

MSTSPACINST P4700.3B CH-8
2 October 1964

APPENDIX B

MONTHLY PREVENTIVE MAINTENANCE SCHEDULE
AND ELECTRICAL CHECK-OFF LISTS

The formats shown in this appendix are primarily guides and must be revised for each type ship and particular design of equipment, ship schedule and operating condition.

The department head will use the sample lists as guides in implementing a preventive maintenance program schedule to be accomplished by ship's force. Such a program is necessary and it's effectiveness will be reflected in operating costs.

MONTHLY MAINTENANCE SCHEDULE: JANUARY THRU MAY

JANUARY

Nos. 1 & 2 Main Condensers
 No. 1 Fire & Sanitary Pump
 No. 2 Aux. Circ. Pump
 Nos. 1 & 2 Bilge & Ballast Pumps
 No. 2 Comb. Control Compressor
 Nos. 1 & 3 Main Feed Pumps
 No. 2 L.O. Purifier
 No. 1 L.P. Evap. Tube Nest Drain Pump
 No. 3 Aux. Cond. Pump
 No. 1 Atmos. Drain Pump
 Nos. 1 & 3 F.O. Service Pumps
 Nos. 1 & 3 L.O. Service Pumps
 No. 1 Reefer Compressor
 Nos. 1-2-3 & 4 Boiler Water & F'sides
 Nos. 1 & 2 E.R., 1 $\frac{1}{4}$ " 150# Rod. Statn
 Nos. 2 & 4 Forced Draft Blwrs (Fans & Motors)
 Crew Dishwashing Machine
 Pneumatic Bilge Suction Valves (Fwd Fr. 98)

FEBRUARY

Nos. 1 & 2 Main Lube Oil Coolers
 No. 1 Aux. Gen. Air & L.O. Coolers
 No. 3 Aux. Circ. Pump
 Submersible Bilge Pump
 No. 1 Priming Pump
 Port Steering Gear
 No. 2 L.P. Evap. Tube Nest Drain Pump
 No. 4 Aux. Cond. Pump
 No. 2 Atmos. Drain Pump
 No. 1 Main Cond. Pump
 No. 2 Reefer Comp.
 No. 1 Main Feed Pump Turbine
 Nos. 1 & 2 E.R., 10# Stations
 Nos. 1 & 3 E.R., 2", 150# Red. Statn

MARCH

Nos. 1 & 2 Mn Mtr Air Coolers
 No. 2 Aux. Gen. Air & L.O. Coolers
 No. 4 Aux. Circ. Pump
 No. 1 Bilge Pump
 No. 2 Priming Pump
 No. 1 Main Circ. Pump
 No. 2 F.O. Transfer Pump
 Nos. 1 & 2 Diesel Oil Trsf Pumps
 No. 3 Reefer Compressor
 Nos. 1 & 2 Main Thrust Bearings, Sumps & Coolers
 Aux. Diesel Generator
 No. 1 Laundry Press
 Nos. 1 & 2 Main Engine Thrust
 Nos. 1 & 2 Boat Winches

APRIL

Nos. 2 & 4 Aux. Condensers
 No. 3 Aux. Gen. Air & L.O. Coolers
 No. 2 Fire & Sanitary Pump
 No. 1 L.P. Evap. Circ Pump
 No. 1 Brine Pump
 No. 3 Priming Pump
 No. 2 Main Circ. Pump
 No. 2 Mn Mtr Cooling Water Pump
 No. 1 L.P. Evap. Cond. Pump
 No. 3 F.W. Pump
 No. 2 Evap. F.W. Dist. Pump
 Main L.O. Coolers
 No. 4 Reefer Compressor
 No. 3 Main Feed Pump Turbine
 Air Eject. Reducing Stations
 No. 2 Laundry Press
 Nos. 1 & 3 Aux. Gen. Thrust & Brgs
 Nos. 3 & 4 Boat Winches
 P & S Shaft Alley Pneumatic Valves

MAY

Nos. 1 & 3 Aux. Condensers
 No. 4 Aux. Gen. Air & L.O. Coolers
 No. 3 Fire & Sanitary Pump
 No. 2 L.P. Evap. Circ. Pump
 No. 2 Brine Pump
 No. 1 Main Motor Cooling Water Pump
 Ballast Stripping Pump
 No. 2 L.P. Evap. Cond. Pump
 No. 1 Ice Water Circ. Pump
 1st Stage Air Eject Nozzles & Valves
 Nos. 1 & 3 Boiler Air Heaters & Econ.
 Line Bearings & Sumps
 No. 5 Reefer Compressor
 No. 1 Laundry Extractor
 Nos. 1 & 2 E.R., 85# Stations
 Nos. 2 & 4 Aux. Gen. Thrust & Bearings
 Nos. 5 & 6 Boat Winches
 Nos. 1 & 2 Cargo Winches
 Butcher Shop Drain Pump & Sump Tanks
 No. 5 Hold Pneumatic Valves

