

Tele 011-21411709

Office of the Director General
Naval Trials and Acceptance Authority
D-II Wing, Sena Bhavan
New Delhi 110011

NATAA/318/Boat Trials

12 Sep 22

The Flag Officer Commanding-in-Chief
(for Chief of Staff)
Headquarters, Western Naval Command
Mumbai 400023

The Commander-in-Chief
(for Chief of Staff)
Headquarters, A&N Command
Port Blair 744102

The Flag Officer Commanding-in-Chief
(for Chief of Staff)
Headquarters, Eastern Naval Command
Visakhapatnam 530014

The Flag Officer Commanding-in-Chief
(for Chief of Staff)
Headquarters, Southern Naval Command
Kochi 682004

POLICY ON COMPREHENSIVE TRIALS OF SHIP BORNE POWERED BOATS/ RHIBS AS PART OF MAJOR REFITS (NR/ MR), POST MAJOR REPAIRS AND ONBOARD NEW CONSTRUCTION SHIPS

1. Refer to Navy Order 03/18.

Background

2. Ship borne Powered Boats/ RHIBs form an integral part of all naval platforms and fall under the category of mission critical equipment, without which ship cannot be mission deployed. Boats/ RHIBS are used for critical evolutions such as VBSS patrol, cargo, passenger transportation, beach survey, etc. Various types of boats/ RHIBs are being utilised pan-Navy depending on the requirement and the same have been standardised into specific categories, details of which are clearly laid down in the NO 03/18.

3. Most of the boats/ RHIBs are built to classification society rules and are inspected by their inspectors. Tests and trials of boats are undertaken by an IHQ MoD(N) nominated overseeing agency/ Class as per contractual requirements during induction and the same are handed over to the Navy. In service repairs of boat/ RHIB hull, engine and controls are undertaken through FMUs/ Repair Yards.

4. **Gap Analysis.** A detailed study undertaken on the status of the boats/ RHIBs on various naval platforms wrt reliability and availability revealed the following:-

- (a) As per NO 03/18, after each major repair, the repair agency is to re-assess the residual life of boat/ engine and record the same in boat log book. However, since boat/ RHIB has multiple components such as navigation/ communication, hull, engines, electrical and control systems, comprehensive assessment after any type of major repair is usually not being undertaken.
- (b) Official transfer of boats/ RHIBs from one unit to the other is stipulated in NO 03/18, wherein they may be transferred from one unit to another for meeting operational requirements. An operational ship may be provided with a boat/ RHIB by the Operational Authority from another ship on temporary loan (upto a period of six months) for a boat landed ashore for repairs, under intimation to the Administrative Authority. Most ships have been utilising this clause for exchange of boats/ RHIBs, especially prior proceeding for work-up, thereby ensuring optimal performance of their boats during inspection. As a consequence, certain boats/ RHIBs in fleet are over exploited while others continue to remain on the jetties and further, due to lack of ownership, their maintenance gets severely hampered.
- (c) The ships do not offer trials of boats/ RHIBs as part of refit trials, due to lack of clarity wrt boat trials. As a general norm, operational boats of ship in refit are handed over to operational ships on ty loan. Since operational boats often shift hands between ships in the fleet, accountability and maintenance of these become an issue and on most occasions leads to degradation.
- (d) Since boats/ RHIBs are designed for high speed operations, each and every component of the boat is critical towards delivery of peak performance such as the hull, engines, control system, steering, etc. Often, it has been noticed that though the performance of the engines is satisfactory, they are unable to attain top speeds. These may be attributable to multiple factors such as sub-optimal engine/ boat controls, hull degradation/ propeller wear down, etc. However, the boats are presently not being assessed in a systemic and integrated manner.
- (e) Boats/ RHIBs, unlike other deck machinery onboard, are subjected to the wrath of high seas during operations and are normally drenched with sea water on most occasions. Such conditions demand a higher level of maintenance by ship staff to prevent corrosion and materiel degradation. It has been observed that poor maintenance leads to the unpretentious parts like the engine cover clips, bilge pumps, etc. getting rusted/ damaged, which eventually leads to ingress of sea water to the engine spaces causing faster degradation.

