391a, 392, 404, 411, 412, 489, 1333, 50 U. S. C. 1275; 46 CFR Part 52)

FIRE EXTINGUISHERS, PORTABLE, HAND, CARBON-DIOXIDE TYPE

Approval No. 162.005/18/1, Model 5AKS Swivel Type CD General Quick Aid Sno Fog Fire Guard 5-pound carbon-dioxide type hand portable fire extinguisher, Assembly Dgw. No. AC-205-X dated July 22, 1947, no revision, Nameplate Dwg. No. BC-205-2, dated February 4, 1947, Rev. October 22, 1948, manufactured by The General Detroit Corp., 2272 East Jefferson Avenue, Detroit 7, Mich. (Supersedes Approval No. 160.005/18/0, published in the Federal Register February 12, 1948).

Approval No. 162.005/21/0, Model 5AKS Swivel Type CD General Quick Aid Sno Fog Fire Guard 5-pound carbon-dioxide type hand portable fire extinguisher, Assembly Dwg. No. BC-205-X, dated July 22, 1947, no revision, Nameplate Dwg. No. BC-205-2 dated February 4, 1947, Rev. October 22, 1948, manufactured by The General Pacific Corp., 1501 East Washington Boulevard, Los Angeles 21, Calif.

Approval No. 162.005/22/0, Model 10AK Lever Type CD General Quick Aid Sno Fog Fire Guard 10-pound carbon dioxide type hand portable fire extinguisher, Assembly Dwg. No. BC-210-X, dated September 4, 1946, Rev. A dated September 6, 1946, Nameplate Dwg. No. CC-210-1G, dated March 6, 1950, Rev. 2 dated March 16, 1950, manufactured by The General Pacific Corp., 1501 East Washington Boulevard, Los Angeles 21, Calif.

Approval No. 162.005/23/0, Model 15AK Lever Type CD General Quick Aid Sno Fog Fire Guard 15-pound carbon dioxide type hand portable fire extinguisher, Assembly Dwg. No. BC-215-X, dated August 4, 1944, no revision, Nameplate Dwg. No. CC-215-1G, dated March 6, 1950, Rev. 2 dated March 16, 1950, manufactured by The General Pacific Corp., 1501 East Washington Boulevard, Los Angeles 21, Calif.

FIRE EXTINGUISHERS, PORTABLE, HAND, DRY CHEMICAL TYPE

Approval No. 162.010/1/1, Ansul 20–B dry chemical carbon-dioxide cartridge type hand portable fire extinguisher, Assembly Dwg. No. DV–1270, dated September 21, 1949, no revision, Nameplate Dwg. No. DV–1266 dated September 19, 1949, Rev. 1 dated December 12, 1949, manufactured by Ansul Chemical Company, Marinette, Wis. (Supersedes Approval No. 162.-010/1/0, published in the Federal Register February 12, 1948.)

(R. S. 4405, 4417a, 4426, 4479, 4491, 4492, 49 Stat. 1544, 54 Stat. 165, 166, 346, 1028, and sec. 5 (e), 55 Stat. 244, as amended; 46 U. S. C. 367, 375, 391a, 404, 463a, 472, 489, 490, 526g, 526p, 1333, 50 U. S. C. 1275, 46 CFR 25.5–1, 26.3–1, 27.3–1, 28.3–5, 34.25–1, 61.13, 77.13, 95.13, 114.15)

VALVES, PRESSURE-VACUUM RELIEF AND SPILL

Approval No. 162.017/63/0, Morrison Fig. 153B pressure-vacuum relief valve, atmospheric pattern, weight-loaded pressure and vacuum poppets, all brass construction, Dwg. No. B4584, dated February 27, 1951, and revised March 12, 1951, and Dwg. No. B4585 dated March 6, 1951. Approved for size 2½". Manufactured by Morrison Bros. Co., Dubuque, Iowa.

(R. S. 4405, 4417a, 4491, and sec. 5 (e), 55 Stat. 244, as amended; 46 U. S. C. 375, 391a, 489, 50 U. S. C. 1275; 46 CFR 162.017)

INCOMBUSTIBLE MATERIALS

Approval No. 164.009/10/1, "Fiberglas Insulation Type TW–MC," glass wool insulation type Incombustible Material identical to that described in National Bureau of Standards Test Report No. TG3610–1493, FP 2569, dated November 10, 1947, and modified by Owens-Corning Fiberglas Corporation letter, dated July 11, 1951, approved in a 3-pounds-per-cubic-foot density. (Supersedes Approval No. 164.009/10/0, published in the Federal Register February 12, 1948.)

