Coordinated technology upgrades

However, combining smart hardware installations with sophisticated control technologies can yield substantially higher savings. A standout example is Odfjell Tankers' 48,555dwt *Bow Olympus*, a 2019-built chemical tanker, which had 22m-high eSAILs from bound4blue installed at EDR Antwerp Shipyard last year.

The tanker subsequently embarked on a trans-Atlantic voyage to Houston and combined the sails with various other energy-saving features. Average energy savings of 15-20% were recorded and, in optimal conditions, the vessel consumed 40% less fuel. The tanker used 100% sustainable biofuel and achieved an 85% reduction in GHG emissions. About five tonnes of fuel were saved each day.

The vessel also benefited from an AI-based Syroco navigation system to determine optimal routing, achieving significant energy savings even in light winds, as well as a more comfortable passage for seafarers on board. *Bow Olympus* now exceeds 2050 FuelEU Maritime requirements as well as the IMO's 2044 carbon targets.

Following this initial success, the company announced plans to install sails on the sistership *Bow Optima*, as well as two newbuildings under construction in Japan.

Weld integrity is paramount

Higher energy costs are likely to have a significant impact on the price of new ships and extending the lives of bulk carriers and tankers that are still in good condition in the second half of their second decade may prove an interesting option. The quality of steelwork, and specifically fatigue-sensitive welded connections, is critical in such projects for both marine and offshore assets.

Ultrasonic Impact Treatment (UIT) has emerged as one of the most effective technologies for enhancing weld fatigue performance and extending the operational life of structures subject to cyclic loading. Sweden-based LETS Global has developed a comprehensive engineering and application framework for the use of UIT in fatigue life extension of marine and offshore structures. The system is built on more than 20 years of experience in fatigue life assessment, structural integrity evaluation, and offshore engineering.

With long newbuilding lead times and high costs, life extension strategies are gaining importance in the shipping and offshore sectors. Within this context, class-approved UIT technology is increasingly being adopted as a practical strategy for improving structural performance without requiring extensive steel replacement.

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The approach combines detailed engineering analysis, identification of critical fatigue locations, and targeted application of UIT to improve fatigue resistance in high-stress areas. The methodology is supported by specialised UIT equipment supplied by Active Arc Srl of Switzerland, together with implementation procedures including training, execution, and quality control.

This integrated framework allows for flexible deployment, either through turnkey subcontracting arrangements or in collaboration with shipyard personnel, ensuring consistent application and verifiable results.

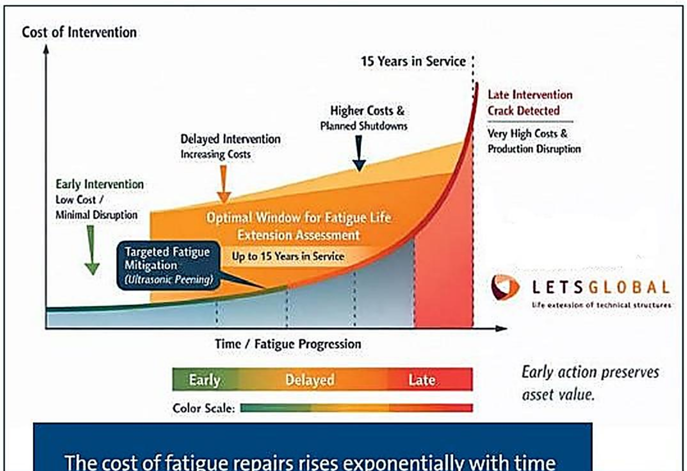
UIT technology is suitable for a range of assets including bulk carriers, tankers, and offshore installations. Benefits include reduced downtime, prevention of recurring repair cycles, and avoidance of carbon-intensive structural replacement.

In bulk carriers, UIT is applied to fatigue-prone areas such as hatch corners, side shell longitudinals, and transverse bulkhead connections. These structural elements are particularly exposed to cyclic loading from heavy bulk cargo operations and hull girder bending.

The technology has been widely used in shipbuilding and repair environments, particularly in South Korean yards, during both construction and as part of in-service repairs. The combination of weld repairs followed by UIT treatment has proven effective in preventing crack recurrence and significantly extending fatigue life.

In tanker segments such as VLCC and Suezmax vessels, UIT is applied to highly stressed components such as deck and bottom longitudinals, web frame connections, and intersections within cargo tank structures. These applications are increasingly relevant in modern designs utilising high-tensile steels, where fatigue sensitivity is higher.

Offshore applications represent a key area of development. In tanker-to-FPSO conversion projects, for example, existing hull structures are subjected to new loading conditions that were not part of the original design framework. Critical areas such as turrets, deck structures, and structural connection points are therefore targeted for UIT application. ■



Source: LETS Global AB

The cost of fatigue repairs rises exponentially with time


Source: LETS Global AB

UIT steelwork on the *FPSO Triton* has enabled the vessel to withstand the harsh conditions of the North Sea for more than two decades