ANTIFOULING
The Barnacle Battle

Altex
Yacht & Boat Paint

An antifouling manufacturer's perspective 2018

Our company has been formulating and manufacturing marine antifouling products for the New Zealand market since the late 1960's. In addition to our own developments, we also manufacture and resell products based on licensed technology.

Since the major EPA review of allowable antifouling biocides took place in 2013, the biocide tools that are available to us as formulators and as resellers/importers has become more restrictive than ever before. In the next 5 years, further reductions in allowable biocides will be implemented in New Zealand.

As a company heavily invested in the antifouling market place, we can feel the compliance lid sinking restrictively down on us regarding the challenge of meeting our boating and commercial marine customers' expectations to have foul free hulls during their respective docking cycles. In addition, the expectation of regulatory authorities to have a foul-free fleet to control and prevent the transport of organisms from one area to another is also challenging.

The current allowable biocides for barnacle control are restricted to one element: copper*.

The other allowable biocides are mainly effective only on soft fouling organisms such as slime, algae and biofilms.

Our current antifouling development program has been running continuously for over 17 years, and during that time new compliant products have been launched. As well, on an experimental basis, we are looking at other compounds that are registered around the world for barnacle control. Early indications show that these new compounds have real promise regarding adding additional firepower to our barnacle battle strategy, should the New Zealand EPA eventually register these compounds.

Meanwhile, the effectiveness of our current product offer is well regarded around most areas of New Zealand, Australia and the Pacific Islands.

However, it's not as simple as that!

Antifouling products can be manufactured consistently to a high standard, under controlled and repeatable conditions, that deliver a consistent product to the customer. However, what we cannot control or even predict is the makeup of the seawater the products are expected to perform in.

Unpredictable variables can occur, such as low salinity, fresh water runoff, dissolved minerals and gases, temperature variations, silt content, contamination from fuels and fertilizers, algal blooms and unusually heavy barnacle spawning seasons. The level of marine life living on surfaces that sit adjacent to berthed vessels can act as a seeding source to attack nice clean hulls, which move into an otherwise highly contested real-estate. Water movement and vessel usage are also strong influencers of antifouling performance, as is correct application of the antifouling system. A little understood fact, now being studied, is that some barnacles have a level of tolerance to copper. Equally, the pH of the seawater is significant.

These variables all come into play at various times and places around the New Zealand coast.
In some instances, a “perfect storm” of these variable factors may occur, and combinations are created such that our products may not always perform as expected. Not unlike antibiotics in the pharmaceutical industry, sometimes nature wins despite our best efforts, investments and intentions, and a product will simply foul up, sometimes in a very short period.

So why do the many variables impact the performance of antifouling?

The quoted variables, either singularly of in combination, can affect antifouling performance and I have listed some examples:

- Fresh water content in seawater (ie brackish conditions), and where runoff is not well distributed by tides or wind, can significantly reduce the toxicity of copper by reducing its solubility.
- Dissolved organic carbon (DOC) in the water is well proven to bind up copper thus rendering it less toxic or non-toxic. The US EPA published a chart showing that the higher the DOC level the more copper is required to be effective. Rainwater, plant breakdown matter and plankton blooms are significant DOC sources.
- Fresh water not only reduces the solubility of copper in an antifouling, but it also slows the solubility of the binder system. In particular, the hydrolysis of silyl polymers is slowed, and this is a key resin in many modern state-of-the-art antifoulings.
- Water movement is another critical factor. Antifouled hulls sitting on moorings and in berths where water movement is sluggish are more prone to fouling, especially where waters are silted up. Biofilms and slimes prefer these conditions, and thrive unless washed off. They can block up the paint surface, thus slowing the release of copper, and barnacles can quickly establish.
- The paint. Adequate coating thickness, with sufficient drying times between coats (longer is better as a generalisation) is important. Over-applying the paint, and/or rapid recoating, can cause solvent entrap ment and soft films that disrupt or prevent the biocide release.

What does all this mean for our marine customers?

A complex set of natural and man-made conditions can singularly, or in combination, cause antifouling products to underperform. There is little that the paint supplier in New Zealand can do about this currently, especially with regard to some types of barnacles.

On a national scale this is not an issue, with a minimal number of problems reported statistically. However, there are local “hot spots” around the coast where problems are of real concern. These include Whangarei north and the Bay of Islands. Slip operators and boat owners are reporting premature barnacle fouling across most manufacturers products.

From a manufacturers position

We can’t control natural events and we don’t promise customers there won’t be a time and place where nature will win the barnacle battle.

We do promise that the products we supply will be made consistently and in compliance with the current regulations and their allowances. We do not skimp on ingredients to economise, and we treat changes to any formulation that have come through our development program with the utmost caution.

We continue with a vigorous development program to look for answers within the sphere of EPA allowable biocides, as well as investigating emerging new technologies.

We have observed that a product which worked well for one docking cycle may not perform as well (or may in fact perform better) for the next cycle. This variation is one of the reasons that most antifouling manufacturers around the world have many products to offer any one market segment.

Take heart, the battle of the barnacle is being fought on many fronts. Looking back over many decades the war is being won despite the dwindling number of approved and allowable defenses.

As an industry investment in R&D and the personal efforts committed to addressing the challenge of marine fouling is very significant. I have full confidence that current technology is very effective though not perfect. Over time even better solutions will be discovered.

Mike O'Sullivan
Altex Coatings Ltd
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**Copper can be used in modern antifouling paints in the form of copper metal powder, cuprous oxide or cuprous thiocyanate ("white copper"). Modern engineered cuprous oxide is significantly more stable and more effective than the pigments we used 50 years ago, and since the banning of TBT, copper in one form or other forms the major barnacle biocide in antifouling used world wide, in both commercial and pleasure marine markets. Copper is also used, but to a lesser extent, in compounds used as co-biocides, and/or as part of the polymer or resin that the antifouling paint is based on.*

Altex Yacht & Boat Paint - www.altexboatpaint.com		
Head Office New Zealand: Altex Coatings Ltd 91-111 Oropi Road Greerton, Tauranga Tauranga Mail Centre Ph :+64 7 541 1221 Fax :+64 7 541 1310	**Head Office Australia: Resene Paints (Aust) Ltd Industrial & Marine Division** 7 Production Avenue Molendinar Queensland 4214 Ph : +61 7 5512 6600 Fax :+61 7 5512 6697	DISCLAIMER Important Information No antifouling paint can be effective under all conditions of exposure, and the performance of this antifouling product depends on many factors beyond the control of the manufacturer, including but not limited to, variables during application and curing, climatic and environmental conditions both global and local during exposure, and acts of nature. We cannot and do not warrant that this product will be suitable for your particular purpose or application and no liability whatsoever is accepted by us. Any information provided by us is provided as a guide only, based on our field experience and raft trials. It is provided without warranty, express or implied. It is your sole responsibility to determine the suitability of the antifouling product for the use contemplated. Ensure you have the latest product datasheet and material safety data sheet from the manufacturer or supplier. Check the data sheet issue date with the listings at www.altexcoatings.com Altex Terms and Conditions of Trade, available at www.altexcoatings.com, apply in respect of all coating products and materials supplied, including samples.