(R. S. 4405, 4417a, 4426, 49 Stat. 1384, 1544, 54 Stat. 1028, sec. 5 (e), 55 Stat. 244, as amended; 46 U. S. C. 367, 369, 375, 391a, 404, 463a, 50 U. S. C. 1275; 46 CFR 164.009)

FIRE INDICATING AND ALARM SYSTEMS

Smoke Detecting System, Audible, Type R, combined with carbon-dioxide fire extinguishing systems; 110 and 220 volts direct current; 24, 32, and 40 line cabinets maximum; Drawing No. 157066 Rev. B dated February 13, 1951, and conversion of existing Combined Rich and Richaudio Smoke Detecting and carbon-dioxide extinguishing systems to Type R system, manufactured by Walter Kidde & Co., Inc., 675 Main Street, Belleville 9, N. J. (Supersedes approval of Combined Rich and Richaudio System published in 1934.)

Smoke Detecting System, Audible, Type R; 110 and 220 volts direct current; 24, 32, and 40 line cabinets maximum; Drawing No. 157066 Rev. B dated February 13, 1951, and conversion of existing Richaudio Smoke Detecting Systems to Type R System, manufactured by Walter Kidde & Co., Inc., 675 Main Street, Belleville 9, N. J. (Supersedes approval of Richaudio System published in 1934.)

(R. S. 4405, 4471, 4491, 50 Stat. 1544, sec. 2, 54 Stat. 1028, and sec. 5 (e), 55 Stat. 244, as amended; 46 U. S. C. 367, 375, 463, 463a, 489, 50 U. S. C. 1275; 46 CFR 61.16, 61.17, 77.16, 77.17, 95.15, 95.16, 114.16, 114.17)

Dated: August 20, 1951.

[SEAL] MERLIN O'NEILL,
Vice Admiral, U. S. Coast Guard,
Commandant.

[F. R. Doc. 51–10188; Filed, Aug. 23, 1951; 8:50 a. m., 16 F. R. 8553—8/24/51]

[CGFR 51–38]

TERMINATION OF APPROVAL OF EQUIPMENT

By virtue of the authority vested in me as Commandant, United States Coast Guard, by Treasury Department Order No. 120, dated July 31, 1950 (15 F. R. 6521), and in compliance with the authorities cited below, the following approvals of equipment are terminated because the items of equipment covered are no longer being manufactured or are being replaced by new designs:

FIRE EXTINGUISHERS, PORTABLE, HAND, DRY CHEMICAL TYPE

Termination of Approval No. 162.-010/2/0, Ansul 30, dry chemical carbon-dioxide cartridge type fire extinguisher, Assembly Dwg. No. DV–663 dated September 12, 1946, Rev. 3 dated December 3, 1946, Nameplate Dwg. No. DV–570 dated June 6, 1946, Rev. 2 dated July 5, 1946, manufactured by Ansul Chemical Co., Marinette, Wis. (Approved in Federal Register dated Feb. 12, 1948.)

(R. S. 4405, 4417a, 4426, 4479, 4491, 4492, 49 Stat. 1544, 54 Stat. 165, 166, 346, 1028, and sec. 5 (e), 55 Stat. 244, as amended; 46 U. S. C. 367, 375, 391a, 404, 463a, 472, 489, 490, 526g, 526p, 1333, 50 U. S. C. 1275, 46 CFR 25.5–1, 26.3–1, 27.3–1, 28.3–5, 34.25–1, 61.13, 77.13, 95.13, 114.15)

VALVES, PRESSURE VACUUM RELIEF

Termination of Approval No. 162.-017/16/0, Morrison Fig. 148 pressure vacuum relief valve, weight loaded, atmospheric pattern, cast iron body, brass poppets, outlets fitted with monel flame screen, Dwg. No. M–2500, dated September 25, 1941, approved for 3" vent, for use with inflammable or combustible liquids of Grade B or lower in direct atmospheric venting system, manufactured by Morrison Bros. Co., Dubuque, Iowa. (Approved in Federal Register of July 31, 1947.)

