New Regulations Lights the Path

While the maritime industry is broadly categorized conservative, times are changing. Forced by regulations, ship owners are specifying and shipbuilders are delivering increasingly modern means to make their ships more efficient and environmentally benign.

By Gregory R. Trauthwein, Editor, Maritime Reporter & Engineering News

Photo: ASRY

The international maritime sector has been besieged in recent years with new environmental regulations calling for strict new limits on ship emissions. These changes are particularly pronounced in the shipbuilding sector which is generally defined by low volume, highly customized production. The solution to this complex design and production riddle starts before the ship is even conceived.

Ballast Water Management Technology: An Expensive Ship Refit Proposition

The carriage of invasive species in a ship's ballast tanks is a problem that has vexed the world for years as ballast water provides a vehicle to deliver non-native species into foreign environments, often wreaking havoc on local ecosystems. New international regulation calls for the installation of ballast water management technology on the world fleet, and it is estimated that 68,000 ships currently in service will need to install Ballast Water Treatment Systems in the coming years, at a cost ranging from $500,000 to as much as $5 million per vessel. The quest to devise an adequate technical solution to remove or destroy these

aquatic hitch-hikers efficiently and effectively from a ship's ballast water has been long and difficult, and a final solution has not been finalized. The shipping industry nonetheless faces looming deadlines for 'compliance' regarding the cleanliness of its ballast water emissions.

The big problem lies in the refit of Ballast Water Management Technology (BWMT) on existing ships; a custom engineered solution on ships where space is a premium. Another problem is shipyard capacity. As governing bodies struggle to deliver final BWMT system approvals, shipowners are remiss to invest millions in a system that may be deemed inadequate in a few years time. As regulators hedge, ship owners wait, and the backlog of business to install BWMT onboard commercial ships grows exponentially.

Success is in the Detailed Planning

ASRY is using 3D scanning technology to carry out engineering assessments for installing ballast water treatment systems on ships (photo: ASRY)

In preparation for what is sure to be a historic level of ship refit business, some shipyards are laying the groundwork now. ASRY is one of the Arabian Gulf's most experienced ship and rig repair yard, founded in 1977 in Bahrain. "ASRY has recently undergone a major organizational restructuring, and a large focus in this streamlining was the identification and creation of the new construction andengineering division," said Nils Kristian Berge, ASRY Chief Executive. "Engineering challenges such as the new BWMT regulations are a primary focus for this division, and it has been equipped with not only the latest technology, such as a new 3D scanner, but also a range of dedicated mechanical, marine and electrical engineers and naval architects to consult on the specific requirements that these new regulations will create." According to Berge, advance planning and engineer work is the key. "Once we know of an owner's interest, we offer him a pre-installation engineering service, by which he completes all engineering work required for the repairs and identifies all materials and components required for the repairs. We can then complete the installation in a very short time when the vessel arrives."

A major part in ASRY's planning for the BWMT refits has been conducting feasibility studies for several major Mideast players. One step assesses the suitability of various suppliers for a particular ship, for which impact in terms of piping, cabling, steel work is assessed separately for each manufacturer. The scope involves steel drawings, pipe spool drawings, wiring diagram of electrical equipment, impact on generator capacity, adequacy of ballast pumps for each manufacturer, thus giving the owner an unbiased scope of work for each of the suppliers.

While planning is essential, partnership is equally critical. "This topic (the forming of strategic partnerships) has been a primary investment area for ASRY for 2014, and will continue to grow throughout 2015," said Berge. "Under the umbrella term 'Project Jupiter,' ASRY has set about building the most comprehensive network of Onsite Specialist Contractors in the Middle East."

Clearing the Air

In tandem with new ballast water rules, ship owners are pressed to reduce air pollution emissions, particularly in the world's growing number of Emission Control Areas (ECAs), a requirement that will require ingenuity and innovation from shipyards to properly fit the new systems. Cruise ships are literal floating cities, perpetually under the regulatory microscope, sailing with thousands of souls through some of the world's most pristine and ecologically sensitive waters.

Photo inside the funnel on Royal Caribbean's Quantum of the Seas (photo: Royal Caribbean Cruises Ltd.)

Royal Caribbean Cruises Ltd. (RCCL) recently announced the plan to retrofit 19 of its ships with advanced emissions purification (AEP) systems, more commonly known as 'scrubbers,' to meet and exceed new environmental standards regarding sulfur dioxide emissions generated by the ship's diesel engines. RCCL faced significant challenges to accommodate the AEP systems on its existing ships – some pieces of which can be as large as a school bus, an entire system having an operational weight of several hundred tons of equipment and liquids. "A retrofit project of this size and complexity – and the scale and intricacy of the research, planning, and design required – is unprecedented for our company, and has required a very systematic process," said Harri Kulovaara, Executive Vice President, Maritime, RCCL. "In my mind, this is one of the most complex technical projects that we have ever started. We are talking about substantial weight and (volume additions). If you went into a cruise ship and try to find a space for a school bus which is in between the funnel and the main engine outlet, you do not find that; we need to carve a lot of space and relocate a lot of equipment. Taking the ships out of service is a very expensive proposition, so that's why we want to do as much work as possible while the ship is in service, which of course adds another dimension to this project."

Installing AEPs is a more complex engineering challenge as opposed to simply switching to higher grade (and more expensive) fuels. But the investment is deemed worthy, as it allows the cruise ships to sail where they want, when they want, not counting on availability of specialty fuels.

"The scrubber technology has been around for a very long time. But it is the footprint, the size and the volume of the system that make this refit difficult," said Kevin Douglas, VP, Technical Projects/Newbuilds *of Royal Caribbean Cruises Ltd*. "There is no question that the overall management must focus on the complexity in relationship to the whole ship. The overall challenge is managing the process from beginning to end."

To ensure the right systems are available for each ship's unique requirements, RCL contracted two different AEP technology suppliers, Alfa Laval of Sweden and Wärtsilä of Finland for the physical units, with additional companies hired for the installations; a collaboration among suppliers, shipyard and ship owner that must be seamless and efficient to ensure each of the 19 ships maintains its sailing schedule and generate positive cash flow for the bottom line. Each installation will take approximately eight months, starting in 2015 and concluding in 2017.

Whatever the technological hurdle, RCCL knows that a collaborative, integrated approach is the only way forward. "We are working in many partnerships with many manufacturers to develop the technologies we will need in the future," said Kulovaara. 'We're doing this on an ongoing basis. This is not a drastic revolutionary change, this is an evolutionary change."