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NATAA/318/Policy

30 Jan 23

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Headquarters, Western Naval Command
Mumbai 400023

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ENDURANCE TRIALS OF EQUIPMENT AND SYSTEMS DURING PRELIMINARY SEA TRIALS (NR/ MR)

1. **Introduction**. Comprehensive post repair/ refit trials of ships/ submarines completing major refits (NR/ MR) are conducted by trial units under the aegis of NATAA ensuring a reliable operational platform post REFCOMP. These encompass harbour trials/ checks, Basin Trials, followed by SSC 1 to assess readiness of the platform to proceed to sea. At this stage, operational availability of engineering & deck machinery, electrical systems and HATs/ Op checks of Nav Aids & Communication systems is ascertained by NATAA. Post conduct of SSC 1, Preliminary Sea Trials (PST) are normally conducted over two to five sea sorties (depending on the type of refit, platform complexity and defects encountered) for checks of main propulsion, shafting, steering, STP, SATs of Nav Aids & Communication and other systems. Finally, the sea trials culminate with Full Power Trials (FPT) of the main propulsion aggregate.

2. **Gap Analysis**. A study of the present procedure of carrying out PSTs, including the scope of trials and the problems/ defects observed onboard ships post refit completion revealed following gaps: -

(a) Limited Exploitation of Equipment/ Systems. PSTs and FPT conducted towards the end phase of the refit are normally limited to **day sorties**. During these trials, primary focus is to prove the main propulsion aggregate, IPMS/ IMCS, auxiliaries, including shafting, steering gear and stabilisers which can be exploited only at sea. All these mission critical machinery and systems are exploited for few hours during the duration of day sorties. As a result, the balance of Hull, Engineering and Electrical equipment/ systems are not exploited for prolonged duration which could result in incipient defects during terminal stages of refit or immediately upon refit completion. The time available for exploitation of these equipment during these PSTs is further constrained in case there are fresh/ emergent defects at sea, leading to inadequate time for assessing the performance of critical machinery and systems.

(b) Performance Assessment of Main Shafting. The performance of shaftlines including plummer blocks, stern tubes etc. can only be assessed when they are exploited for a reasonably prolonged duration and all possible regimes. However, this is not feasible in the present methodology, as the trial duration/ sorties are short.

(c) Running-in of Machinery. Proper running-in period of the main propulsion aggregate and other certain critical auxiliaries like Steering gear, Stabilisers, RO plants, HPACs, Servo Air Compressors, Control Air Compressors, Refrigeration plants, DAs, TAs etc is not catered for institutionally post major overhaul/ repairs. Ensuring conduct of Endurance trials will aid in identifying incipient and nascent defects which otherwise remain unnoticed, resulting in premature failure of the equipment in the end phase of refit/ beginning of operational phase.

(d) Non-exploitation of All Equipment/ Systems. During day sorties, the ship staff is unable to exploit all the equipment/ systems in a phased manner and only reliable machinery is usually exploited. Certain equipment and systems such as AC plants, HVAC, machinery compartments ventilation system along with bilge coolers etc are not exploited with complete heat load of men, machinery and systems running. Certain equipment/ systems remain unexploited adequately prior refit completion which affects the reliability immediately post refit.

(e) Inadequate OJT and Watchkeeping. Considering duration of major refits, the turnaround of crew during refits is inevitable. Newly joined crew gets minimal exposure on equipment exploitation/ watchkeeping at sea prior refit completion. The tendency of ship staff is to employ the best watchkeepers during the day sorties to avoid any human induced failures. The Basic Sea Training by FOST

during the first sea sortie is also of limited duration and may not provide adequate training exposure to all watchkeepers on continuously running main and auxiliary machinery.

3. **Aim of Policy Letter**. The aim of this policy letter is to mitigate the above mentioned gaps, with a concept of '***Endurance Trials***', which can be undertaken for a period of about two days during PST 2 or 3 for Hull, Engineering & Electrical equipment and systems. The concept is planned to be implemented for all ships undergoing major refits (NR/ MR). General guidelines for conduct of Endurance trials are placed at Enclosure.