Termination of Approval No. 162.-017/17/0, Morrison Fig. 149 pressure vacuum relief valve, weight loaded, atmospheric pattern, brass body, durable composition discs, pressure vent, Dwg. No. B–1231 dated December 18, 1936, approved for 3" diameter vents, for use with inflammable or combustible liquids of Grade B or lower in direct atmospheric venting system, manufactured by Morrison Bros. Co., Dubuque, Iowa. (Approved in Federal Register of July 31, 1947.)

Termination of Approval No. 162.-017/18/0, Morrison Fig. 153–A pressure vacuum relief valve, atmospheric pattern, outlet fitted with monel flame screen, weight or spring loaded pressure poppet, cast iron body, brass poppets, Dwg. No. M–2498, dated September 23, 1941, approved for sizes 3", 4", and 6" for use with combustible or inflammable liquids of Grade A or lower, manufactured by Morrison Bros. Co., Dubuque, Iowa. (Approved in Federal Register of July 31, 1947.)

(R. S. 4405, 4417a, 4491, and sec. 5 (e), 55 Stat. 244, as amended; 46 U. S. C. 375, 391a, 489, 50 U. S. C. 1275; 46 CFR 162.017)

CONDITIONS OF TERMINATION OF APPROVALS

The termination of approvals of equipment made by this document shall be made effective upon the thirty-first day after the date of publication of this document in the Federal Register. Notwithstanding this termination of approval on any item of equipment, such equipment manufactured before the effective date of termination of approval may be used on merchant vessels so long as it is in good and serviceable condition.

Dated: August 20, 1951.

[SEAL] MERLIN O'NEILL,
Vice Admiral, U. S. Coast Guard,
Commandant.

[F. R. Doc. 51–10189; Filed, Aug. 23, 1951; 8:50 a. m., 16 F. R. 8553—8/24/51.]

Equipment Accepted by the Commandant

FUSIBLE PLUGS

The Marine Engineering Regulations and Material Specifications require that manufacturers submit samples from each heat of fusible plugs to the Commandant for test prior to plugs manufactured from the heat being used on vessels subject to inspection by the Coast Guard. A list of approved heats which have been tested and found acceptable during the period from August 15 to September 15, 1951, is a follows:

The Lunkenheimer Co., P. O. Box 360, Annex Station, Cincinnati 14, Ohio. Heat Nos. 394, 395, 397, 398, and 399.

CERTIFICATION OF ARTICLES OF SHIPS' STORES AND SUPPLIES

Articles of Ships' Stores and Supplies certificated from August 26 to September 25, 1951, 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:

Turco Products, Inc., Terminal Annex 2649, Los Angeles 54, Calif., Certificate No. 336, dated September 4, 1951, "Turco 2851."

WELDING ELECTRODES

Distributor or manufacturer	AWS symbol	Operating positions and electrode sizes, (inch)									Current limitation
		3/16	5/64	3/32	1/8	5/32	3/16	7/32	1/4	5/16	
Hollup Corp. Sureweld UE	E6013				1	1	1	2	2	3	AC-DC
Hollup Corp. Sureweld FD	E6020						2	2	2	3	AC-DC
Hollup Corp. Sureweld G	E6012			1	1	1	1	2	2	3	AC-DC
Hollup Corp. Sureweld 7016	E6016			1	1	1	2	2	2	3	AC-DC
Hollup Corp. Sureweld MLY 50 (.50 Mo.)	E7010				1	1	1		2		DC
A. O. Smith Corp. SW 76	E7020			2				2			

MERCHANT MARINE PERSONNEL STATISTICS

INVESTIGATING UNITS

	1951			
	April	May	June	July
Total cases investigated	563	700	589	649
Hearings before examiners (officers)	13	15	14	19
LICENSES:				
Revoked	1	1	1	0
Suspended	3	3	4	6
Suspended with probation	6	5	7	7
Voluntarily surrendered	0	1	2	0
Hearings dismissed	1	6	3	2
Admonitions after hearing	2	0	0	2
Hearings before examiners (unlicensed personnel)	58	67	51	71
CERTIFICATES:				
Revoked	9	9	8	14
Suspended	14	31	21	14
Suspended with probation	19	16	15	27
Voluntarily surrendered	8	10	8	7
Hearings dismissed	3	3	2	4
Admonitions after hearing	4	2	9	7

CLEANLINESS

Cleanliness aboard a ship is important. Mighty important. And it plays a bigger role than you might think in reducing accidents on shipboard.