Way Forward and Trials Methodology

5. Considering prolonged operational cycle of the ships, especially capital ships and mission criticality of the boats, it is imperative that regular checks/ maintenance by ship staff, quarterly assessment by Operational authorities, PRT to assess/ benchmark the materiel state prior refit commencement, End of refit trials and during acceptance trials of onboard new construction ships will provide the required impetus to address the gaps elaborated at Para 4 above. While the regular checks by ship staff and quarterly assessment by Operational Authorities may continue based on calendar based timelines, the trials of boats as part of PRT/ End of refit/ post major repairs/ onboard new construction ships are to be offered by ship staff to HITU along with assisting trial units. In case of sub-optimal performance of the boat during trials, HITU may seek assistance of MTUs/ DTTTs/ CTT(Pbr)/ ETMA/ ETMU, as appropriate, depending on the nature of issue/ problem. The broad procedure of boat/ RHIB trials is listed below: -

(a) **Harbour Checks.**

- (i) Inspection/ checks of boat/ RHIB hull and rubber collar.
- (ii) Inspection of engines, steering gear system, controls and associated engineering and electrical systems.
- (iii) Inspection of navigation and communication systems including lights (if any).
- (iv) Check weight of boats/ RHIBs iaw NO 03/18.
- (v) Documentation and boat/ RHIB/ engine registration/ serial number inspection.

(b) **Sea/ Speed Trials.** The sea trials are to be undertaken wherein the boat/ RHIB is to be subjected to sea/ speed trials at 50%, 85% and 100% engine power and run for a distance of one nautical mile (for each run) as per the following laden conditions: -

- (i) Light load.
- (ii) Full load.

(c) **Integrated Trials Report.** The final Integrated Trials Report is to be rendered by respective HITUs by sourcing the required trials outcome from the Assisting trials units. A guiding Boat Trials Protocol is placed at **Enclosure.**

6. **Responsibilities of Ship Staff and Operational Authorities.** The checks and maintenance guidelines on boats to be followed by Boat Holding Units (ship staff) and Operational Authorities are elucidated in Appendix 'B' of NO 03/18. Regular checks of bilges, dewatering pumps, general condition of hull, engine routines, periodic boat weighing, inflatable collars etc are to be ensured by ship staff whereas the Operational Authorities are to ensure surprise checks on upkeep and hygiene of boats hull and equipment/ systems, regular training on boat handling/ operations/ maintenance, review

of entries in boat log book, mustering of items including OBS and quarterly assessment of boats health. Additionally, the ship staff is to ensure that the boats are offered to the concerned trial units for comprehensive checks post major repairs/ Pre refit and End of refits in case of NR/ MR and onboard new construction ships.

7. Responsibilities of Trial Units. It is envisaged that regular checks/ quarterly assessment by ship staff/ Operational authorities and holistic trials/ checks by trial units as part of Pre and Post Refit Trials, after major repair and onboard new construction ships, will ensure enhanced materiel state of the ship borne boats/ RHIBS, thereby achieving higher operational availability of the same. Accordingly, following is to be ensured: -

- (a) **Lead Trial Unit.** HITUs are to function as the 'Lead Trial Unit' at the respective Station/ Command for conduct of trials of all types of powered boats/ RHIBs pan-Navy. On completion of trials, an Integrated Trials report is to be rendered by HITUs on each boat, bringing out the materiel state. The assisting trial units are to provide the outcome of trials to HITUs.
- (b) **Assisting Trial Units.** MTUs are to assist HITUs in conduct of trials which will be offered by ship staff. Further, DTTTs/ CTT(Pbr)/ ETMA/ ETMU/ ETT shall function as the Assisting Trial units, on as required basis. These units are to assist HITUs for specific requirements/ defects/ sub-optimal performance depending on the nature of issue/ problem encountered during trials of boats.
- (c) **Boat/ RHIB Audit & Trials Protocol.** A guiding inspection and documentation checks protocol has been formulated by referring various GRAQs, OEM TDs, etc and fine tuning based on the inputs received from Professional directorates at IHQ MoD(N), Commands, Operational authorities and trial units. (copy placed at **Enclosure**). The trial units are to use the Protocol for assessing the comprehensive materiel state of boats/ RHIBs.

8. Towards ensuring better materiel state and higher operational availability of various types of ship borne powered boats pan-Navy, it is prudent that the checks/ trials of boat/ RHIB are undertaken more diligently as per periodicity due to prolonged operational cycle and in a systemic and integrated manner by all concerned. In view of the above, following is requested to be undertaken for ship borne powered boats with immediate effect: -

Operational Authority

- (a) Conduct of quarterly assessment of boat health by Operational Authorities (Appendix 'B' of NO 03/18 refers).

