

Successful ship trial results for barnacle-repellent active agent

A twelve-month trial of the bio-repellent active agent Selektepe was recently completed on the Laurin Maritime-owned chemical and products carrier Calypso. In this report, the trial results are revealed.

Average global water temperatures are increasing. Ships are increasingly idling in subtropical/tropical areas and there is a growing regulatory movement against the transportation of invasive species by ships. This trio of issues, whilst of great concern for shipyards and ship operators alike, is catalysing great innovation in the coatings sector as the pressure is on antifouling coatings to perform through changing environmental and market conditions.

The issue of biofouling is 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 month 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 pushing for antifouling solutions that ensure static performance during outfitting. In parallel, ship owners are demanding solutions that ensure good fouling prevention for vessels with differing activity levels, whether they be in constant active service, idle for long periods of time, or are at risk of fluctuating between the two.

The need to future-proof antifouling coatings against uncertain vessel operating patterns is exerting major pressure on coatings suppliers, but is in turn encouraging great innovation and new approaches to the development and trialling of fouling prevention technology.

In Sweden, biotech innovator I-Tech AB has dedicated over a decade of research and development work to these issues from its hub in Gothenburg. Its quest to find, develop and commercialise a fouling prevention technology alternative commenced in the wake the IMO decision to ban the application of tributyltin (TBT)-based paints on vessels as of 1 January 2003.



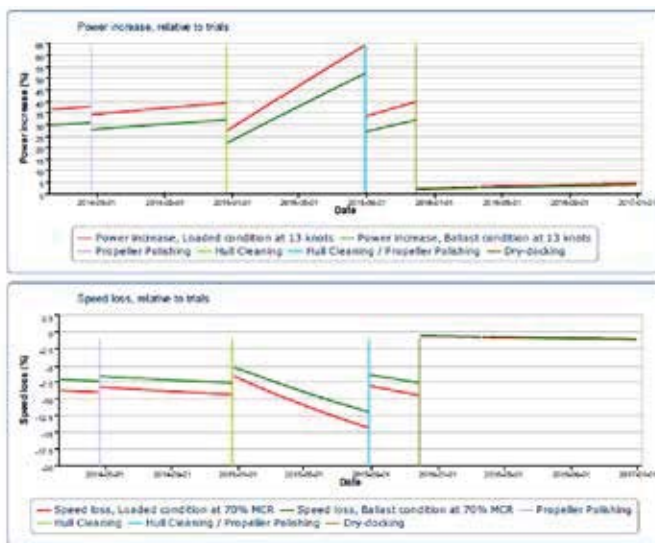
and a 'Eureka' moment which yielded an organic, non-metal compound named Selektepe. The innovation milestone for the industry was subsequently followed by 15 years of trials, and exhaustive regulatory hurdles for the technology.

What the I-Tech research team 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 making their way to market launch.

The decisive 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 approvals that had already been secured for the use of active agent in Japan, China and South Korea.

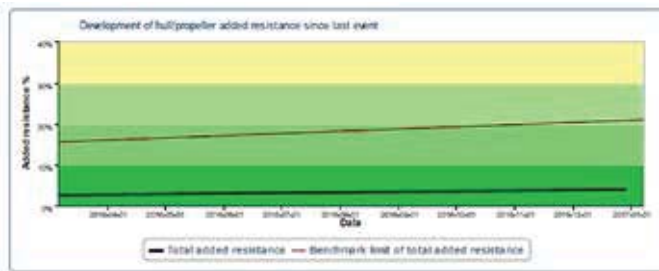
Last year was a big year for the technology. The first commercial, Selektepe-containing coating products for use on ocean going vessels



Graph_Power increase_speed loss

The resulting Selektepe story about its biotech approach to fouling prevention is one that involves chemists, marine biologists and engineers

(OGVs) were launched into the market in addition to ship trials being conducted over a period of twelve months which yielded incredible results.

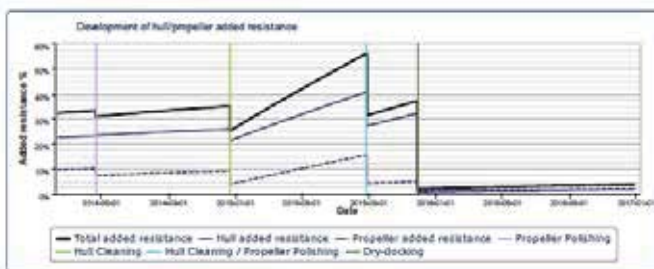


The added resistance is the increase in hull and propeller resistance relative to new building at design draft and design speed. The benchmark limit is an upper limit of the normal development of added resistance. Hull or propeller cleanings should be considered when the total added resistance exceeds the benchmark limit. After each dry-docking the benchmark limit is adjusted to the new level.

GRAPH_Hull and propeller performance

It was a copper-free coating product inclusive of Selektope that was applied to the side walls of the 2010-built, 46,067dwt IMO II chemical and products tanker vessel Calypso during its first five-year survey at the Singapore yard Sembcorp.

Laurin Maritime’s technical director Bertil Andersson says that: “It was important that the company selected a coating that can cope with conditions in the “red zones” in which its ships operate, where water temperatures can be high and fouling can be problematic if a ship is at anchorage for three to four weeks.” The Calypso operates in several regions including East and south Asia, the Americas and Australia, making it the perfect ship for the trials.



GRAPH_Hull and propeller performance 2

“The application of a Selektope-containing coating comes after several years of strong performance trial results,” says Mikael Laurin, chief executive officer of Laurin Maritime.

The hydrodynamic analysis of performance data during the trial was carried out by independent party Propulsion Dynamics. Operating rates were measured by fuel oil consumption and power output. After 12 months, the vessel was found to have increased its resistance to fouling by a total of 3% compared with a benchmark new vessel that would see an increase in resistance of 5-10 %.

The benchmark is made up of a wealth of different vessels with different coatings and draws on the extensive Propulsion Dynamics database.

This benchmark allows for the comparison of one ship to a large variety of similar vessels, overcoming the fact that it is not possible to compare equivalent ships directly when analysing and contrasting coatings performance.

The trial on the Calypso also showed that the increase in resistance came mainly from the propeller, 3%, with the remaining resistance being measured on the hull. These are very encouraging results for this game-changing antifouling ingredient.



I-Tech chairman Stefan Sedersten, applies caution when celebrating the successful trial results, saying that: “Although there are very convincing long-term performance results from patches, more time is required to confirm the promising results from Calypso [and] there would need to be further trials of Selektope for longer periods so that the long-term effects of the biocide can be measured.”

Nevertheless, these trial results are taken from a full year of the ship’s year’s operation. They offer promise for the future of Selektope as a contender to combat not only hard fouling, but also as a powerful solution to the issue of static performance, in addition to supporting the reduction of invasive species transfer and emissions by contributing to cleaner, more efficient hulls.

Laurin Maritime’s technical director Bertil Andersson says that: “It was important that the company selected a coating that can cope with conditions in the “red zones” in which its ships operate, where water temperatures can be high and fouling can be problematic if a ship is at anchorage for three to four weeks.” The Calypso operates in several regions including East and south Asia, the Americas and Australia, making it the perfect ship for the trials.