Roughly 35 percent of all shipboard accidents are caused by falls of one type or another. Tripping over loose gear, slipping on wet or greasy surfaces, stumbling on out-of-place equipment and falling through or off of shaky makeshift platforms are heavy contributors.

The "Accident looking for a place to happen" has a tough time on a clean ship. No loose gear, rope, or wires on the decks or ladders to trip over; no oil, grease, or water to slip on; no equipment where it should not be to stumble on and no shaky boxes or benches to stand on and fall off of.

Do not neglect this fact, either. Neat and orderly storerooms and the lack of piles of rubble about the decks greatly reduces the fire hazard as well.

Remember your gangway, too. It should be kept clean and have two sets of clean and taut man ropes. That pays big dividends.

Cleanliness is only good seamanship, and it not only helps safety but shows the visitor what kind of a seaman you are. Keep your ship shipshape.

(Farrell Lines Safety News, September 1951)

DANGER

NO JOB IS SO IMPORTANT
NO WORK IS SO URGENT
THAT WE CAN NOT TAKE TIME
TO PERFORM OUR WORK SAFELY

ORIGINAL SEAMEN'S DOCUMENTS ISSUED MONTH OF MAY 1951

Region	(1) Staff officer	(2) Continuous discharge book	(3) U. S. merchant mariner's documents	(4) AB any waters unlimited	(5) AB any waters 12 months	(6) AB Great Lakes 18 months	(7) AB tugs and towboats any waters	(8) AB bays and sounds [1]	(9) AB seagoing barges	(10) Lifeboatman	(11) Q. M. E. D.	(12) Radio operators	(13) Certificate of service	(14) Tankerman
Atlantic coast	28		652	141	34	3		1		87	63	9	637	6
Gulf coast	5	22	432	59	25	2				49	34	1	427	21
Pacific coast	14		551	63	57	1				91	41	8	508	3
Great Lakes and rivers	1		881	35	83	51			1	102	61		791	16
Total	48	22	2,516	298	199	57		1	1	329	199	18	2,363	46

[1] 12 months, vessels 500 gross tons or under not carrying passengers.

NOTE.—Columns 4 through 14 indicate endorsements made on U. S. merchant mariner's documents.

ORIGINAL SEAMEN'S DOCUMENTS ISSUED MONTH OF JUNE 1951

Region	(1) Staff officer	(2) Continuous discharge book	(3) U. S. merchant mariner's documents	(4) AB any waters unlimited	(5) AB any waters 12 months	(6) AB Great Lakes 18 months	(7) AB tugs and towboats any waters	(8) AB bays and sounds [1]	(9) AB seagoing barges	(10) Lifeboatman	(11) Q. M. E. D.	(12) Radio operators	(13) Certificate of service	(14) Tankerman
Atlantic coast	32		1,076	167	48	8			1	152	150	13	922	10
Gulf coast	12	20	498	53	23	3		7		45	46	1	482	21
Pacific coast	17	3	530	61	40	1				84	50	7	488	6
Great Lakes and rivers	5		764	31	69	28		1		82	84	4	691	29
Total	66	23	2,868	312	180	40		8	1	363	330	25	2,583	66

[1] 12 months, vessels 500 gross tons or under not carrying passengers.

NOTE.—Columns 4 through 14 indicate endorsements made on U. S. merchant mariner's documents.

ORIGINAL SEAMEN'S DOCUMENTS ISSUED MONTH OF JULY 1951

Region	(1) Staff officer	(2) Continuous discharge book	(3) U. S. merchant mariner's documents	(4) AB any waters unlimited	(5) AB any waters 12 months	(6) AB Great Lakes 18 months	(7) AB tugs and towboats any waters	(8) AB bays and sounds [1]	(9) AB seagoing barges	(10) Life boat man	(11) Q. M. E. D.	(12) Radio operators	(13) Certificate of service	(14) Tankerman
Atlantic coast	40		1,518	164	45	8		2		119	167	3	1,386	8
Gulf coast	8	14	547	58	28	1				45	53		524	17
Pacific coast	24		987	79	61	1	1			109	73	9	909	5
Great Lakes and rivers			775	29	57	27				67	71	1	714	13
Total	72	14	3,827	330	191	37	1	2		340	364	13	3,533	43

[1] 12 months, vessels 500 gross tons or under not carrying passengers.

