

Scandinavian company leads antifouling revolution

Sit in the heart of Scandinavia, Swedish biotech innovators I-Tech AB has been shaking things up in the paints and coatings sector of the maritime industry over the past few years. The company was founded upon a unique discovery made by Gothenburg scientists that is revolutionizing hard biofouling prevention on ship hulls. The team of scientists proved the efficacy of an active substance, which at extremely low concentrations, can neurologically scramble a barnacle larva making it hyperactive, with reversible effects, preventing it from being able to attach to any coated ship wetted hard surface. This bio-repellent innovation is unique within its application in marine coatings and has attracted great interest from marine coatings manufacturers and ship owners. For the owners of dry bulk carrying ships, this Scandinavian innovation could offer a solution to the growing problem of hull fouling, particularly for idling bulk carriers.

Companies that transport dry bulk, iron ore, coal and other bulk commodities are weathering the downturn in a market. Under current market conditions, idle bulk carriers, in addition to other ship types, are inhabiting coastlines across the globe. Ship owners are increasingly demanding solutions that are both well-suited to specific ship trading patterns, and varying activity levels. When looking at the future

trading potential, they need to ensure that their ship is protected whether it be in constant active service, idle for long periods of time, or have the risk of fluctuating between the two. This future-proofing approach to antifouling coating selection, without any certainty of future trade, is exerting great pressure on the coatings suppliers, prospering great innovation and new approaches to the development of fouling prevention technology.

A great number of ships frequently lay idle in biofouling hotspots. Average global sea temperatures are warming meaning that biofouling risk within these areas is increasing year-on-year. A fouled hull is an issue for any ship operator as it directly impacts the fuel consumption of a ship due to increased drag. The different types of fouling can also present differing issues in addition to immediate fuel consumption impact. Some soft fouling may be 'washed off' when an idling ship once again becomes active at a certain speed. Soft fouling can also be removed by less impactful hull cleaning practices. Hard fouling, however, is a trickier guest to get rid of. Hard fouling, including barnacle growth, will not be removed when a vessel is travelling at speed. Also, the hull cleaning methods required to remove hard fouling can be more impactful to the coating than those effective for the removal of soft fouling.

This means that ship owners are placing great importance on selecting coating products that can cope with conditions in the 'red zones' in which their ships operate, where water temperature can be high and hard fouling can be problematic if a ship is at anchorage for three to four weeks, for example.

The issue of biofouling is also becoming an increasingly dominant issue on the agenda of some Asian shipyards, with newly launched vessels laying idle in warming waters, suffering the effects of intense fouling during the three to four months fitting out process. This accumulation of biofouling on the hull can impact both the newly applied coating and the ship performance of a newbuild leaving the yard. This means the shipyards are also pushing for antifouling solutions that ensure static performance of ships during outfitting.

Gothenburg-based I-Tech AB has thus far dedicated over a decade of research and development work to these current aforementioned issues. Its quest to find, develop and commercialize a fouling prevention technology alternative for hard fouling prevention commenced in the wake of the IMO decision to ban the application of tributyltin (TBT)-based paints on vessels as of 1 January 2003.

The resulting Selektepe® story about I-Tech's biotech approach to fouling prevention is one that involves chemists,



The entire hull of the Calypso is coated with Selektepe®.

The Selektepe® difference



Without Selektepe®.



With Selektepe®.



Coastal vessel: the Selektepe patch is still clearly visible after one year.

marine biologists and engineers and a 'Eureka' moment which yielded an organic, non-metal compound named Selektepe®; this agent is effective at 0.1% of an antifouling coating's overall constituency. This innovation milestone for the industry was subsequently followed by 15 years of trials, and exhaustive regulatory hurdles for the technology.

What the Swedish scientists discovered was a unique pharmacological mode of action that works to prevent barnacle larvae from settling on ship structures by inducing hyperactivity in the barnacle larvae. Selektepe's fouling prevention mechanism works by temporarily stimulating the cyprid larvae octopamine receptor and activating swimming behaviour. The effects of this neurological scrambling are temporary, with the larvae returning to normal functional capacity shortly after encountering the Selektepe® present in the ship's hull coating.

