

UPDATE

Marine News - The 'DISPRO' Research Project



© Oleg Fedorenko | Dreamstime.com

A new joint marine coatings research project has been started, managed by Safinah Ltd, Morpeth, UK, and with the research being carried out in collaboration with Newcastle University School of Marine Science and Technology, American Bureau of Shipping (ABS), IHC Merwede Offshore & Marine the Netherlands, Jotun Paints of Norway, and Muehlhan International of Germany.

The purpose of the research is to improve the safety of ships by looking at new ways in which structural design can be improved to gain the optimum benefit of modern coating materials, surface preparation and application technology.

The IMO SOLAS regulation MSC.215 (82), more widely known as the Performance Standard for Protective Coating (PSPC) in dedicated seawater ballast tanks, is now in the process of enforcement by Classification on a worldwide basis. Dr Raouf Kattan, Managing Director of Safinah Ltd, said "I believe the IMO regulation has highlighted a shortage in the market place of engineering knowledge and thought leadership on issues relating to improving the coating process to meet the challenges posed". The team at

Safinah has already responded actively to clients in need of services with regard to the management of processes required to meet the regulations. However we see opportunities to assist clients further by developing new design guidelines, which will enable them to reduce costs and improve the long term performance of coatings applied in water ballast tanks. In our opinion, this may lead towards more efficient design of the internal structure of ballast tanks, improved build methods surface preparation and new coating process solutions. This could in turn help shipbuilders benefit from increasing productivity and further automation of coating related activities".

This research will allow Safinah, and their project partners, to explore what can be achieved by altering the approach to structural design and how much it can be optimised for coating activities, without having to compromise either shipbuilding or operational requirements.

The project will be undertaken within the framework of a Knowledge Transfer Partnership (KTP) programme over a period of 3 years, and with an agreed funding of £200,000. This funding is provided by AEA PLC acting on behalf of the Technology

Strategy Board.

In terms of anticipated future input to the marine coatings industry, which will hopefully result from this research, this initiative can be neatly summarised as “Design for Improving Structural Protection” or DISPRO.

The DISPRO Project Aims

These can be summarised as to reduce the complexity of ballast tank design to provide the following benefits: reduced man-hours; improved productivity in shipyards; reduced repair hours; improved turnaround in dry-dock; increased coating life, and hence reduce the operation cost to the owner.

Naval Architects have long been accustomed to designing vessels to meet operational and production requirements. However the concept of design to prevent corrosion is a new one, in fact there is often a tendency to create corrosion problems as a by-product of design, for example;

- Creating complex geometries that are difficult to prepare and coat and result in many edges that can corrode.
- Creating tight spaces that are difficult to access and ventilate/de-humidify.
- Creating tight spaces that cannot easily

be coated using an airless spray gun but require build up coats to be applied by brush and roller.

- Creating spaces that are subsequently difficult to repair and maintain
- Having flat spaces with no camber or rise of floor to assist with drainage.
- Use of dissimilar metals.
- Poorly designing outfit items for installation, resulting in corrosion traps.

If the design of ballast tank structures can be simplified it could open up significant opportunities to reduce the cost of coating ships and possibly provide routes to automation, typically the coating process can absorb between 12 -25% of the total man hours for the construction of a vessel (depending on vessel and yard type). Coating rework can account for as much as 30% of the total coating man hours, thus it can be seen that if the rework and the overall coating work content can be reduced, then the first cost of a vessel can be reduced. In addition to this if the structural design is simpler then the number of coating failures should also reduce thus giving through life benefits to the shipowners.

