

Antifouling Paints- Past, Present & Future

Robert J. Martin

Arch Chemicals, Inc.



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Antifouling Paints: Past, Present & Future



Results of Toredos worms



Barnacle invasion



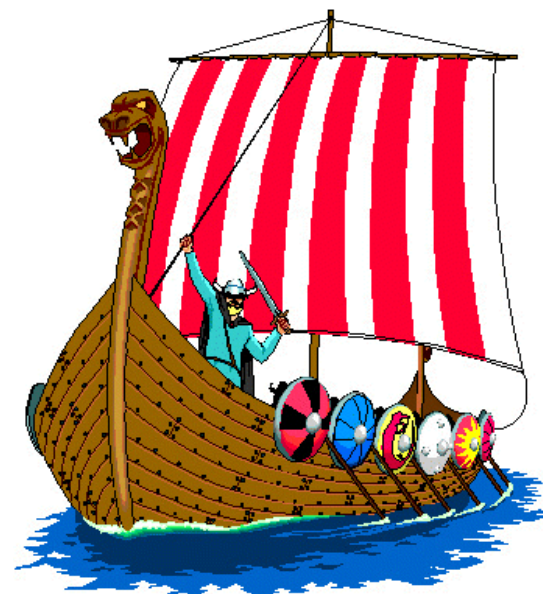
Fouled fish net



Algae on a non-stick surface

Antifouling Paints: Past, Present & Future

- 280 BC lead sheets attached to ship hulls
- 1000 Vikings apply tar to ship hulls to prevent worms
- 1700's copper sheathing was found to be lighter than lead by British Navy
- 1960's organometallic compounds easy and inexpensive to apply.



*Antifouling Paints: **Past**, Present & Future*

- **In 1625, the first patent for antifouling paint**
 - Issued in Britain to William Beale (No. 32/1625).
- **The first U.S. patent for a paint against fouling.**
 - Issued to James G. Tarr and Augustus H. Wonson of Gloucester, Mass. on 3 Nov 1863
- **First Japanese patent for an antifouling paint**
 - Issued to Zuisho Hotta on 14 Aug 1885
 - First Japanese Patent ever issued

*Antifouling Paints: **Past**, Present & Future*

- **The sixties saw the entrance of TBT and self polishing polymers**
 - **A significant advance in performance**
 - **Polishing insured consistent delivery of the biocide**
 - **Consistent 5 year performance**
 - **Economical**

Antifouling Paints: Past, Present & Future

- TBT was found to have some problems
 - Persistent in the environment
 - Destruction of shellfish populations
 - Sex changes in invertebrates
 - An endocrine disruptor
 - Bioaccumulates
 - Toxic at extremely low concentrations

“TBT is the most toxic compound deliberately released into the marine environment by man.”



STOP TBT

**VERBODEN
AF TE**

GREEN?

*Antifouling Paints: **Past**, Present & Future*

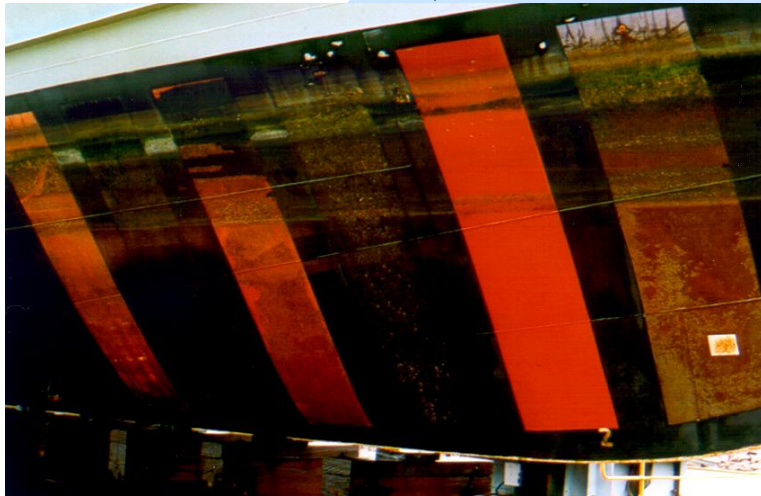
- Collapse of the oyster industry in Arcachon Bay, France, resulted in restrictions upon the use of TBT beginning in 1982
- France, UK, US, Australia and many others banned its use on vessels less than 25 meters
- Commercial vessels continued to use TBT SBC paints but with a controlled leach rate
- Proposal introduced in 1996 at the MEPC to ban all use of TBT by 2006

*Antifouling Paints: **Past**, Present & Future*

- **AFS treaty met with serious resistance by both the commercial ship industry and key flag states**
 - **Concern about the performance of alternative technology**
 - **Concern about the alternatives environmental impact**
 - **Concern about cost**

Antifouling Paints: Past, Present & Future

Concern about performance



2 year performance



5 year performance

Comparison Test of AF Paints on Australian Navy Ship

*Antifouling Paints: **Past**, Present & Future*

- Concern about Environmental Impact
 - Education about the alternatives to NGO Environmental Groups
 - Registration of Ecoloflex by the US EPA
 - Recognition that there were multiple biocides available