MONTHLY MAINTENANCE SCHEDULE: JUNE THRU NOVEMBER

JUNE

Nos. 1 & 2 Main Gen. Air Coolers
 No. 4 Fire & Sanitary Pump
 No. 1 Aux. Circ. Pump
 Reefer Circ. Pump
 No. 2 L.P. Evap. Feed Pump
 Oil & Water Separator Sump Pump
 No. 1 L.O. Purifier
 No. 2 Ice Water Circ. Pump
 Main Air Compressor
 2d Stage Air Eject Nozzles & Valves
 Main Gen. Air Coolers
 Main Motor Bearings & Sumps
 No. 6 Reefer Compressor
 No. 2 Main Feed Pump Turbine
 Nos. 2 & 4 Boilers Air Heaters &
 Econ.
 No. 2 Comb. Control Board
 Main Engine Thrust
 Nos. 7 & 8 Boat Winches
 Nos. 3 & 4 Cargo Winches
 Educto Chain Locker
 P & S Pneumatic Valves

JULY

Nos. 1 & 2 Main Condensers
 No. 1 Fire & Sanitary Pump
 No. 2 Aux. Circ. Pump
 Nos. 1 & 2 Bilge & Ballast Pumps
 No. 4 Priming Pump
 No. 2 Hot Water Circ. Pump
 No. 3 L.O. Purifier
 Johnston Heating System Compressor
 No. 4 F.W. Pump
 No. 3 Main Cond. Pump
 No. 1 E.R. Fuel Oil Heaters
 No. 4 Main Feed Pump Turbine
 Nos. 1 & 2 E.R., $1\frac{1}{4}$ " 150# Red Statn
 Nos. 9 & 10 Boat Winches
 Nos. 5 & 6 Cargo Winches
 Fire Main Loop Valves
 Nos. 1 & 2, Trp Dishwashing Machines

AUGUST

Nos. 1 & 2 Main Lube Oil Coolers
 No. 1 Aux. Gen. Air & L.O. Coolers
 No. 3 Aux. Circ. Pump
 No. 1 L.P. Evap. Feed Pump
 No. 1 Hot Water Circ. Pump
 No. 1 Boiler Feed Transfer Pump
 No. 2 L.P. Evap Air Eject Condenser
 No. 1 Fresh Water Pump
 No. 2 E.R. Fuel Oil Heaters
 Galley Day Box Compressor
 Nos. 1 & 2 E.R. 10# Reducing Statn
 Nos. 1 & 2 E.R., 2", 150# Red Statn
 Nos. 11 & 12 Boat Winches
 Nos. 7 & 8 Cargo Winches
 Pneumatic Bilge Suction Valves (Aft
 Frame 166)

SEPTEMBER

Nos. 2 & 4 Aux. Condensers
 No. 2 Aux. Gen. Air & L.O. Coolers
 Nos. 1 & 2 Main Motor Air Coolers
 No. 4 Aux. Circ. Pump
 Nos. 1 & 2 Main Thrust Bearings,
 Sumps & Coolers
 Nos. 2 & 4 Main Feed Pumps
 Passenger Elevator
 Butcher Shop Equipment
 No. 2 Fresh Water Pump
 Nos. 2 & 4 Fuel Oil Service Pumps
 Nos. 2 & 4 Lube Oil Service Pumps
 Nos. 1-2-3 & 4 Boiler Water &
 Firesides
 Aux. Diesel Generator
 Freight Elevator & Dumbwaiters
 Main Engine Thrust
 Nos. 1 & 3 Forced Draft Blowers
 (Motors & Fans)
 Nos. 9 & 10 Cargo Winches
 Main Pantry Dishwashing Machine

OCTOBER

Nos. 1 & 3 Aux. Condensers
 No. 3 Aux. Gen. Air & L.O. Coolers
 No. 2 Fire & Sanitary Pump
 No. 1 L.P. Evap Circ. Pump
 No. 1 Brine Pump
 No. 2 Main Motor Cooling Wtr Pump
 No. 1 Main Eng Sump & L.O.
 Gravity Tanks (Batch L.O.)
 Bake Shop Equipment
 Main Galley Equipment
 No. 2 Main Cond. Pump
 Ice Water Compressor
 Air Ejector Reducing Station
 Settlers & Deep Tank Pneumatic
 F.O. Valves
 Nos. 1 & 3 Aux. Gen Thrust Brgs
 Nos. 11 & 12 Cargo Winches

