October/November 2012 the journal of ships' engineering systems

marine propulsion & auxiliary machinery

Rudders that do not need recoating

Hydrex's Ecospeed rudder coating claims to offer lasting defence against the effects of cavitation

Cavitation can be the single most destructive element for rudders and propellers, so it is vitally important that everything is done to protect them. If not it can prove to be very costly. Once the surface of a rudder has been damaged by cavitation, the protective coating will have worn away, leaving bare steel. The ongoing process can result in deep pitting and, if not treated, holes in the rudder.

Hydrex's Ecospeed coating has been designed to give a very thorough and lasting defence against cavitation and corrosion for a vessel's entire service life. The coating provides the rudder with an impenetrable protective layer while its flexibility enables absorption of the forces that are produced by cavitation, thereby preventing the damage normally caused by this phenomenon. If the cavitation cannot pierce the coating then no damage, erosion or corrosion can occur.

French Ministry of Defence tests were carried out in Grenoble in a flow channel, showing that Ecospeed performs very well under severe cavitation. These tests were divided into six stages during which the coating was exposed to an increasing pressure drop, creating a growing cavitation force. Even after the last stage no erosion was present on the test patch coated with Ecospeed.

The Belgian navy has also been active in the use of Ecospeed, to very good effect. The underwater hulls were still in excellent condition and only a few touch-ups were needed; five of the ships had been sailing with Ecospeed for over five years.

The Belgian navy chose to use Ecospeed after very satisfactory results with a first coating in 2004 on the mine-hunter *Aster*. The results were suitably impressive, and they consequently chose the Ecospeed solution for almost their entire fleet.

Corrosion, cavitation and mechanical damage add to the roughness of a ship's hull, as does the accumulation of marine fouling on the underwater hull of the vessel. This is especially significant for navy ships where fouling inevitably builds up much faster during long idle periods in between operations. All these elements lead to a loss of performance and an increase in fuel consumption.

The Belgian navy has its own in-water cleaning equipment that allows it to keep its fleet in the best possible operating state. Ecospeed's unique properties give the navy the opportunity to make savings on fuel costs and a wider operational range.

One of the latest specialised vessels to get the Ecospeed treatment, in August this year, was the 31m tug boat *Ocean Raymond Lemay*. It was prepared and painted with Ecospeed on LIsle-aux-Coudres in Quebec, Canada. The vessel is owned by Ocean Group Inc and offers harbour towing services in the ports of Quebec, Montreal, Toronto and a number of smaller harbours.

Ocean Raymond Lemay is both an ice class and a fire-fighting class vessel, which means the ship is also used to open up the frozen passageways in ports during the winter season. During such operations the vessel has to use its weight to ram into thick ice and force a passage. It is constantly hit by chunks of ice that may be 50cm or more in thickness.

When operating under these winter conditions in heavy ice season after season, the hull plates, as well as being constantly battered with heavy chunks of ice, will be flexing quite significantly in some cases. The hull coating therefore needs to be flexible enough to cope with the constant flexing of the hull without cracking or lifting, but at the same time it must be hard, to cope with the extremely abrasive action of the ice which is constantly moving across the surface with considerable force. The coating also needs to be tough enough to absorb the high impact loads when the vessel is using its weight and power to smash through the ice.

Clearly any paint is only going to be as good as the surface it is attached to, and that is the key to any type of hull coating. Preparation is just as important as the coating itself. Many owners have discovered that after spending tens of thousands of dollars on a new paint job in drydock, that months or even weeks down the line the paint is starting to flake or even peel off in sheets. Surface blasting preparation, rust and dust, and humidity all play a key role. **MP**

Hull of Ocean Raymond Lemay blasted ready for painting

Paint crew applying top coat of Ecospeed

Good blasting preparation is vitally important before painting

The finished coat should remain intact well past the next docking