

Before the Girassol FPSO, operated by TotalFinaElf and installed off Angola, became operational a series of training sessions were carried out at MARIN's nautical centre MSCN.



The Girassol training was set-up on the basis of data obtained during model studies executed at MARIN in 1999. The simulator database prepared contains a mathematical model of the moored FPSO, the export tanker and the three tugs available to assist the tanker during the approach, connection and offloading operations. The export tanker and the

MSCN provides vital FPSO training

tugs were all controlled from a simulator bridge. Under the simulation programme the export tanker sails from MSCN's primary simulator bridge, one Azimuthing Stern Drive (ASD) tug sails from the secondary bridge and one ASD tug and a supply vessel, sail from tertiary bridges.

Taking place in 2000, the first training sessions already showed that offloading from the spread moored FPSO is a feasible operation. However, the operation does require additional tug assistance and a high level of attendance from personnel. Training plays a crucial role in the preparation. Not only mooring masters but also tug masters and management were made aware of the factors involved in tandem offloading from the FPSO.

SPM out of order

Normally offloading is done from the Single Point Mooring (SPM), but in April 2002, three of the SPM's mooring chains broke off and it was no longer possible to export oil from the SPM.



Although in case of emergencies the FPSO has the possibility to export oil in tandem from the bow of the FPSO.

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After the mooring lines broke it was necessary to execute all offloading operations from the FPSO. This operation is regarded as more complicated than berthing at the SPM. The heading of the FPSO is fixed and approach and berthing are only allowed in a limited sector in order to reduce the possibility of a collision. This limited sector restricts the possible heading of the export tanker so this vessel is not necessarily in equilibrium with wind, waves and currents. Both during the manoeuvres and during offloading the tugs are used to assist and control the tanker. As these manoeuvres are more complicated TotalFinaElf decided to have two mooring masters on the bridge, both during the approach and offloading. Consequently, extra mooring masters were required and extra training sessions were set up.

Between April and October 2002, a total of 49 tandem offloading operations have been executed successfully. TotalFinaElf could continue their production without interruption and meet their objectives. It shows that this type of operation is feasible but only after proper training of all the personnel involved.

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