NOVEMBER

No. 2 Main Eng Sump Gravity
 Tanks (Batch L.O.)
 No. 4 Aux. Gen. Air & L.O. Coolers
 No. 3 Fire & Sanitary Pump
 No. 2 L.P. Evap Circ Pump
 No. 2 Brine Pump
 No. 1 Main Mtr Cooling Wtr Pump
 Stbd Steering Gear
 No. 2 Boiler Feed Transfer Pump
 No. 1 Aux. Cond. Pump
 No. 1 F.O. Transfer Pump
 Nos. 1 & 3 Boiler Air Heaters
 & Economizers
 Line Bearings & Sumps
 Laundry Flat Work Ironer
 Nos. 2 & 4 Aux. Gen. Thrust &
 Bearings
 Nos. 13 & 14 Cargo Winches
 Butcher Shop Drain Pump &
 Sump Tanks

MONTHLY MAINTENANCE SCHEDULE: DECEMBER

DECEMBER

Nos. 1 & 2 Main Gen. Air Coolers
No. 4 Fire & Sanitary Pump
No. 1 Aux. Circ. Pump
Reefer Circ. Pump
No. 1 Comb. Control Compressor
No. 1 L.P. Evap. Air Eject. Condenser
No. 2 Aux. Cond. Pump
Troop Galley Equipment
Nos. 2 & 4 Boiler Air Heaters &
Economizers
No. 4 Main Cond. Pump
Main Motor Bearings & Sumps
Laundry Washing Machine
100# Laundry Steam Reducing
Station
No. 1 Comb. Control Board
Main Engine Thrust

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SAMPLE ELECTRICAL MAINTENANCE CHECK-OFF LISTANNUALLY

USCG 111.05-10(D) - Test Each Thermostat Kidde Fire Alarm System

1	2	3	4	5	6	7	8	9	10	11	12
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SEMI-ANNUALLY

MSTSPACINST 4700.3B - Megger Readings on all Motors

1	2	3	4	5	6	7	8	9	10	11	12
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USCG 78.17-45 (c) & (d) - Ship's Service Battery Performance Tests

1	2	3	4	5	6	7	8	9	10	11	12
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QUARTERLY

USCG 78.17-10 (b) - Open & Inspect all Electrical Lifeboat Equipment

1	2	3	4	5	6	7	8	9	10	11	12
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CO₂ Pressure Alarm Devices Tests

1	2	3	4	5	6	7	8	9	10	11	12
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MSTSPAC INST 4700.3B - All Storage Batteries & Equalizing Charge

1	2	3	4	5	6	7	8	9	10	11	12
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Open, Clean and Check Gyro MG Set

1	2	3	4	5	6	7	8	9	10	11	12
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MONTHLY

Fry Kettles - Test & Calibrate Thermostats

1	2	3	4	5	6	7	8	9	10	11	12
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USCG 78.17-45 (b) & (d) - Emergency Generator Test - 2 Hours Loaded

1	2	3	4	5	6	7	8	9	10	11	12
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MSTSPAC INST 4700.3B - Megger & Record Ship's Service Aux. Gen. & Emerg. Gen.

1	2	3	4	5	6	7	8	9	10	11	12
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Test Emergency Steering Engine Order Telegraph

1	2	3	4	5	6	7	8	9	10	11	12
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Test Ground Connections, all Portable Electric Tools

1	2	3	4	5	6	7	8	9	10	11	12
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Test Power Failure Alarms, Wheelhouse

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

Test Run Emergency Forced Blower

1	2	3	4	5	6	7	8	9	10	11	12
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RED LINE UNDER NUMBER OF MONTH DENOTES WHEN DUE
RED "X" OVER NUMBER DENOTES WHEN COMPLETED

APPENDIX C

BUNKERING OCEAN VESSELS

Excerpts appearing on the following pages are taken from a paper delivered by ADMIRAL F. D. Higbee, U. S. Coast Guard, Retired, Port Warden, City of Los Angeles. While the preparation and procedure for bunkering ocean vessels pertain to commercial practices, it is recommended that the contents be carefully studied looking toward the establishment of an efficient bunkering system utilizing the team concept and check-off list in each MSTS Ship. Oil spills can involve costly clean up losses as well as a danger to life and property. A coordinated procedure will decrease the frequency and severity of oil spills.

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EXCERPTS ON THE PREPARATION AND PROCEDURE FOR BUNKERING OCEAN VESSELS

Bunkering an ocean vessel is a task too important for delegating exclusively to the ship's engineers. It needs the coordinated attention (under direction of the Master) of other personnel. There is a part in it for the Mate on watch, the carpenter, electrician, operator of the oil barge, the licensed engineers, the wipers or oilers, and the gangway or other watchmen.

Some of those concerned need not be on duty during actual time of the bunkering. Their participation may be only during preparation.

The needs of ships for bunkering details are obviously variable and so must their plans vary. Those having most frequent and most severe spills are those that have no coordinated plan whatever. They occur in ships of companies that take for granted that the Chief Engineer will bunker the ship, night or day, with whoever is kept on board for the machinery division watch. They occur in ships where the Master does not participate in a plan for safe bunkering. He may even consider the task as none of his responsibility whatever.

