

EQUIPMENT.		WHERE SITUATED.	ELEC: REGISTER REFERENCE.
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M.S. CODE No:	DATES OF COMPLETION OF ROUTINES.									
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DATE.	A.	REMARKS. (TO INCLUDE DEFECTS FOUND, SPARES FITTED ETC.)	DATE.	A.	REMARKS. (TO INCLUDE DEFECTS FOUND, SPARES FITTED ETC.)

B	C	CODE No	TYPICAL PREVENTIVE MAINTENANCE ROUTINES.	Sheet No.	ELECTRICAL OFFICERS REMARKS. (TO INCLUDE FEATURES NOT COVERED BY ROUTINES.)
				1016	
		M1	Clean out unit with vacuum cleaner and soft brush.		
		Q1	Examine all components for ageing, overheating and general deterioration. Clean up contactor and switch contacts, if necessary, applying a small amount of grease A.P.M12812.		
		S1	Examine fan bearings and renew grease if necessary.		
		A1	Carry out insulation test of input and output sides.		
		A2	Forward and Reverse current tests to be carried out as laid down in Maker's Handbooks.		
				CODE	REFIT ITEMS.

B	C	CODE No	TYPICAL PREVENTIVE MAINTENANCE ROUTINES.	Sheet No.	ELECTRICAL OFFICERS REMARKS. (TO INCLUDE FEATURES NOT COVERED BY ROUTINES)	
				1110		
		01	Check meters, switches and rheostats for normal operation.			
		01	Strip racks, wash insulators, dry and reassemble.			
		02	Clean knife switches, rheostat contacts and lubricate as necessary, using A.P. N12812 petroleum jelly.			
		03	Carry out insulation test on all charging equipment.			
		S1	Open charging panels, clean internally and check connections.		CODE	REFIT ITEMS.
			Note:- The racks must be kept scrupulously clean and dry to prevent damage through stray currents.			

TYPE: 242M

PERFORMANCE RECORD SHEET

PERFORM...

H.M.S.....

	TYPICAL	FITTING OUT RESULTS DATE:.....	MONTHLY RECORD					
			DATE	DATE	DATE	DATE	DATE	DATE
1. Transmitter frequency								
2. Performance meter "Input Gain" setting								
3. Performance meter "Output Gain" setting								
4. Performance meter Responsor Sig/Noise ratio								
5. Performance meter Aerial insulation								
6. Aerial feeder insulation								
7. Dummy load output pulse Height (full power)								
8. Dummy load output pulse Height (low power)								
9. Aerial continuity								
10. Type and serial No. of wavemeter and date last checked against a standard								

PERFORMANCE RECORD SHEET

TYPE **277P/293P** H.M.S. 038

	TYPICAL	FITTING OUT RESULTS DATE :.....	MONTHLY RECORD						
			DATE	DATE	DATE	DATE	DATE	DATE	
Radiation meter reading									
Power output									
S.W.R.									
Frequency									
Crystal current									
G208 receiver performance test									

H.M.S. "....."

RESULTS OF BALANCING ELECTRICAL CIRCUITS AND FITTINGS.

The whole of the circuits and fittings mentioned herein have been tested and found satisfactory, except as stated.

Dated.....19.....

Admiralty Officer under Director of }
Electrical Engineering }

at

Date

MAIN GENERATORS D.C.

SHIP'S NUMBER	MAKER'S NUMBER	MAKER'S NAME	RESISTANCE OHMS			INSULATION MEGS.			
			Joint Internal	Main Shunt Field	Aux. Shunt Field	All in	Arma-ture	Aux. Shunt Field	Heater

NOTES

- Generator to be isolated from Main Switchgear and Voltage Regulator.
- The Main Shunt Field resistance as measured is to include the adjusting resistance (or shunt protecting coil) as set.
- The details in this Form are to be entered by the Dockyard or Shipbuilder prior to the Testing Circuits by Admiralty Officers.
- This Form is to be rendered in triplicate. (1 copy each for:- D.L.E., C.O. SHIP & SHIP'S HOME YARD.)

D.-499.C.

(Established - Sept. 1910) (Revised - February, 1955)

Results of Testing Electrical Circuits of H.M.S.

at

Date

MAIN SUPPLY SWITCHGEAR - D.C. GENERATORS

Used with Generator No.	Insulation Megs		
	Positive	Negative	Non-Contact
Main Bus Bars (Supply)			
Main Bus Bars (Output)			
Emergency Supply Bus Bars			
Shore Connection			
Supply to Local Lighting			
Supply to L.P. Services			
Supply to L.P. Services			
Supply to Auxiliaries			
H.P. Circuits on Main Switchboard			
H.P. Circuits on Unit Switchboard			
Cross Connector Lamp Relay on Unit Switchboard			
Local Instrument Panel			
Used with Generator No.			
Main Bus Bars (Supply)			
Main Bus Bars (Output)			
Emergency Supply Bus Bars			
Shore Connection			
Supply to Local Lighting			
Supply to L.P. Services			
Supply to L.P. Services			
Supply to Auxiliaries			
H.P. Circuits on Main Switchboard			
H.P. Circuits on Unit Switchboard			
Cross Connector Lamp Relay on Unit Switchboard			
Local Instrument Panel			

When Low Voltage
Relay Control
is fitted.