Ship Staff

- (b) Offer comprehensive trials post major repairs to HITUs and the assisting trial units, based on the directives of the Administrative Authority.

(c) Offer Comprehensive trials as part of Pre refit as well as End of refit trials for ships undergoing NR/ MR to HITUs along with assisting trial units. In case of NR/ MR, the status of boats trial is to be brought out by HITUs in the Pre Refit trials report and during conduct of SSC Stage 1.

(d) The acceptance trials of the boats by *I/N* nominated agency for accepting the same from boat OEM may continue, as hitherto. In addition, post handing over of the boats to the commissioning crew of a new construction ship, the ship staff is to offer trials to HITUs and the assisting trial units. The status of boats trial is to be brought out by HITUs during Pre CST Wash-up meeting.

*N
Srinivas*
(K Srinivas)
Rear Admiral
Director General

Enclosure: - As above

Internal: - SO/ ACOM(IT&S)

SO/ ACOM(D&R)

CMDE(ME)

CMDE(EE)

CMDE(NA)

Info: - NA/ VCNS

TA/ COM

SO/ DCNS

Copy to: -

The Flag Officer Commanding
Karnataka Naval Area
Naval Base
Karwar 581308

The Flag Officer Commanding
Maharashtra Naval Area
Mumbai 400023

The Flag Officer Commanding
Eastern Fleet
c/o Fleet Mail Office
Visakhapatnam 530014

The Admiral Superintendent
Naval Dockyard
SBS Road
Mumbai 400023

not exhibition to be held between them and located near and convenient place of assembly of
The Admiral Superintendent
 Naval Dockyard
 C/o Fleet Mail Office
 Visakhapatnam 530014

The Flag Officer Commanding
 Western Fleet
 c/o Fleet Mail Office
 Mumbai 400023

The Flag Officer Commanding
 Goa Naval Area
 Vasco-da-Gama
 Goa 403802

The Admiral Superintendent
 Naval Ship Repair Yard
 c/o Navy Office, Naval Base
 Karwar 581308

The Admiral Superintendent
 Naval Ship Repair Yard
 c/o Naval Base
 Kochi 682004

The Officer-in-Charge
 Fleet Maintenance Unit
 c/o Fleet Mail Office
 Visakhapatnam 530014

The Officer-in-Charge
 Fleet Maintenance Unit
 c/o Fleet Mail Office
 Mumbai 400001

The Commodore Superintendent
 Naval Ship Repair Yard
 c/o Navy Office, Naval Base
 Port Blair 744102

Director / Osi/C – HITUs, MTUs / MCTU, CTT(Pbr), MSETT, , GTTTs, DTTTs, CBIU, ETMA/ ETMUs/ ETT

(Appendix II of HQ 03/10 refers)

SHIP STORES

(b) Other comprehensive trials cost and the cost of trials of the new units, based on the design and the other aspects leading to the trials.

Enclosure to NATAA Letter
NATAA/318/Boat Trials dated 12 Sep 22

SHIP BORNE BOAT - HARBOUR CHECKS

1. General Inspection and Documentation Checks.

- (a) Boat log book IAW Appendix 'C' of NO 03/18.
 - (b) Records of inspection and maintenance of boat and lifting arrangements carried out iaw NO 03/18.
 - (c) Record of weighing of boat iaw NO 03/18.
 - (d) Boat log book folder be also scrutinised iaw Part II of Appendix 'C' of NO 03/18.

2. Lowering/ Hoisting Test.

Place:	Date :
Boat Type:	Boat Regn No:
Representatives:	<ul style="list-style-type: none"> (a) <u>Ship</u>: (b) <u>Trial Teams</u>: (i) HITU/ FMU (ii) MTU/ DTTT/ CTT(Pbr)/ ETMA/ ETMU/ ETT (on as required basis)
Documentation:	<ul style="list-style-type: none"> (a) Availability of in-date load test certificate for Davit (b) Availability of in-date test certificate for ARH (c) Lifting sling load test report and visual inspection of lifting eyes/ hooks.
General Inspection post hoisting of Boat	<ul style="list-style-type: none"> (a) Condition of hull, appendages and rubber collar. Inspect securing arrangement of rubber collar with boat hull. (b) Condition of paint (c) Condition of Hull fittings. (d) Condition of lifting arrangement fitted on boat. Inspect records of survey of metallic fitting for lifting arrangement. (e) Inspect record of lifting slings/ FSWR.
Inspection of webbing sling	<ul style="list-style-type: none"> (a) Visual Survey of webbing sling (b) Year of manufacturing and service life raft