NOTE.—Columns 4 through 14 indicate endorsements made on U. S. merchant mariner's documents.

WAIVER OF MANNING REQUIREMENTS FROM MAY 1 TO MAY 31, 1951

Region	Number of vessels	Deck officers substituted for higher ratings	Engineer officers substituted for higher ratings	Ordinary seamen substituted for able seamen	Wipers or coal passers substituted for qualified members of engine department	Total
Atlantic coast	16		1	12	4	17
Gulf coast	9			9	3	12
Pacific coast	23	2	4	3	21	30
Great Lakes	33	1	2	26	11	40
Total	81	3	7	50	39	99

NOTE.—In addition, individual waivers were granted to permit the employment of 120 able seamen holding certificates for "any water—12 months" in excess of the 25 percent authorized by statute.

WAIVER OF MANNING REQUIREMENTS FROM JUNE 1 TO JUNE 30, 1951

Region	Number of vessels	Deck officers substituted for higher ratings	Engineer officers substituted for higher ratings	Ordinary seamen substituted for able seamen	Wipers or coal passers substituted for qualified members of engine department	Total
Atlantic coast	33			33	9	42
Gulf coast	31			25	3	28
Pacific coast	30		1	4	44	49
Great Lakes	12			10	12	22
Total	106		1	72	68	141

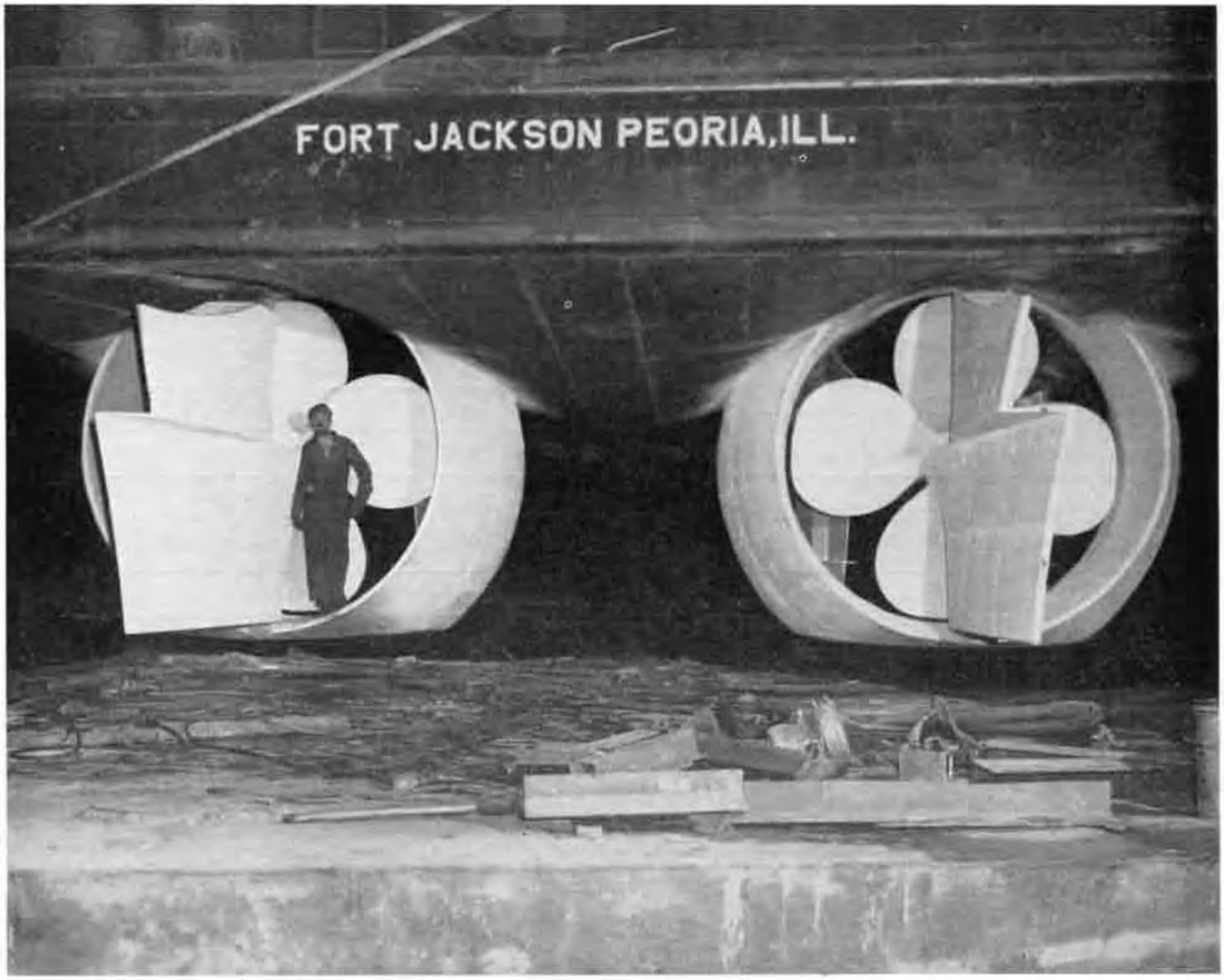
NOTE.—In addition, individual waivers were granted to permit the employment of 55 able seamen holding certificates for "any water—12 months" in excess of the 25 percent authorized by statute.