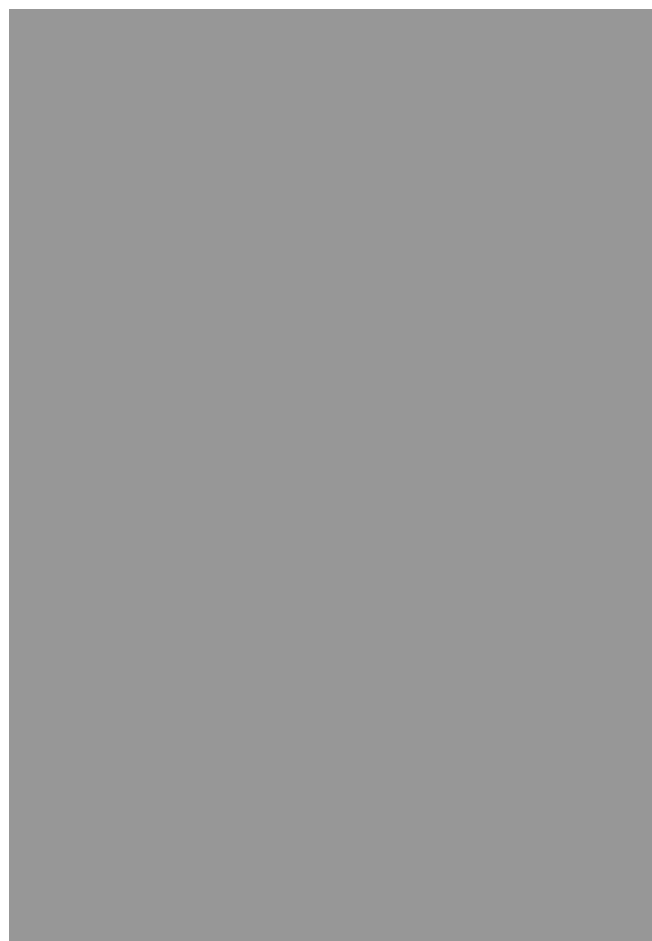
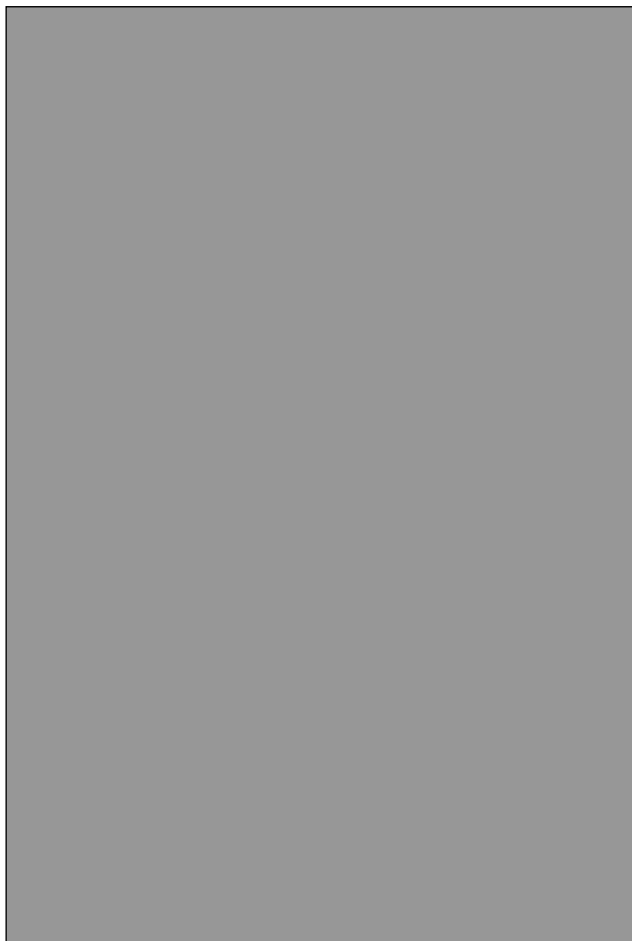
The project will review some existing

designs and quantify their complexity. These designs will then be ‘simplified’ and optimised whilst still satisfying the structural and operational requirements of the vessel. Once a number of design options have been identified, they will be presented to the project partners, to ensure that they would satisfy the other vessel safety criteria and operational needs. They could then form the base of coating friendly design guidelines. The project will thus have input to, and feedback from, all of the major parties involved in the process of designing, building and coating of ships.