The worst spills are the undetected ones during the night. Oil is overflowing for appreciable intervals without knowledge of those responsible.

The bunkering operations of all ships have been observed with interest by the Port Warden's force. Records are maintained of all known spills and comments recorded as to causes when ascertained.

By written general orders from the home office, every Master is required to organize a bunkering procedure and get a detail trained in the practice of it.

There will be exacting compliance with a check-off list used for the purpose.

Team work does it.

It begins with participation of the Master. The detail includes surveillance by the Mate of the watch for operations visible on deck and overside. The carpenter plugs and effectively cements scuppers. The electrician rigs the sound-power extension telephone to afford communication from on deck near hose coupling to the machinery departments several decks below. The man on deck is at the shut-off valve by the hose coupling. He keeps on his head-set phones as does the licensed engineer below deck who is watching the pneumercator and other gauges. A five-man team, sometimes a good four-man team, is usually competent to bunker most any ship without mishap provided **EFFICIENT DIRECT COMMUNICATION IS MAINTAINED.**

If a night job, the electrician rigs cargo cluster lights to illuminate the water line, especially below overboard discharges. The gangway watchman is alerted to patrol alongside ship's entire length and with flashlight to seek indication of oil from drains above or below water line. He is provided with a police whistle and instructed to use it upon observing the first trickle. The Second Engineer is in the machinery compartment watching the pneumercaters, static legs, pressure gauges and receiving reports from subordinates by means of ship's communication system and the deck man with the headset sound-power phone. The Second Engineer is assisted below decks by another licensed engineer. Two or more oilers or wipers are employed at outage soundings and miscellaneous chores.

The barge operator has been definitely told the rate of flow desired. The gauges are watched. When the pressure is exceeded or the flow accelerated, the ship will caution the barge and it may shut down against it. A ship can shut down against a barge or shore station having centrifugal pumps and a by-pass without rupturing a good hose. When 85 percent filled, the ship signals the barge man for a full stop. A slow down is less effective and insufficient. A full stop, if only for five minutes, assures that communication is being maintained with the barge and ship and it alerts the entire team to top-off time vigilance. That pause sometimes enables an air pocket to escape or subside. A big bubble that might have caused an overflow before the tank had filled with fuel may thus be eliminated. Then, after the short pause, the barge is asked to resume loading at a slower rate while the tanks are topped off. This is all accomplished by a small but well-organized team.

Communication is of the utmost importance. The phones must be tested as O.K. before fuel starts aboard.

When the barge man disappears beyond conversational distance, the ship shuts down until he resumes station as he should. He is best situated to detect the start of an overflow through a vent on his side of the vessel. He will need to be told to watch for them and sound his horn if it happens. It takes no more than one shutdown to convince a barge man that he is dealing with a customer who is going to exact proficient, alert service from him, the way they want it.

Our records reveal that negligent lack of vigilance originates many spills, lack of communication between barge, machinery space watches, and men on deck is another common cause.

Lack of bunkering team is most common cause of all.

Barge men are sometimes in haste to get back for a load scheduled for another vessel, and for other reasons.

The company cited herein has that haste hazard solved by its shut-down orders when rate of flow ordered is exceeded. The barge men get no penalty for a spill because it cannot be proven that the oil overflowed from his vessel. It spilled from the ship. He is snugly aware of that evasion.

All men of the bunkering team have police whistles as a precaution against failure of telephones and for other reasons. Just enough men in a bunkering team with good communication do better than a needless number without it. No member of the team detailed for duty on deck is required to go below decks and no one assigned to a below decks station is required or expected to leave there for a duty on deck.

The navigating bridge is sometimes a communication station because from either wing of the bridge an observer can see overside full length of ship and from the pilot house there are phones, speaking tubes, engine room telegraphs, and general alarms with communication generally throughout the ship. The vessel is provided with those facilities and most large ships have extension cord telephones for other places. Failure to employ those facilities and failure to make best use of men in the watch aboard is a costly negligence.

The steamship company cited herein as successful in oil spill abatement has one veteran skipper who well explained the system thus:

"When our ships burned coal, bunkering was a job for all hands. Now we take fuel through a hose, but it still requires some duties that are not done by the men who stoke the furnaces. In my ship the Chief Engineer knows more about bunkering than I do. But I am the boss and the overall responsibility is mine. I know the Chief needs the support of myself and the help of a few men not of the Engineer Department. So long as I am Master he is going to get that essential assistance. They are building bigger ships now but I have yet to sail in one big enough for more than one boss."

Other plans than these used effectively by the one line may be even better, but no plan at all and any plan not participated in by the Master has not been observed to be effective.

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