3. Harbour Checks.

Place:	Date :
Boat Type:	Boat Regn No:
Representatives:	(a) <u>Ship</u> : (b) <u>Trial Teams</u> : (i) HITU/ FMU (ii) MTU/ DTTT/ CTT(Pbr)/ ETMA/ ETMU/ ETT (on as required basis)
General Inspection:	Condition of hull, appendages and rubber collar.
Machinery Fitted:	
(a) Main Engines	: Make : _____ Power : _____ Serial No. _____
(b) Drive Units	: Make : _____ Serial No. _____
(c) Transom Shield	: Make : _____ Serial No. _____
(d) Bilge Pump	: Make : _____ Capacity _____ (Motor Driven)
(e) Bilge Pump	: Make : _____ Capacity _____ (Hand Operated)
(f) Batteries	: Make : _____ Model : _____
(g) DG Set	: Make : _____ Model : _____

4. Sub-Component Checks.

Following checks to be completed prior commencing

Sea Trials:-

<u>Ser</u>	<u>Sub-Components</u>	<u>(SAT / UNSAT)</u>	<u>Remarks/ Observations</u>
(a)	Main Engine functional trials		
(b)	Steering system including propeller and rudder functional checks		
(c)	Main Engine gauges & alarms		
(d)	Battery:- (i) Terminal voltage (Pre and Post starting operation) (ii) Specific Gravity (iii) Electrolyte levels		
(e)	Battery charging mechanism including integrity of connectors/battery charging sockets and associated switches		
(f)	Fuel system including tanks and associated piping		
(g)	Bilge Pump (Motor driven)		

(h)	Engine Cabinet & Securing clips		
(j)	Bilge Pump (Hand operated)		
(k)	Status of Bilges		
(l)	Lights		
(m)	Horn		
(n)	Mast Light		
(p)	Side Light Port		
(q)	Side Light Stbd		
(r)	NUC Lights		
(s)	Search Light		
(t)	Fire & Smoke Detector		
(u)	Navigation and Communication System		
(v)	Control System/ Wiring including proper cleaning, sealing, insulation, continuity etc.		

Note: Operation of all relevant gauges in the sub-components to be ensured

5. Result of Harbour Checks.

(a) Specific Defects observed periodically: _____.

Note: A summary of the overall status of the boat harbour checks to be brought out in the report. Readiness of the boat for sea / speed trials is to be clearly RECOMMENDED / NOT RECOMMENDED.

SHIP BORNE BOAT - SEA TRIALS

Place:	Date :
Wind:	Sea State:
Boat Type:	Boat Regn No:
Distance: 1 Nm (Nautical mile) for each run.	
Representatives:	(a) <u>Ship:</u> (b) <u>Trial Teams:</u> (i) HITU / FMU (ii) MTU/ DTTT/ CTT(Pbr)/ ETMA/ ETMU/ ETT (on as required basis)

1. **Light Load Condition**. Three to four crew, fuel tank half filled (50% of the fuel required for designed endurance) and all basic equipment i.e., ropes, anchor, paddles, aldis lamp, signal flags, torches, communication set, boat hooks, etc. (*may vary depending upon the type of boat*). Power regimes are as follows: -

(a) 50% Power.

<u>Ser</u>	<u>Run</u>	<u>Engine Speed RPM</u>	<u>Parameters</u> <i>(to be filled up based on the available indications and type of boat)</i>		<u>Speed by GPS</u>
			<u>Coolant Temp (°C)</u>	<u>LO Pressure (bar)</u>	
(i)	Up				
(ii)	Down				
(iii)	Up				
(iv)	Down				

$$\sum \text{Speed} = \text{Speed (i)} + \text{Speed (ii)} + \text{Speed (iii)} + \text{Speed (iv)}$$

Average Speed recorded = $\sum \text{Speed} / 4$ = ___ /4 = _____ Knots

(b) 85% Power.