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CHAPTER 5

DOCKYARDS ALTERATIONS AND ADDITIONS and Preparation for Reserve

The Dockyards are responsible for the building, repair, conversion and modernisation of H.M. Ships, for the embodiment of Alterations and Additions, and for carrying out certain periodical tests, trials and surveys of ships and their fittings where the work is beyond the capacity of the Ship's Staff.

A "tree" system of the Electrical Engineering Manager's Department of a typical large dockyard is included at the end of this chapter.

You will meet the Dockyard Officers in two ways:-

- (a) When the ship is taken in hand for refit, repairs or interim docking.
- (b) When appointed to stand by a ship building, undergoing modernisation or conversion, or being brought forward from Class III Reserve.

The Defect List - Form S. 340 series

Not less than one month before arrival in the Dockyard for refit or docking the Commanding Officer forwards the Defect List (proper title - List of Repairs Absolutely Required) to the Admiral Superintendent of the Dockyard which is to do the work. The Engineer Officer is responsible for the preparation of the List and for its division under the appropriate headings i.e. Hull and Miscellaneous, Main Engines, Boiler, Auxiliary Machinery, Weapons (General), Weapons (Electrical), Main Electrical, First Fitting Stores.

Your part is to supply him with a full and comprehensive list of all repairs required within your Department (Electrical or otherwise) and all electrical repairs throughout the ship which are beyond the capacity and resources of your own staff. In small ships you will also be required to provide some clerical help in the reproduction of the list.

The list is tripartite

- (a) Form S. 340 - "The Pink List" in which all repairs necessary for the fighting and seagoing efficiency of the ship are entered.
- (b) Form S. 340B - "The White List" in which all repairs necessary for other reasons than fighting and seagoing efficiency are entered.

These first two parts refer to repairs which cannot be carried out by the Ship's Staff. The third part is:-

- (c) Form S. 340D which is a list of repairs it is proposed that Ship's Staff should carry out together with all the items in the other two parts on which it is proposed that the Ship's Staff should assist the Dockyard.

For part (c) you should produce the Electrical List and hand it to the Engineer Officer for inclusion. The reasons for rendering S. 340D are:-

- (i) So that the Superintendent of the Dockyard may satisfy himself that the ship is not attempting to shuffle off work, properly the ship's responsibility, on to the Dockyard.

- (ii) So that any items of stores, not allowed by establishment may be obtained for use by the Ship's Staff. A list of these stores should be included in Form S. 340D.

You will be required to sign the Certificate on the front of the form that the repairs cannot be executed without etc., and you will have to assure the Captain that all the defects for which the assistance is required are included before he signs the certificate immediately beneath your signature.

The separate repairs are entered on the inside sheets, not more than ten to a page. In column 1 the Engineer Officer will write the number of the item, in column 2 the precise nature of the defect and the repair work required and in Columns 3 and 4 the appropriate code letters, details of which will be found on the inside of the front cover of Form S. 340B.

The statements of the defects and repairs required are to be detailed (vide Q.R. & A.I. Article 5606). Such an item as:-

"After 40 kVA machine requires overhaul" will not do.

Try this instead:-

"After 40 kVA C.W.S. 230V 50 c/s 3 phase generator:-
Slip rings heavily scored, exciter end bearing brass cages heavily worn, interior of machine generally dirty; machine requires to be dismantled, bearing changed, slip rings skimmed, interior cleaned out. Machine to be reassembled and tested to full load."

Whenever you require large repairs to main generating machinery you must always include a requirement for full load and paralleling tests (as necessary) to be carried out on completion.

When you are preparing the lists of defects you should always have the following books by you:-

- (a) The Defect Book.
- (b) The Electrical Register.
- (c) The Electrical Log and Progress Book.
- (d) The Insulation Register.
- (e) The last report rendered on the state of the ship's cables (see Chapter 2).
- (f) The Radio Equipment Log.
- (g) The last Defect List rendered from the ship with your own or your predecessor's notes on it.

To assist Electrical Officers in the preparation of their Defect Lists, Standard Defect Lists are being produced and are expected to be in use for destroyers and below in the near future (A.F.O. 886/55). These lists will provide an admirable yardstick by which to measure your own and will remind you of the irritating little items which are so easily missed but which make the difference between a good refit and a poor one.

