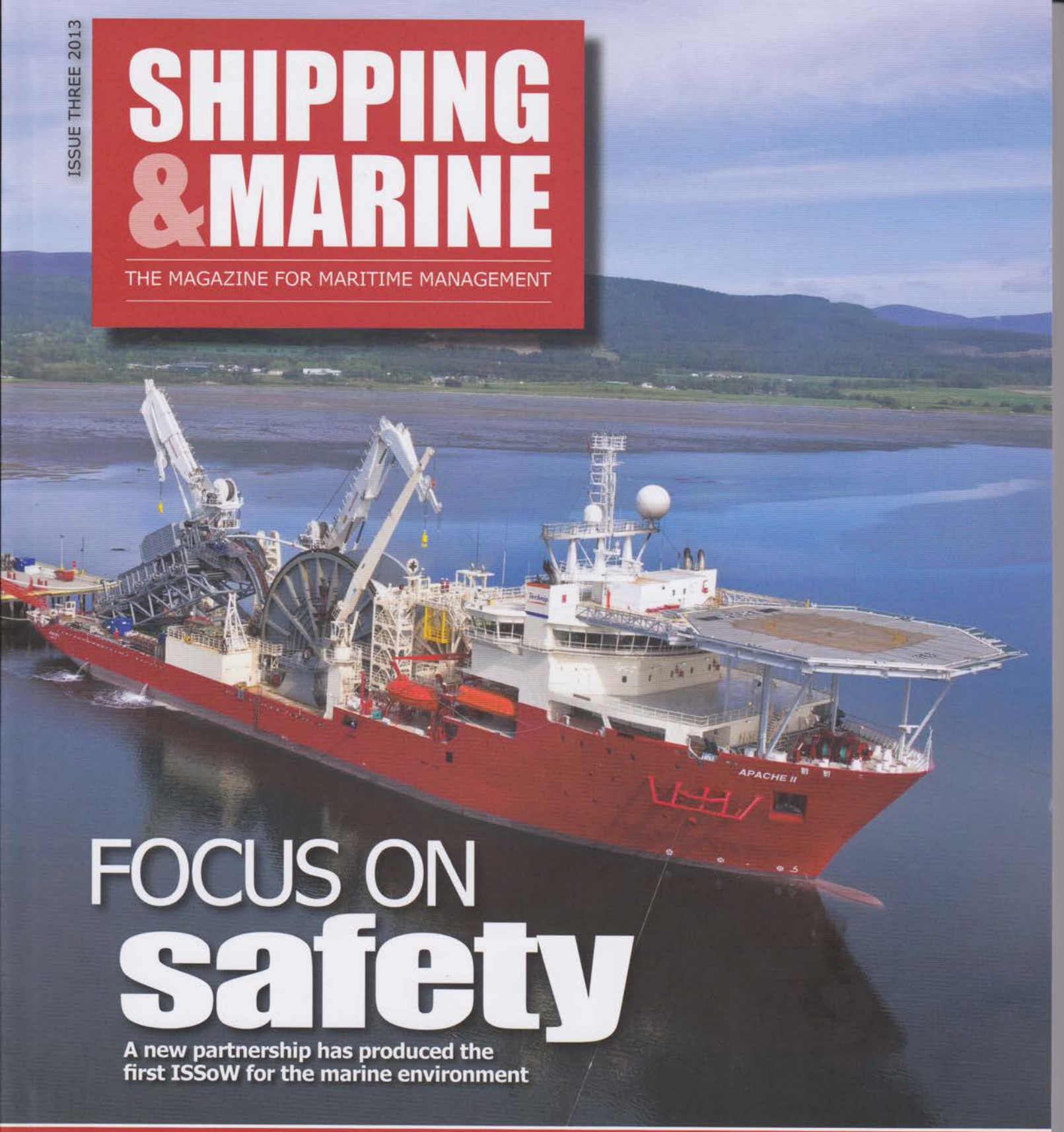
ISSUE THREE 2013

SHIPPING & MARINE

THE MAGAZINE FOR MARITIME MANAGEMENT



FOCUS ON safety

A new partnership has produced the first ISSoW for the marine environment

SMOOTH OPERATORS
The biggest potential saving for most ships comes from having a clean hull