With an efficacy that requires just 0.1% of Selektepe® in an antifouling coating's overall constituency, this technology offers the opportunity for coatings suppliers to use just a fraction of the active substance needed to achieve comparable performance if traditional copper-based biocides are used. In fact, Selektepe® is flexible enough to boost copper-based formulations, but is also powerful enough to replace copper in copper-free formulations.

Due to the powerful effects demonstrated, this first-of-its-kind coatings technology rapidly caught the attention of coatings suppliers in the early stages of its research and development. To this date, the testing of Selektepe®-containing formulations by coatings suppliers continues to accelerate at a rapid pace, with a multitude of commercial products being launched onto the market.

The all-important green light for global market deployment was signalled in 2015 when I-Tech received EC recognition for Selektepe®, enabling it to be included in anti-fouling products sold throughout the EU as of 1 January 2016, in accordance with the terms of the EU Biocidal Products Regulation. This came in addition to the already secured approvals for the use of active agent in Japan, China and South Korea.

The first commercial, Selektepe®-containing coating products for use on ocean going vessels (OGVs) were launched in the market in 2016. That same year, a 12-month trial of a tanker coated with copper-free, Selektepe®-containing paint yielded fantastic performance results. This six-year 2010-built, 46,067dwt IMO II chemical and products tanker vessel Calypso, due to enter into its second year of active service since the Selektepe®-containing hull coating was applied in November 2016, is still showing extremely low development rates of added resistance on the hull. Scandinavian ship owner, Laurin Maritime, applied the coating inclusive of I-Tech's bio-repellent technology during the ship's first five-year survey at the Singapore yard Sembcorp.

Another Scandinavian owner, Stena RoRo signed a contract to coat the hulls of four newbuild RoPax ferries with paint that incorporates Selektepe®. The delivery of the newbuild Stena RoPax ferries is scheduled for 2019/2020. They will be built at the AVIC yard in Weihai, China.

"We are honoured that a pioneer of sustainability in commercial shipping such

as Stena RoRo has chosen a Selektepe®-containing hull coating product for its newbuild programme. Their investment in a premium antifouling product that contains Selektepe® will deliver strong antifouling performance with the additional benefit that their high-activity vessels will have the best protection from barnacle invasion," says Philip Chaabane, CEO I-Tech AB.

I-Tech has also celebrated success with the launching of brand new products into the market this year. The increasing diversification in the range of Selektepe®-containing products available to ship owners suitable for different vessel requirements demonstrates the unrivalled versatility of the antifouling ingredient. It also demonstrates a growing commitment to the technology as demand from ship owners for antifouling coatings comprising Selektepe® intensifies.

SEA GRANDPRIX 880HS PLUS is the third product Chugoku Marine Paints (CMP) has launched that contains Selektepe®. It joins CMP's SEAFLO NEO CF Premium; and SEAFLO NEO-S PREMIUM Selektepe® products.

The new antifouling coating is based on hydrolysing technology and can be applied to deep sea-going vessels trading worldwide in-service periods for up to 90 months. Uniquely, CMP guarantees extended static performance of up to 45 days, thanks to the barnacle-repellent boost enabled by Selektepe®-combating barnacle settlement on the ship's hull by temporarily stimulating the barnacle larvae's swimming behaviour.

To date, marine coating products containing Selektepe® have been applied to over 150 vessels including many bulk carriers.

"As demand for Selektepe® soars, the number of antifouling products that contain our unique bio-repellent ingredients is expanding. This ensures that ship owners and operators have a selection of products to choose from, and confirms the flexibility and compatibility of our product with a range of different antifouling ingredients," says Philip Chaabane, CEO I-Tech AB.

For Selektepe®, the future is promising as an ingredient for marine coating that can enable superior static performance in addition to supporting the reduction of invasive species transfer and emissions by contributing to cleaner, more efficient hulls.



Philip Chaabane, CEO I-Tech AB.