*Antifouling Paints: **Past**, Present & Future*

- Obtaining the critical mass to pass the treaty on a timely basis
 - Japan and the US working together
 - Environmental Groups recognizing that building in a mechanism for future helped prevent another TBT
 - Support by the Paint industry that alternatives were available
 - Convincing the key flag states of the need for a treaty

*Antifouling Paints: Past, **Present** & Future*

- International Convention on the Control of Harmful Anti-fouling Systems on Ships
 - Passed in October 2001
 - Enters into Force September 17, 2008
 - Ratified by 30 member states with 49.17% of the worlds tonnage
 - No ship with an antifouling paint with organotin used as a biocide can be used by or enter into countries who have ratified the treaty

Antifouling Paints: Past, Present & Future

- What hurdles does a new antifouling paint face?
 - Biocide Product Directive in the EU
 - REACH in the EU
 - FIFRA registration in the US
 - AFS Treaty
 - ISO Risk Assessment for AF Biocides (Proposal)
- Cost to register a new biocide in the EU is 3-5M €

Antifouling Paints: Past, Present & Future

- Concern for invasive species
 - New Correspondence group in IMO discussing the issue
 - Recognition in the US that performance of AF coatings are key in this issue.
 - AP Moller-Maersk stopping use of silicones
 - “Slime impacting fuel consumption and air emissions has a greater environmental impact than the increase in toxicity of the biocide based”*

*Environmental Report 2007, A.P.Moller-Maersk Vessels

Arriving in Australia with a clean hull

New rules for vessels entering Australia

AQIS fact sheet

New biofouling protocols

The Australian Quarantine and Inspection Service (AQIS) is preparing to introduce the world's first biofouling protocols as part of a national project to keep marine pests out of Australian waters.

From 1 October 2005, a phase in period of voluntary guidelines will commence. After a review of the voluntary phase, the requirements will become mandatory. This is expected to occur after 1 October 2006.

What is biofouling?

Biofouling refers to marine organisms that attach themselves to objects immersed in salt water, including the hulls and ancillary gear of yachts.

Ancillary gear includes anchors cables, fenders, cordage, tenders and anything else in regular contact with the sea.

Primary fouling is the layer of slime that accumulates on an object shortly after immersion.

Secondary fouling is the attachment of larger organisms that feed on the slime – for example weeds, barnacles and mussels.

When these organisms arrive in a new location they may out-compete local species for available food, spread disease and devastate native environments.

What is the threat?

It is estimated that 70 per cent of the 250 introduced marine pests in Australian waters arrived via vessel biofouling, with the remainder arriving in commercial vessel ballast water.

Many introduced species have no natural predators and can therefore spread rapidly.

Recent incursions of invasive marine species into Australia, notably the Black Striped Mussel into Darwin and the Asian Green Mussel into Cairns, are believed to have been the result of small vessel biofouling.

What you need to do

Arrive clean

If your vessel arrives clean in Australia with acceptable documentation, then you will fulfil Australia's biofouling requirements.

Before you leave your last port for Australia:

1. Keep all ancillary gear and internal seawater systems clean of marine pests and growths; and
2. Clean your vessel's hull within one month before arrival; or
3. Apply antifouling paint within one year before arrival; or
4. Book your vessel in to be slipped and cleaned within one week of arrival.

Make sure that special attention is paid to the following high risk areas:

- hull, keel and rudder;
- propellers and shafts;
- anchor wells (including anchor, chain and rope);
- water intakes and outlets;
- tenders and outboard motors; and
- sea strainers and internal water systems.

Note: Careening in Australian waters is not permitted.

Keep records

If you clean or apply antifouling paint to your vessel, as in (2) or (3) above, keep a record of where, when and by whom the work was done (including paint details). Also retain any receipts from marinas, haul out facilities or chandlers to assist AQIS to verify when the work was done.

If you do the work yourself, keep records of what was done, where and when in your vessel's logbook or journal.

Benefits of hull maintenance

Boats sail better and faster; resale values are maintained; hulls last longer and marine pests are kept out of Australian waters.

Vessel operators who arrive in Australia with a clean hull won't face the cost of an unplanned slipping of the vessel.

Quarantine Matters!



Australian Government
Australian Quarantine and Inspection Service

Antifouling Paints: Past, Present & Future

- More non persistent biocides with minimal impact on non target species
- Balancing the concerns for the environment with practical solutions
- Combining the best of non-stick coatings and Biocidal coatings
- Developing surfaces that help repel unwanted passengers
- A world where innovation can thrive and move forward without crippling costs that stifle innovation



Antifouling Paints: Past, Present & Future

The 14th International Congress on Marine Corrosion and Fouling in Kobe, Japan has created an environment for the global exchange of ideas, new technologies, potential solutions and the pathway to the future in antifouling technology

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Thanks to

World Council of Shipping

Bryan Wood-Thomas

Arch Chemicals

ICMCF Organizing Staff