4. **Way Forward**. Implementation of '***Endurance Trials***' for all equipment/ systems will help in identifying and eliminating any defects that may otherwise go unnoticed and lead to premature failure of critical equipment/ systems besides ensuring improved reliability and confidence of ship staff in operating equipment and systems immediately after refit completion. It will also serve as an on job training opportunity for newly joined crew to develop hands-on skill and expertise on ship's equipment/ systems. This opportunity would be utilized to undertake extensive trials of main propulsion plant, steering gear, stabilisers, RO plants, turbo driven machinery etc.

5. In view of the above, it is requested that Endurance Trials (for a duration of about two days during PST 2 or 3) be undertaken with immediate effect for all ships undergoing NR/ MR. Trial teams may embark, as required.

(K Srinivas)
Rear Admiral
Director General

Enclosure: - As above

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Info: - **TA/ COM**

Enclosure to DG NATAA letter
NATAA/318/Policy dated 30 Jan 23

ENDURANCE TRIALS – GENERAL GUIDELINES

Ser	Equipment/ System	Duration
1.	Main Engines, Boilers, Propulsion Auxiliaries & Shafting	All Main Engines and all shaftlines are to be exploited in all Propulsion modes of operation. As part of Endurance trials all Main Engines are to be exploited for at least 40% of time on its respective shaft over a period of 02 days. All propulsion auxiliaries are to be changed over every watch/ as applicable, as per standard practice to ensure adequate running hours.
2.	Steering	Continuous running with steering gear pumps changed over *four* hourly during the 02 days sea sortie.
3.	TAs/ GTGs/ DAs	TAs - Continuous running during 02 days sea sortie. GTGs - Each GTG should run for at least 50% of time; changed over every 12/ 24 hrs during 02 days sea sortie. DAs - Each DA should be run for at least 12 hrs (wherever more than *two* are fitted) during 02 days sea sortie.
4.	Steam Auxiliaries viz. Fuel Service Pump, Aux. Feed Pump, TD Ext. Pump, Main Cir. Pump, Main Feed Pump, TD Fire Pump, TDFL Pump, evaporators, distilling plants, etc.	Continuous running during sea sortie
5.	HPACs and SACs (steam ships only)	To be changed over *four* hourly/ every watch; auto-drain system should be in operation.
6.	Stabilisers	Continuous running as per speed requirements for atleast 24 hrs during 02 days sea sortie
7.	AC Plants & Ref Plants	Continuous running of each AC & Ref Plant for at least 72 hrs (as part of harbour/ sea trials)
8.	Fire & Sea Water Cooling Pumps	Each Fire & Sea Water Cooling Pumps is to run continuously for at least 12 hrs duty cycle (as part of harbour / sea trials)
9.	MD Auxiliary Pumps	Each MD auxiliary pump is to run for at least 12 hrs (as part of harbour / sea trials)
10.	FO/ LO Centrifuges	Each FO/ LO is to run for at least 04 hrs (as part of harbour / sea trials). LO centrifuges for Main Diesels are to be run continuously during the running of Main Diesels.
11.	Auxiliary Boilers	To be exploited for a minimum of 08 hrs where feasible
12	RO Plants	Each RO Plant to be run continuously for at least 48 hrs duty cycle (as part of sea trials).
13.	Engineering Systems - Firemain, Fresh Water, HP & LP Air, Sea Water Cooling, Eductors, AVCAT, Chilled Water, Lub Oil, Fuel, Bilge, Salvage systems, etc.	The complete system to be exploited throughout during the 02 days sea sortie. Specific systems not in continuous operation are to be proved by exploiting for atleast 04 hrs where feasible.
14.	Emergency Equipment - DD Fire Pump, DD Compressor, EDA, etc.	To be exploited for a minimum of 01 hr where feasible (as part of harbour/ sea trials)