The Supplementary Defect List

Where, after submission of the Main Defect List further defects are discovered as a result of surveys or because of straightforward breakdown a Supplementary Defect List may be forwarded to arrive not later than the date of the ship's arrival at the yard. In this connection it should be noted that you are responsible for producing all possible Defects in the Main List and that Supplementary Lists should contain only those items which could not reasonably have been foreseen at the time of forwarding the Main Lists (see notes at the bottom of Page 1 of S.340).

The Supplementary Lists should be raised on the same form as the Main Lists but it should be clearly indicated at the head that this is a Supplementary List and the Commanding Officer must give reasons why the defects were not included in the Main Defect List.

After the ship has been taken in hand it may well happen that the opening up of machinery etc., will reveal further defects. Provided that they can be completed in the time available and the labour and necessary stores are to hand these repairs will be taken in hand by the Dockyard. Application should be made to the Electrical Engineering Manager of the Yard on Form S.339. It is usually best to take the forms in person to the Technical Officers and explain why you would like them dealt with.

When the ship arrives in the Yard you should take the earliest opportunity to call on the Electrical Officer on the Electrical Engineering Manager's Staff taking with you a copy of your defect list to discuss with him. You should also take your list of As. & As. outstanding (see later in this Chapter) so as to get an idea which of them can be done. This visit will enable you to meet the subordinate Officers on E.E.Ms. Staff and to lay plans for the progressing of the work of the Ship's Staff.

The Refit Conference

As early as possible after the ship arrives the Ship's and Dockyard Officers will meet in conference to discuss the Defect List and the As. & As. List.

You should attend carrying your lists suitably annotated, giving reasons why the repairs are necessary and why they cannot be dealt with by the Ship's Staff. As regards to As. & As. you should have a priority list of As. & As. classified "A" again with reasons for priority. You should also produce a copy of the latest Ship's Magazine Lighting Certificate (see Chapter 2) and if possible the Electrical Register.

The Conference is usually presided over by the Manager of the Constructive Department or his representative. The defects are discussed item by item and they are either accepted or rejected there and then. Occasionally the Electrical Engineering Manager's representative will ask to investigate the defect before accepting it. At such inspections and all other inspections of the defects you are to be present (Q.R. & A.I. Art. 5606).

Progress of Work

After the ship is taken in hand you should examine your defect list daily making notes as to the progress of the work and you should confer frequently with the Dockyard Officers so that at any time you have a complete picture of the state of the ship.

You should take care that repairs to generating machinery are taken in hand early and are progressed at the same rate as that of work on their prime movers so that so far as is possible both ends are ready for testing together. In this connection it should be noted that loading and paralleling tests are carried out by means of a dummy load to reduce inconvenient breaks in supply and to protect the electrical apparatus against surges.

Switchboard repairs should be carefully planned to reduce inconvenience to users of electricity to the minimum. Where the repairs are being done by Ship's Staff consideration should be given to doing them at night. You should make a point of being present at the testing of main machinery after repairs.

A log of all items removed from the ship for repairs by the Dockyard should be kept.

Completion Certificate

When the work has been done the Ship's Officers will draw up a supplementary Defect List of all items which have been dealt with on Form S.339 which you will be required to sign in the same way as an ordinary defect list.

You will also, when completely satisfied that all work has been properly executed, be required to sign the Completion Certificate. In the case of ordinary refits or docking this will be Form S.339A and in the case of extended refits, conversions etc., Form D.448 (see Chapter 2). If any item is not complete you may, without prejudice, sign the completion certificate entering in the space provided a note to the effect that such and such a work is still in hand.

Extended Refits (see A.F.O. 886/55)

In present circumstances there is need for the greatest economy in manpower and it is essential that the number of men retained in ships undergoing extended refits should be reduced to the minimum and accordingly the following special Extended Refit procedure has been introduced:-

- (a) The crew will be accommodated in barracks whenever possible.
- (b) Only valuable, perishable, inflammable, combustible and dangerous stores will be landed. Other naval stores will remain on board in the custody of the supply staff retained, although it will be necessary for compartments to which the Dockyard require free access to be emptied. When, owing to special circumstances, it becomes necessary for a ship to be destored, instructions will be given.
- (c) Ships will not be preserved before the refit but will be maintained through it.
- (d) Ship's Officers will be responsible for the provision of a full and accurate statement of the work required to be undertaken and for making representations to the Dockyard or to the Administration Authority if they are not satisfied with the work as it is progressed during the refit. They will also be responsible for accepting the ship on satisfactory completion of trials.
- (e) The Dockyard will be responsible for:-
 - (i) Carrying out all items of survey and defect as laid down in Admiralty Standard Defect Lists (when these have been produced) additional to items in the ship's Defect List.