<u>Ser</u>	<u>Run</u>	<u>Engine Speed RPM</u>	<u>Parameters</u> <i>(to be filled up based on the available indications and type of boat)</i>		<u>Speed by GPS</u>
			<u>Coolant Temp (°C)</u>	<u>LO Pressure (bar)</u>	
(i)	Up				
(ii)	Down				
(iii)	Up				
(iv)	Down				

$$\sum \text{Speed} = \text{Speed (i)} + \text{Speed (ii)} + \text{Speed (iii)} + \text{Speed (iv)}$$

$$\text{Average Speed recorded} = \Sigma \text{Speed} / 4 = /4 = \text{Knots}$$

(c) **100% Power.**

<u>Ser</u>	<u>Run</u>	<u>Engine Speed RPM</u>	<u>Parameters</u> (to be filled up based on the available indications and type of boat)		<u>Speed by GPS</u>
			<u>Coolant Temp (°C)</u>	<u>LO Pressure (bar)</u>	
(i)	Up				
(ii)	Down				
(iii)	Up				
(iv)	Down				

$$\sum \text{Speed} = \text{Speed (i)} + \text{Speed (ii)} + \text{Speed (iii)} + \text{Speed (iv)}$$

$$\text{Average Speed recorded} = \sum \text{Speed} / 4 = \underline{\quad} / 4 = \underline{\quad} \text{ Knots}$$

Remarks: On running the boat at full throttle, it was observed that the engine achieved a maximum _____ RPM upstream & _____ RPM downstream at Sea. The speed trials were carried out at 50%, 85% and 100 % power (_____, _____ and _____ RPM) by taking four runs at each speed (two RUNS in each direction). The speed during each run was measured by the GPS and recorded. The average speed at each RPM as well as the recorded engine / stern drive parameters are given below. All obtained parameters were found to be SAT / UNSAT.

2. **Full Load Condition.** Trials to be undertaken at full load displacement with 100% fuel, 10 men onboard including crew (*may vary depending upon the type of boat*) and all basic equipment. Power regimes are as follows: -

(a) **50% Power.**

<u>Ser</u>	<u>Run</u>	<u>Engine Speed RPM</u>	<u>Parameters</u> (to be filled up based on the available indications and type of boat)		<u>Speed by GPS</u>
			<u>Coolant Temp (°C)</u>	<u>LO Pressure (bar)</u>	
(i)	Up				
(ii)	Down				
(iii)	Up				
(iv)	Down				

$$\sum \text{Speed} = \text{Speed (i)} + \text{Speed (ii)} + \text{Speed (iii)} + \text{Speed (iv)}$$

$$\text{Average Speed recorded} = \sum \text{Speed} / 4 = \underline{\quad} / 4 = \underline{\quad} \text{ Knots}$$

(b) 85% Power.

<u>Ser</u>	<u>Run</u>	<u>Engine Speed RPM</u>	<u>Parameters</u> (to be filled up based on the available indications and type of boat)		<u>Speed by GPS</u>
			<u>Coolant Temp (°C)</u>	<u>LO Pressure (bar)</u>	
(i)	Up				
(ii)	Down				
(iii)	Up				
(iv)	Down				

$$\Sigma \text{ Speed} = \text{Speed (i)} + \text{Speed (ii)} + \text{Speed (iii)} + \text{Speed (iv)}$$

$$\text{Average Speed recorded} = \Sigma \text{Speed} / 4 = \underline{\quad} / 4 = \underline{\quad} \text{ Knots}$$

(c) 100% Power.

<u>Ser</u>	<u>Run</u>	<u>Engine Speed RPM</u>	<u>Parameters</u> (to be filled up based on the available indications and type of boat)		<u>Speed by GPS</u>
			<u>Coolant Temp (°C)</u>	<u>LO Pressure (bar)</u>	
(i)	Up				
(ii)	Down				
(iii)	Up				
(iv)	Down				

$$\Sigma \text{ Speed} = \text{Speed (i)} + \text{Speed (ii)} + \text{Speed (iii)} + \text{Speed (iv)}$$

$$\text{Average Speed recorded} = \Sigma \text{Speed} / 4 = \underline{\quad} / 4 = \underline{\quad} \text{ Knots}$$

Remarks: On running the boat at full throttle, it was observed that the engine achieved a maximum _____ RPM up stream & _____ RPM downstream at Sea. The speed trials were carried out at 50%, 85% and 100 % power (_____, _____ and _____ RPM) by taking four runs at each speed (two RUNS in each direction). The speed during each run was measured by the GPS and recorded. The average speed at each RPM as well as the recorded engine / stern drive parameters are given below. All obtained parameters were found to be SAT / UNSAT.

3. Operational Checks of Navigation and Communication Equipment.4. Overall Trials Report.

Note: A summary of the overall trials is to be brought out in the report. The performance of the boat is to be commented upon and mitigative measure are to be brought out in the report towards improving the performance the boat (if performance UNSAT/ sub-optimal).