

## SIMULATION

# A picture is worth a thousand words

**W**hen Captain Corey Herritt of Canship Ugland Limited moves his 960-foot, one-million-barrel shuttle tanker into position at an offshore oil field to hook up for loading, his 15 years of experience on shuttle tankers and training in Dynamic Positioning Offshore Loading stands him in good stead. Master of the vessel *Catherine Knutsen*, he is currently conducting offshore loading out of Venezuela. Comparing his first training course in 1997 to the one he completed three months ago at the Marine Institute in St. John's, Newfoundland and Labrador, Capt. Herritt says, "At the first training, there was absolutely no visualization. It was really hard to get a true feel for what you were actually doing with the vessel."

Four mariners including junior and senior officers and captains participate in the Centre for Marine Simulation's (CMS) three-day Dynamic Positioning and Offshore Loading course where realistic visuals give new meaning to the phrase: a picture is worth a thousand words.

"If you're on the bridge of a ship," says Capt. Herritt, "part of your watchkeeping and positionkeeping is visual. Here, you can actually look through the window of a bridge and see where the field or FPSO (floating production storage and offloading unit) is actually located, in relation to your own vessel. This feature makes this course more realistic and accurate."

When CMS developed their ship models, they incorporated the characteristics of the tankers that are used to service the Hibernia, White Rose and Terra Nova oil fields, providing an extra element of realism. In 2007, a company that manages shuttle tankers told CMS



**Besides reducing training costs, simulation provides mariners with strong visuals, making the training more realistic and accurate**

Director Captain Chris Hearn that the cost of sending people away for training was too high and that the oil companies preferred a local training option. "We took this on as a major project to develop more advanced modeling with the turret system," he recalls. (Moored to an anchor chain, the turret connects the flowline from the pipeline end manifold on the ocean floor to the tanker's hull by means of a docking cone.) "We designed a type of system that integrates dynamic positioning with the full-motion ship's bridge simulator, which hadn't been done before." Currently, the course is conducted using CMS' DP simulators, configured with maneuvering consoles to represent the ship's manual controls, while the DP-ship's bridge integration is being completed.

Key elements of the CMS course are the simulation of various wind, wave

and current conditions and their effects on the tanker during various operations, and simulations of failures, such as alarms indicating the malfunction of a thruster. "On the Grand Banks," Capt. Herritt says, "the weather is so unpredictable, it's nice to see how the vessel would react in various wind speeds and sea states." It is quite common to have to wait out very high wind conditions and sea states for several days until the sea



state dies down to 4.5 metres (for connection) and 5.5 metres (for loading). He has found that re-enacting equipment faults and single-point failures—such as a thruster that is stuck full ahead or full astern—has been the most beneficial. "The majority of the time when something does happen," Capt. Herritt says, "you've already seen it in simulation. You have a mental procedure that you go through."

Harkening back to his first training in Norway in 1997, Capt. Herritt emphasizes the benefits of having the training available locally, noting that his round trip travel took four days. "That's valuable family time that I had to give up," he says, adding that the ongoing rela-



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tionship with CMS also allows for incorporating his input regarding issues he has seen into the training sessions.

Looking ahead, he expects to train on operations in a new field on the Grand Banks once the software for that field is installed in CMS' DP simulator, well before going to the actual field.

"We have been part of all the major projects offshore," says Capt. Hearn who adds that simulations of the tow-out and sailaway from all three production units were built at the Marine Institute. As of September 2012 they had conducted eight three-day Dynamic Positioning Offshore Loading trainings, up from a total of five in 2011. Capt. Hearn attributes the increase to industry's requirement that junior and senior officers and captains on shuttle tankers receive the training every two years, as well as new personnel who require the training.

CMS is currently piloting a module focused on operations involving a taut hawser (the shock-proof mooring line that connects the tanker to the hull or FPSO to keep the production unit from drifting while the tanker's loading hose is connected to the turret or spar buoy). During the approach, the tanker holds position astern to the production unit while the hawser is connected, and then the loading hose is connected. The dynamic loading and movement of the vessel is absorbed by the hawser, rather than the loading hose. The hawser is not always tight between the two vessels, requiring that the tanker proceed slowly astern to exert force on it to hold the FPSO in place.

An offshore operator had told CMS there was a need to create simulation

training that focuses on this operation. "The field operator was very concerned about anybody who hadn't loaded from the platform before," reports Capt. Hearn. The module they developed simulates taut hawser operations at that field's production unit. Capt. Herritt explains that there are several stages involved in taut hawser operation, ranging from keeping the vessel back to shutting down the DP system. "To be able to


train on a full-motion simulator with DP incorporated along with all the position reference equipment, and simulate possible failures or errors in equipment," he says, "to a DP operator, that would be worth its weight in gold." Final sanction and inclusion in CMS' Offshore Loading course, which will include some position reference systems, is anticipated for later this year.


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