GETTING A LIFT
One crane manufacturer is addressing the demands of deep-sea operatives

SPEED IS OF THE ESSENCE
Improving crew safety with personal AIS MOB devices

SMOOTH OPERATORS

Mike Garside discusses fuel efficiency and hull coatings

As bunker fuel prices have spiraled upwards, fuel costs dominate the worry lists of most ship operators. Meantime, greenhouse gas emissions from inefficient ships dominate regulators' concerns. Energy efficiency is more pressing than ever.

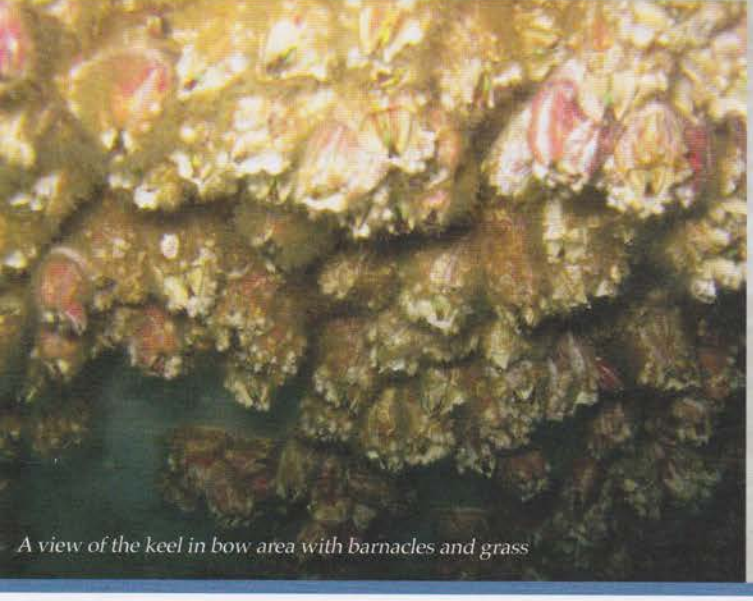
Ship design and engine efficiency play a major part in efficiency but they can't be easily changed: the biggest potential saving for most ships comes from having a clean hull. A fouled hull can add 40 per cent to fuel consumption (one US Navy study even puts the figure as high as 85 per cent), and significant fouling can develop within days while sitting in port or even slow steaming.

Even light slime adds significantly to fluid resistance, while barnacles and other growths develop with remarkable speed and tenacity and are far more severe. At 300 tons of fuel per day on a large cargo ship, at a cost of around $150,000, the fuel penalty of fouling looms large on balance sheets.

TBT era substitutes

Until 2008 the answer was biocidal anti-fouling paint containing Tributyl tin (TBT). This did a remarkably good job of keeping hulls clean and smooth and killing off incipient marine growths. Its environmental effects, however, resulted in an international ban. Even now, ports such as Rotterdam dare not even carry out dredging operations for fear of stirrup up the poisons from anti-fouling, which lie accumulated within harbor sediment.

The industry is still waiting for a successor to TBT. Many operators consider modern anti-fouling paints both comparatively ineffective and fragile, suffering as they do from long-term paint degradation (LPD, which includes such effects as blistering, delaminating, cracking and roughness from partial reapplication) which then forces relatively frequent re-coating in dry-dock – another expensive operation. But any biocide as vigorous as TBT and strong enough to wipe out fouling is likely to face major regulatory barriers on environmental grounds.



A view of the keel in bow area with barnacles and grass

Three choices

There are three main categories of hull coatings on the market, and operators have to make up their minds where to put their trust. TBT substitutes in modern anti-fouling coatings attempt to prevent the growth of fouling with a variety of allowed poisons, while superslick silicone coatings in foul-release coatings attempt to wash off marine life as they move through the water, and glass-flake hard coatings allow growths to occur but are tough enough to allow frequent underwater cleaning and thus maintain an ideal surface.

