THE MARINE INDUSTRY IN 2030

DIGITAL MARINE WORKFORCE

In 2012 the Costa Concordia, an Italian cruise ship, struck rocks off Giglio Island in the Tyrrhenian Sea. Thirty-two people died, and more than 4,000 had to be rescued. Images of the partially sunken ship dominated the world's headlines, and her eventual righting was a true feat of engineering and courage.

The accident investigation determined that the Concordia set sail as usual, then deviated from her course to move closer to the island for a maritime salute, sounding her horn as she sailed past. The waters near the island are rocky, and the ship's course took it too close to an outcropping. The Master ordered a change in course that the helmsman misunderstood, and, even though the bow swung clear, the stern collided with the rocks, resulting in a 174 foot (53 meter)-long tear on Concordia's port side.

The investigation found failures in communication, response, and training. Regulators, cruise industry organizations, and maritime safety groups identified several areas of improvement. Lifeboat drills, restricted bridge access, and passageway planning changes were mandated, along with real-time monitoring technologies to ensure vessels follow their planned routes.

MONITORING IS PART OF THE SOLUTION

Monitoring technologies are already used in many different aspects of vessel operations. Location and heading, power output, fuel use, cargo refrigeration, and other readings are

tracked to give operators a detailed view of their vessel's performance. These data points can be analyzed on board the vessel for immediate action or fed back to shore (on instant or periodic uplinks) for deeper analyses. This data can inform vessel operations, from course corrections to maintenance activities and training needs. Position monitoring could have warned the crew that the Concordia was in danger, causing them to change course.

WORKFORCE TRAINING ADDS ANOTHER LAYER

As the experienced maritime workforce ages out, the industry is looking to technology to bridge the gaps. Training on simulators prepares the crew for real-life working conditions. They will simulate both typical and emergency scenarios before going to sea, and their reactions could be close to automatic when encountered in real life. In the case of the Concordia, simulated collision responses could have led to better and faster evacuations.

These simulations are carried out in dedicated training centers or, increasingly, on-site using virtual and augmented reality techniques. Virtual reality (VR) creates an entirely digital environment for the training session, perhaps simulating the bridge or engine room for the trainees to work in and interact with. Augmented reality (AR) places instructions or other important information into the operator's physical world, usually on a headset or handheld device. VR is used in training applications and to plan virtually any activity before it takes place. AR assists workers while they carry out maintenance, inspections, and other jobs that require information that may not be available or easy to access from the site of the activity.

REMOTE ASSISTANCE IS CRITICAL

An onboard crew’s use of AR is also often enhanced by a connection to onshore assistance. Experts onshore can best help diagnose a problem when they see precisely what the on-site worker sees, which is possible now using AR headsets and even cell phones (assuming a connection for the phone). These experts can support a significant number of colleagues at sea without ever leaving their desks.

This sort of help-from-shore isn't limited to AR. Ship operators are testing remote bridges, where a team onshore helps the Master navigate, perhaps even taking control at specific times to rest the onboard crew. In this mixed environment, an onboard crew teams with

experts on shore, a setup that will become more prevalent as communications technologies improve.

DIGITALIZATION MAKES IT POSSIBLE

AR, VR, and advanced maintenance strategies require accurate data about the ship and its components. This is often called a digital twin and represents the physical object as completely and accurately as possible. The twin may use as-designed, as-built, operations and maintenance data, which can come from many sources. Gathering, maintaining, and analyzing all of this is best done via a digitalization platform that can integrate and distribute this data as needed.

GET READY FOR 2030

Shipowners want to minimize risk; onboard sensors can alert the crew and onshore partners of trouble before it happens. Operators want to reduce the cost of training; VR saves money, improves skill levels, and can create a new training business for the equipment maker. Everyone wants to minimize downtime; AR can guide the onboard crew by providing on-site help, along with possible access to remote help (and again, there's a business opportunity for the equipment supplier).

We'll never know what could have prevented the Costa Concordia from hitting those rocks. More sensors, data-driven operations and a crew that had trained on a simulator for collision avoidance and evacuations could very well have saved lives.

TRANSFORM HOW YOU WORK, ENABLED BY DIGITALIZATION

Schnitger Corporation created this brief at the request of Siemens Digital Industries Software, Inc. For more information or to comment, please visit www.schnitgercorp.com