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**POLICY ON MAINTENANCE AND MONITORING OF
SHAFT GROUNDING SYSTEMS ONBOARD IN SHIPS**

1. Refer to the following (NOTAL):-

(a) IHQ MoD(N)/DNA letter NC/Policy/H-58/Equipment dated 05 Nov 13 regarding promulgation of NCD 3922.

(b) IHQ MoD(N)/DME letter of even number dated 05 Aug 20 regarding maintenance and monitoring of ASG systems.

2. **Background** Large electrical currents (also known as corrosion currents) pass through the ship's hull due to galvanic action caused by ICCP system, sacrificial anodes, dissimilar metals of ship etc. The electric current is modulated at

the frequency of shaft rotation resulting in emission of 'Extremely Low Frequency Electromagnetic' (ELFE) field, which can be detected by sensors and also activate Multi-Influence Ground Mines (MIGM), posing a serious far-field threat. Shaft Grounding system is an arrangement to reduce the shaft's modulation of the galvanic current/associated ELFE field as well as protection of shaftline components from effects of corrosion currents. This is achieved by reducing the potential difference between shaft and hull. While Passive Shaft Grounding (PSG) system ensures reduction in potential between shaft and hull by physically shorting the hull to shaft, an Active Shaft Grounding (ASG) system ensures even lower potential difference by creating an extremely low resistance electric path between shaft and hull, through an ACU.

3. Issues w.r.t Maintenance/ Monitoring of ASG/ PSG Systems.

Comprehensive audit undertaken on ASG/ PSG systems pan Navy by NATAA in Dec 20 has revealed sub optimal performance of these systems, primarily due to lack of awareness/ parentage of the system onboard. The critical gaps observed in the present induction/ maintenance model are as follows:-

(a) While PSG systems are normally supplied by shafting OEM, the ASG systems are presently being procured by shipyard along with ICCP systems through nominated indigenous vendors (M/s Cathodic Controls and M/s Sargam Metals) based on specifications vide NCD 3922, Issue 2 (promulgated vide IHO MoD(N)/DNA letter ibid).

(b) ASG system comprises of three slip rings out of which one performs function of PSG system. Presently, in view of different routes of induction of ASG/ PSG systems, a few new construction ships are supplied with both ASG system and PSG system separately by ICCP OEM and shafting OEM respectively, leading to installation issues.

(c) MAINTOPs specific to Shaft Grounding Systems were not existing leading to sub optimal maintenance of the Shaft Grounding systems. Accordingly, iaw IHO MoD(N) directives at Para 1 (b), separate MAINTOPs have been now issued for Shaft Grounding Systems in Mar 21.

(d) There is a need to clearly define the maintenance and monitoring aspects onboard ships for ASG systems in order to ensure proper parentage and optimal performance of these systems.

(e) Towards resolving issues at Para 3(a) and (b), a review of present model of sourcing ICCP and ASG systems as a set from nominated ICCP vendors is warranted with procurement of ASG system to be undertaken through shafting OEM from reputed ASG manufacturers, for all future projects, akin to PSG systems.

4. Responsibilities for Onboard Maintenance/ Monitoring. Overall responsibility of the ASG/ PSG system would fall under Engineering department. The department-wise responsibility for onboard maintenance, performance monitoring, defect logging, maintenance of spares etc would be as follows:-

<u>Ser</u>	<u>Activity</u>	<u>Responsibility</u>
(a)	Recording of ASG/ PSG parameters and maintenance of log book	Engineering department
(b)	Maintenance/ Inspection of cables/ ACU/ conduits/ all electrical Units of Shaft Grounding systems	Input power supply to ASG system- Electrical department ASG system downstream of input power supply- Engineering department.
(c)	Defect logging and remedial action (including raising of the defects to yard/ OEM)	Input power supply to ASG system- Electrical department ASG/ PSG system- Engineering department
(d)	Rendering of ASG parameter returns to HITU and MTU/ CTT on quarterly basis	Engineering department
(e)	Performance monitoring of ASG/ PSG systems	Engineering department
(f)	Provisioning and stocking of spares onboard ships	Engineering department

5. **Action By NATAA.** Optimal and effective maintenance of the ASG/ PSG systems would involve effective coordination between Engineering and Electrical departments onboard ships. Further, coordinated and integrated trials by MTUs/CTT, ETMA and HITU are envisaged for holistic performance assessment of Shaft Grounding systems. MTUs/CTT are to be the lead trial agencies for integrated trials of Shaft Grounding Systems. Following be undertaken by NATAA in order to develop clear roadmap for life cycle support of Shaft Grounding systems onboard *IN* ships:-


(a) Preparation of trial protocols for checks of ASG/PSG system for in-service ships.

(b) Checks of ASG/ PSG system during Pre Refit/ Post Refit/ Commissioning trials as per GRAQs/ Trial Protocols.

6. **Procurement of ASG System.** Procurement of ICCP and ASG systems is to be de-linked and procurement of ASG system is to be undertaken through shafting

OEM from reputed ASG manufacturers based on SOTRs formulated by IHQ MoD(N)/DME, for all future projects.

7. IHQ MoD(N)/DNA policy letter at Para 1(a) and NCD 3922 will be amended in due course


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