Background to the Project and Collaborators

IMO SOLAS

For the first time the new IMO regulation establishes a link between the design and corrosion of ballast tanks on board ships, in section 3.3.1 it states “The coating performance can be improved by adopting measures at the ship design stage such as reducing scallops, using rolled profiles, avoiding complex geometric configurations and ensuring that the structure permits easy access for tools and to facilitate cleaning, drainage and drying



© Oleg Fedorenko / Dreamstime.com



from the space to be coated.”

This new project will allow the project partners to explore what can be achieved by altering the approach to structural design and how much it can be optimised for coating activities whilst still allowing the vessel to meet operational and production requirements.

Marine Coating Process

Safinah Ltd has participated in two successful European Commission funded projects namely Ecopaint and EcoDock. These projects helped to lay the groundwork for the current KTP project and examined new coating technology and new application tools/techniques respectively. This work continues through a new EU funded Framework 7 project “Breakthrough in European Ship and Shipbuilding Technologies” (BESST) in which Safinah is working with many of Europe’s leading shipbuilders (www.besst.it). The outputs from these early projects clearly identified the importance of design as a route to reducing costs and improving productivity.

Ecopaint was an EU framework 5, project which set out to test alternative coating materials combined with new surface and application technologies to reduce solvent emissions at the new building stage, so that the shipyards were prepared to fulfil the demands of the solvent emissions directive. The target of the project was to properly integrate the coating process into the ship production activities to achieve improved productivity and coating standards throughout the life of the ship and reduce the environmental impact.

Following from the success of Ecopaint, Safinah was involved in an EU Framework 6 project, EcoDock.

This project set out to identify elements of maintenance coating costs, which influence the optimum solution through life. The EcoDock starting point was the fact that maintenance costs for ships are increasing as a result of increasing legislation and regulation. The overall objectives of EcoDock were to:

- Improve the performance of marine coatings during the ship lifetime.
- Reduce the environmental impact of marine coatings during the ship life cycle.
- Provide independent assessment of marine coating systems with regard to economy, technical performance, environmental influence, and health and safety conditions.
- Establish a European communication platform to stimulate the information exchange of all parties involved.
- Speed up the application of advanced environmentally friendly materials and production processes in ship new building, repair and operation.

The project identified the following areas that were key for European shipbuilding and were set as the focus for EcoDock:

- Corrosion protection in ballast tanks,
- Anti-fouling at underwater areas,
- Visual impression of the superstructure,
- Improved through life,
- Improved test methods,
- Software needs.

The results from the EcoDock project allowed a gap in the market to be filled, and provided shipowners with an independent data source on selecting the right generic product type for their needs while understanding the yard implications.

These successful projects examined the surface preparation and application of the coating process, and the coatings themselves in great detail, of key vessel areas. However through this work it became clear that improved design is required. That is where the 'DISPRO' project aims to provide insight.

Safinah Ltd

Safinah Ltd is a Morpeth, UK based consulting company, providing independent advice on all aspects of coatings in the marine, protective and offshore industries. It provides authoritative, expert technical advice on the whole chain of activities that links ships, structures, coatings and the environment. It also provides market research and intelligence to help clients understand and take advantage of opportunities in a dynamic global marketplace.

Jotun Paints

Jotun Paints, based in Sandefjord, Norway, is a global leader in paints and coatings, and has 71 companies and 40 production facilities on all continents. In addition, Jotun has agents, branch offices and distributors in more than 70 countries.