MARINE DECK OFFICER LICENSES ISSUED

	April 1951		May 1951		June 1951		July 1951	
	Original	Renewal	Original	Renewal	Original	Renewal	Original	Renewal
Master:								
Ocean	14	204	33	215	29	149	29	165
Coastwise	2	19		23		7	1	10
Great lakes	2	29		9		2		11
B. S. & L.	11	63	3	69	5	40	11	56
Rivers	1	20	8	32	3	13	5	34
Chief mate:								
Ocean	34	75	31	72	9	47	38	56
Coastwise								
Mate:								
Great lakes								
B. S. & L.	2	5	13	14	3	9	3	4
Rivers	11	11	7	4	4	19	7	16
Second mate:								
Ocean	26	75	27	71	33	49	22	61
Coastwise	2			1		1		
Third mate:								
Ocean	42	70	49	59	117	50	47	45
Coastwise								
Pilots:								
Great lakes	4	17	1	9		4	1	9
B. S. & L.	89	218	96	218	68	127	82	162
Rivers	60	38	40	47	35	28	37	47
Master:								
Uninspected vessels	6	11	6	8	2	10	2	6
Mate:								
Uninspected vessels	2		4	1			2	
Total	308	855	318	852	308	555	287	682
Grand total	1,163		1,170		863		969	
Total radio officer licenses issued	33		50		28		64	

MARINE ENGINEER OFFICER LICENSES ISSUED

	April 1951		May 1951		June 1951		July 1951	
	Original	Renewal	Original	Renewal	Original	Renewal	Original	Renewal
STEAM								
Chief engineer:								
Unlimited	19	240	30	212	20	110	22	236
Limited	8	126	5	89	2	52	12	82
First assistant engineer:								
Unlimited	37	84	33	91	20	39	35	82
Limited	6	13	4	18	1	5	4	11
Second assistant engineer:								
Unlimited	28	117	31	95	19	65	26	90
Limited	1	5	1	6	1	2	2	2
Third assistant engineer:								
Unlimited	36	173	61	140	64	79	73	78
Limited				1				1
MOTOR								
Chief engineer:								
Unlimited	6	56	4	54	3	32	4	73
Limited	21	77	18	72	11	38	16	57
First assistant engineer:								
Unlimited	1	7	4	12	1	3	2	12
Limited	6	2	12	8	6	4	4	3
Second assistant engineer:								
Unlimited		7	1	8	2	4	2	12
Limited	3							
Third assistant engineer:								
Unlimited	6	140	34	104	46	57	32	67
Limited			1				1	
Chief engineer:								
Uninspected vessels	2	4	4	5	2	6	4	4
Assistant engineer:								
Uninspected vessels	6	2	2		1		1	1
Total	186	1,053	245	915	199	496	240	811
Grand total	1,239		1,160		695		1,051	



The Fort Jackson of Peoria, Illinois, is shown after installation of twin Kort Nozzles and Contra-Guide Rudders. This propelling mechanism is being used on many river towboats. Its size is illustrated by the man standing in the port tube.

Courtesy Waterways Magazine, Pittsburgh, Pennsylvania.

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