

MARIN develops anchor-handling simulator for Swire Pacific Offshore

With oil exploration moving into deeper and harsher waters, anchor-handlers and their crews are often working to the limits of their capabilities and in some cases, beyond those limits. MARIN recently embarked on a challenging project to develop and install a world-class anchor-handling simulator for Swire Pacific Offshore at the new Swire Marine Training Centre (SMTC) in Loyang, Singapore.

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The anchor-handling simulator at SMTC will result in increased safety awareness, an ongoing reduction in accidents and an improved capability to understand the operating parameters of company vessels.

Anchor-handling simulation brings some new challenges to the field of simulation and one element that sets it apart from existing nautical simulations is the need for proper wave response characteristics.

Another specific element is the importance and magnitude of external forces that come into play during the operation, along with the simulation and visualisation of a series of operation-specific components such as deadman's wire, tugger wire, work wire, winches, cranes, moving pins, sharkjaws and animations of personnel on deck etc.

This led to the development of a dedicated anchor-handling model that can deal with winches, wires, chains, catenaries, bottom interaction, chaser and friction effects.

Realistic visualisation is also very important to provide feedback for the operator, including the direct environment, like waves, weather, and propeller wash but also animations of deck activities. These are highly procedural and require the observation of strict rules to ensure the safety of men on deck and of the vessel. Equipment on deck, like shark jaws, pins, tugger wires, and capstans come into action when the operator applies the controls on the bridge. For example, a work wire under large variable forces will 'dance' on deck and will do likewise in the simulation.



Of course, not all events on deck are initiated by the operator. Effects like an unsecured buoy moving on deck are handled autonomously by the physics engine of the visual system. Special care has been taken to accurately represent actions on deck. Movements and gestures are modelled using bones and morphing technology and they are rendered in real-time as part of animation macros controlled by the instructor.

As the search for oil and gas moves further offshore, the risk of supporting those operations increases significantly. Add to this the growing shortage of experienced seafarers and continuing advances in the technical sophistication of onboard systems and it becomes clear that anchor-handling simulation has a significant role to play in ensuring and securing the offshore support chain.

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