Measurement problems

Some manufacturers are now offering measurement systems to back up competing efficiency claims. No standard has emerged, and efforts to assess the fuel benefits of different coatings in practice are notoriously difficult. Frictional resistance to water is only one parameter among many: efficiency is affected by ship design, engine efficiency, fuel quality, speed of sailing, draft, trim and list of the vessel, propeller design and condition, as well as ambient factors such as wind, waves, swell, currents, water depth, water temperature and salinity. Measurements during non-steady conditions, such as while steering or changing speed, affect basic measurements. And LPD deterioration occurs over time and hulls suffer minor damage from abrasions and are then painted over, resulting in unevenness.

A to G rating

The Carbon War Room's simple A to G rating for fuel efficiency, now available on around 60,000 ships, is aimed at charterers, with the hope that fuel-efficient ships will become more popular and drive the market towards lower carbon output. Its calculations however do not yet attempt to answer the many questions regarding hull coatings.

An 'mpg' figure for ships and coatings would be welcomed, but ship-to-ship comparisons remain well over the horizon: the best that can be hoped for is measurement against baseline established for each vessel.

Cleaning bowthruster

Efficiency management plan

All ships over 400 gross tonnage were required, from 1st January 2013, to have their own Ship Energy Efficiency Management Plan (SEEMP), in line with the IMOs efforts to reduce greenhouse gas emissions. New ships with a keel-laying date on or after 1st July 2013 will also be required to meet the Energy Efficiency Design Index standards (EEDI) in order to be issued with a certificate.

The SEEMP provides an approach for monitoring ship and fleet efficiency performance over time using, for example, the Energy Efficiency Operational Indicator (EEOI) as a monitoring and/or benchmark tool. The SEEMP urges the ship owner and operator at each stage of the operation of the ship to review and consider operational practices and technology upgrades to optimise the energy efficiency performance of a ship. These upgrades include any measure that can be taken to increase the efficiency of the hull coatings.

Cleanable coatings

Coating industry giants Jotun, Hempel, Sigma and International all offer a range of coatings but the bulk of their business is in TBT-substitute anti-fouling. But if, as some operators suspect, the days of anti-fouling are numbered, then the future may divide between silicone coatings and hard glass-flake technology.

Nippon Paints did much work on the development of silicone coatings, which attracted great initial interest and enjoyed high early adoption. The silicone approach offers impressively low resistance, and claims at speeds over 15 knots to be able to shed fouling before it is established. It is however perceived by some operators as fragile and easily prone to damage. Touching up damaged sections is difficult since application requires both time and good conditions, and surface roughness caused by touching up is itself a source of fuel penalty. Maersk Shipping tried the approach but then famously abandoned it, and is still engaged in an expensive removal programme.

New generation glass-flake cleanable coatings could represent a way forward. While in port cleaning of anti-fouling coatings is banned in most ports, cleaning of glass-flake coatings is generally viewed favourably since they are environmentally neutral. The cost of regular in-water cleaning is minimal when compared to the fuel efficiency saving of operating a ship close to its original design specification with no fouling. Hydrex in Belgium is leading this race with its Ecospeed. Its figures suggest that performance increases even above ship design specifications as regular cleaning further smoothes the coating. Cruise lines using Ecospeed have reported impressive reductions in their fuel bills.

Defining moment

The international market for hull coatings is worth over $5bn a year, and is predicted to hit $10.2bn by 2018. With such high stakes the efforts to woo operators or retain their loyalty are intense. New technologies such as cleanable coatings, which last the lifetime of the ship, might be unpopular in an industry that is used to repainting ships every few years. In the meantime, a commonly agreed standard seems a long way off and operators have to trust their own judgment. ❖

Mike Garside is a writer on the coatings industry. For more information, email: mikegarside@fastmail.net