History of research of biofouling and antifouling systems conducted by Brazilian Navy

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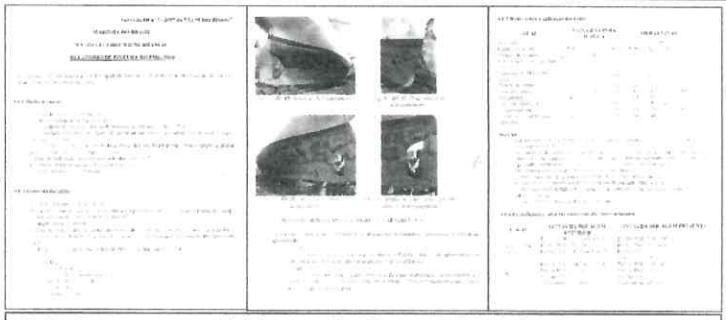
✓ Biofouling research carried out by the Institute of Marine Studies Admiral Paulo Moreira (IEAPM), a R&D Brazilian Navy Institute, in the last three decades was essential for fouling control and management on Navy vessels. Initially, it was proposed the inclusion of a manual for fouling species identification in the docking reports and a database was created to store these information, providing a tool for an objective evaluation of the performance of commercial antifouling systems (AFS).

✓ From 1983 to 2007, the BIOTECMAR Department of the IEAPM analyzed 320 Painting Reports of ships and submarines of the Brazilian Navy, generating information about the fouling organisms and the efficiency of the different types of inks used.

✓ Over the years, several aspects were integrated for best practices, such as consider in the evaluations the operational profile of the vessels and the environmental parameters of the anchoring areas of navy vessels.



Painting Reports of ships and submarines of the Brazilian Navy

✓ From 1997 to 2008, the fouling occurring in 57 vessels of the Brazilian Navy (BN) during its explorations, including mainly Patrol Ships, Corvettes, Frigates and Submarines, were analyzed. In specific reports for each vessel, the antifouling effectiveness of the paints applied to the hulls was evaluated.

4 painting reports - Corvettes

8 painting reports – Navy Patrol

14 painting reports - Frigates

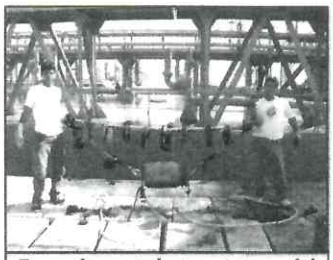
7 painting reports – Training Ship Brasil

14 painting reports - Submarines

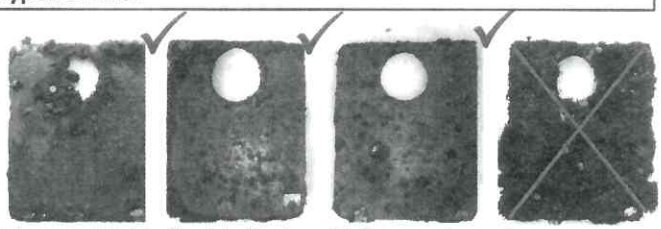
10 painting reports other vessels BN

✓ IEAPM had an effective contribution to the 2001 Antifouling Paint Convention with 30% of the proposed articles approved in the Convention. Methods developed by IEAPM to test AF systems has national and international recognition as well as the use of the Biofouling Index to evaluate and compare the different types of AFS.

✓ Between 2003 and 2004, the BIOTECMAR Department of IEAPM tested 10 new paints from 6 companies, with the aim of replacing the Tributil Tin (TBT) biocide, which was banned because it is highly toxic to the environment.



Experimental structure with plates with 10 TBT inks tested in Guanabara Bay, RJ



Interocean DRP (Tecno Química) | Captain Excion (RENNER) | AF Seaquantum (JOTUN) | Plate with paint Low efficiency

Plates with efficient formulations anti-fouling performance after 2 years of testing in Guanabara Bay

✓ Since 2007, the BIOTECMAR Department of the IEAPM has been testing new anti-fouling paints without TBT manufactured by different companies, aiming to homologate the most efficient formulations to be used by the ships and submarines of the Brazilian Navy.

Ecoloflex SPC HBR
Ecoloflex SPC 600

Supermarine AF Ionex MB HS 870
Supermarine AF LCL 870
Supermarine AF LCL PLUS 870
Supermarine AF LCL 75

Ecofleet 690

Sea Quantum Ultra S
Sea Force 90
Sea Conomy 700

Paints tested in Guanabara Bay and in the IEAPM experiment site at Arraial do Cabo City, RJ. (better anti-fouling performances)

✓ The participation of IEAPM in the project Low Emission Antifouling (LEAF), project funded by the European Community, the coordination of GEBIO project for management and control of biofouling and bioinvasion in Brazilian coast and the recent nomination of the IEAPM as coordinator of the GloFouling Project in Brazil, demonstrate the international level that biofouling research has achieved in the Brazilian Navy.

GEBIO

LEAF

IMO