Fotos: Hydrex

Protection for the Long Haul

Offshore vessels work in specific markets and under specific conditions. To protect them for decades without the need for drydocking, SubSea Industries has developed the new product Ecolock. By **Boud Van Rompay**

The very concept of FPSO's is based on exploiting marginal oil fields and it is customary for all our clients to demand an FPSO that will operate in one location for 15 to 20 or even 25 years without drydocking. Whether it is a new build or a converted hull, this long life expectancy is a tall order indeed. Besides no drydocking, the contract is always quite demanding regarding downtime. Either zero or minimal few hours every month, the downtime does not allow the contractor any freedom for remedying corrosion wastage during operations, particularly in inaccessible areas of underwater hull, moorings, sub-sea structures and even cargo/ballast tanks. The rationale of not stopping production is fully understood by the contractor as this has substantial and often unbearable economic impact.« These words were spoken at a workshop on Coatings for Corrosion Protection held in Biloxi, Mississippi by Adolfo Bastiani, Vice-President Offshore Operations of MODEC International LLC.

They apply to more than just FPSOs. In general, offshore vessels of all types need to stay out of drydock for greatly extended periods of time without suffering corrosion problems stemming from hull coating failures. These ships tend to be very expensive to drydock. Off-hire time is too costly to consider. To add to the problem, these ships are often stationary. They accumulate large quantities of biofouling, even if toxic antifouling or foul-release coatings are used. This thick layer of biofouling must be removed or partly removed for any underwater inspection in lieu of drydock (UWILD) by classification society surveyors. Yet cleaning hulls coated with biocidal antifouling greatly depletes any remaining AF coating and is hazardous to the local marine environment. Offshore vessels increasingly operate in sensitive marine areas, which tends to rule out the continual leaching of toxic substances into the water.

Glassflake Reinforced Coating

For decades it has been known that glassflake reinforced hard coatings last longer, are tougher and more resilient, need less repair and replacement than any other type of hull coating. Soft coatings such as biocidal antifouling and foul-release coatings do not hold up well. They need to be repaired or replaced often which is not good news for shipowners and operators and particularly offshore operators who need to keep their ships out of drydock. Their antifouling or foul release properties require that the ship move through the water at relatively high speed. On stationary vessels the fouling simply builds up.

Since the early 2000s Subsea Industries, a Hydrex subsidiary, has provided a hard, cleanable, non-toxic, glassflake reinforced coating, Ecospeed. It is actually a coating system which combines a hard coating with routine in-water cleaning. The coating holds up for a remarkably long time, even in the ice or other harsh conditions. It can be cleaned as often as needed and becomes smoother not rougher with such cleaning.

It was found over time that a tougher version of Ecospeed, Ecoshield, is an even more effective protection against the forces of cavitation and corrosion that constantly impinge on the rudder and other running gear of a ship.

Recently Ecospeed and Ecoshield have acquired a cousin, also a glassflake reinforced coating, but this one intended specifically to meet the hull protection requirements of offshore vessels: Ecolock.

This is an extremely tough and durable coating designed to remain in excellent condition for 15 to 25 years without drydocking, repair or replacement. Ecolock can be cleaned underwater as often as needed to meet the UWILD and weight requirements of FPSOs, drill ships and other offshore vessels.

Surface preparation is similar to that required of any good quality coating application intended to last: roughness profile of at least 75 µm; surface cleanliness of SA 2.5 or better. This generally requires grit-blasting. No primer, mid-coat, tie-coat, topcoat, corrosion protection scheme or any other complications. Ecolock is applied directly to the prepared steel, aluminum or GRP surface in two or more coats, each of 500 µm DFT. Overcoating time is about three hours, depending on temperature and humidity. No special equipment is needed. Environmental conditions required are the usual ones for coating application. The vessel can be launched 24 hours after the final coat has been applied.

Ecolock is non-toxic. It is a hard, impermeable coating which even the toughest barnacle will not penetrate. This is in direct contrast to antifouling or foul-release coatings. Barnacles and other fouling organisms attach and penetrate those coatings right through to the steel permitting the start and spread of corrosion. In the case of Ecolock the barnacles, coral and other fouling organisms can be removed completely by divers using special equipment, leaving no trace and restoring the coating to its original condition. And because it is non-toxic, it is safe to clean the Ecolock coated hull when needed for UWILD or simply to reduce the weight when too much fouling has accumulated. This can be done even in sensitive waters.

As long as it is standardly applied, Ecolock comes with a 10, 15 or 20 year warranty if the coating has been maintained according to the specifications. The thickness of the coating can be increased to extend its longevity. Even if minor mechanical damage does occur, because of the superior adhesion of Ecolock no undercreep will occur.

Launch Platform »Odyssey«

The Sea Launch Launch Platform (LP) »Odyssey« is a unique vessel, a semi-submersible converted to a sea-based platform dedicated to launching rockets to carry satellites to their intended orbit.

Drydocking the platform is a major, time consuming, expensive undertaking which cuts across the vessel's launch schedule. Thus the goal of Sea Launch vessel's Senior Superintendent was to find a coating that would permit a 15 year dry-docking interval.

The biocidal antifouling coating system in use on the vessel before early 2012 was not designed to last 10 years, let alone the 15 years required. Nor did it, in practice, keep the hull of the slow moving, often stationary ship free of fouling. With the soft, antifouling coating system, the biofouling that did accumulate was harder to remove and it eventually penetrated the coating. From the first cleaning after application it was typically no more than 9–12 months before the ship had to be dry-docked to repair/replenish the antifouling. Sea Launch was also looking for an environmentally friendly coating to replace the AF coating previously in use.

The reasons for the move to what is now Ecolock can be summarized: Anticorrosive properties over at least a 15 year period, ease of cleaning and the fact that it can be cleaned in the vessel's home port of Long Beach since cleaning this coating presents no hazard to the environment and the fact that it is environmentally benign.

Although the new coating on the Odyssey is only two years old and has far from reached its fifteenth birthday, it has already been put through its paces and is living up to expectations. The hull accumulated fouling as expected and this has been cleaned off without any damage to the coating. The barnacles and other fouling organisms were not able to penetrate the coating at all, let alone through to the steel, and were removed completely, restoring the hull to its former condition.

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Antifouling coating during shipbuilding process