

As operator of Block 17, TotalFinaElf E&P Angola¹ intends to develop the offshore field Dalia, located approximately 80 miles off the coast of Angola. The installation being considered is preferably a spread-moored FPSO. Offloading is done in tandem and the export tankers range from Suezmax tankers to VLCCs, up to 315,000 DWT.

FPSO tandem offloading

To determine the economic feasibility of tandem offloading in this situation, MARIN's Nautical Centre MSCN and the offshore department have executed a variety of simulations.

Offtake tanker manoeuvring simulations

A large number of fast-time simulations is executed, simulating the approach and connection to the FPSO. Normal approaches are made to the FPSO under various combinations of waves, wind and currents and with the assistance of tugs. The FPSO and its mooring are modelled as well, and simulations stop when the hawser is connected to the FPSO and the tanker is stable. The aim of these simulations is to define approach strategies and weather windows for the various export tankers. The effects of failures will also be considered in this activity.

Moored tanker simulations

The offtake tanker manoeuvring simulations focus on the operational aspects of approaching and connecting, whereas the moored tanker simulations focus on the behaviour of the moored tanker and FPSO when connected. Simulations are executed with the LIFSIM model, considering various combinations of wave, wind and currents in order to identify the threshold of conditions under which safe offloading is possible.

Quantitative Collision Risk Assessment

As a continuation of the offtake tanker manoeuvring simulations, this assessment starts with the identification of possible errors and the probabili-

ty of occurrence. These errors vary from mechanical and human failures on board of the tanker to sudden changes in environment. An automatic system is prepared to combine failures, environmental conditions and ships in a simulation scenario. Results of the simulations are post-processed, resulting in a probability distribution regarding the closest point of approach between export tanker and FPSO.

Training

TotalFinaElf E&P Angola is combining the Dalia study with preparations for the Girassol development, as these developments are very similar. The real-time simulator will be prepared to train the future mooring masters and tug masters for the Girassol field. The simulator scenarios will include 5 ships: the FPSO and its mooring, an export tanker and three tugs.

MARIN

¹ together with ExxonMobil, BP, STATOIL and Norsk Hydro, under a Production Sharing Agreement with the Angolan National Oil Company Sonangol.

New SHIPMA 6.0 release

MARIN's Nautical Centre MSCN will soon release an update of the fast-time manoeuvring simulation program SHIPMA with extended simulation capabilities and state-of-the-art pre- and post-processing.

For further information: www.marin.nl

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