School of Marine Science and Technology at Newcastle University

The School of Marine Science and Technology is the UK's first marine school which provides a single base for all education, innovation and research related to the sea. Annually more than 300 students, from more than 40 countries, register for accredited degrees in Marine Biology and four Marine Technology related streams. Teaching in the School is complemented by

Courtesy of Safinah



internationally recognised and industrially relevant research and supported by specialised facilities.

In an environmentally conscious era sustainable use of the seas, conservation of sea life and the management of the marine environment and coastlines is critical. The Marine Biology degree focuses on these current concerns and also ensures that all graduates are experienced ecologists using the Dove Marine Laboratory for coastal studies and *R.V. Bernicia* for work offshore.

Marine Technologists at Newcastle recognize that the use of the sea and waterways for energy resources, transport and leisure is growing rapidly and lead the development of new solutions for sustainable marine industries. Research activities underpin teaching on all undergraduate degree courses - marine engineering, naval architecture, offshore engineering and small craft technology.

Postgraduate courses in the School either taught or by research, span a wide range of activities but association with identified research groups mean that students enjoy the close contact with staff and fellow students to provide a friendly and flourishing research culture.



© Oleg Fedorenko / Dreamstime.com

American Bureau of Shipping (ABS)

Founded in 1862, ABS is a leading international classification society devoted to promoting the security of life, property and the marine environment through the development and verification of standards for the design, construction and operational maintenance of marine-related facilities.

IHC Merwede Offshore & Marine

IHC Merwede Offshore & Marine is one of the leading yards in the Netherlands, ISO-9001-2000 certified and able to respond to the needs of ship owners who require large vessels of innovative concept and modern design, built to a 'one off' order or in limited series. Specific demands result in dedicated designs. Ships built by IHC Merwede can provide cost-effective solutions with low life cycle costs.

Due to the productivity and efficiency of their shipyards, they have proven that substantial cost savings can be obtained. The fabrication facilities consist of two modern covered slipways which can accommodate new building vessels up to a maximum length of 240 metre and maximum beam of 38 metre. The climate conditioned painting facilities, indoor production process and 'just in time' delivery process guarantees the highest standard of quality, combined with short project lead times. The combined in-house engineering, fabrication and project management skills, together with an economic ship design and technical achievement supported by modern planning tools, has made IHC Merwede Offshore & Marine one of the first choices of many ship owners, when it comes to turnkey projects for custom build offshore vessels.

Muehlhan International AG

Muehlhan AG is an international specialist in industrial and marine surface protection - in particular for protecting ships' surfaces,



© Oleg Fedorenko / www.istockphoto.com

offshore platforms, wind mills and complex land-based steel structures against corrosion. With some 2,500 employees worldwide, the company generated sale revenue of more than EUR 206 million in 2008. Muehlhan's headquarters is in Hamburg, Germany. Activities are however, spread worldwide.

Muehlhan operates an R&D department, which differentiates the company well from other market participants. The R&D department is active in the following areas: surface preparation, painting techniques, surface inspection, quality assessment, and materials sciences. Co-operative, nationally and internationally funded projects that Muehlhan has been involved in include: "EcoDock" (environmentally friendly painting procedures), "PFAU" (corrosion protection systems for offshore wind towers), "BEKAS" (protection of edges in water ballast tanks) and "POLAR" (maritime techniques for cold regions). For its R&D work, Muehlhan was repeatedly honoured, for example with the "Outstanding Publication Award" of SSPC in 2008.

Knowledge Transfer Partnership

KTP is a UK-wide programme funded by 18 organisations and headed by the Technology Strategy Board, a business-led, executive non-departmental public body. KTP aims to:

- Improve the competitiveness and productivity of UK companies
- Facilitate the transfer of knowledge through projects undertaken by high calibre, recently qualified people under joint supervision from a company and an academic institution
- Provide company-based training for recently qualified people to enhance their business and specialist skills
- Stimulate and enhance business-relevant training and research undertaken by the academic institutions
- Increase the interaction between businesses and academic institutions, and awareness of the contribution academia can make to business development and growth. ■