

FPSO Offloading training

Transferring oil from an FPSO to a VLCC in an exposed offshore environment is not an operation without risks. It requires a well-trained team to perform the offloading operations safely and efficiently. The operation is a team effort, involving terminal supervisors, mooring masters, tug captains and ship's crew. MARIN has the expertise, experience, facilities, tools and people available to assist in training these professionals to conduct their operations in a safe and efficient manner. The training sessions are performed using Full Mission Bridge Simulators with MARIN's latest simulation techniques.

Training programme

MARIN offers mooring master training throughout the year. Groups of four to five trainees can be accommodated in a one-week period. The training period may be adjusted to accommodate more or less participants.

The training program is tailor made, taking into account site specific environmental conditions, vessels, protocols and procedures.

The learning objectives of the training depend on the technical, social and cognitive competences of the trainee. On request assessments can be included in the training program.



Example of tandem offloading operations

Customers

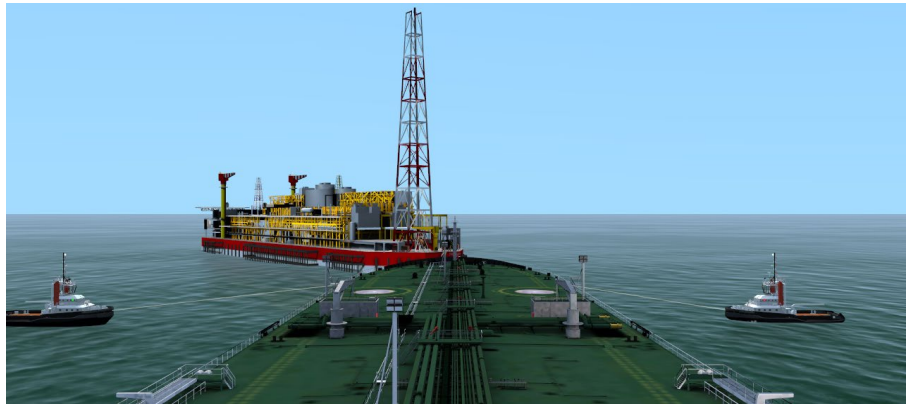
MARIN conducts offloading training on a regular basis for:

- Chevron
- Total
- Northern Oil Company
- BP
- Exxon Mobile
- SBM Offshore

Simulator training

MARIN offers simulator training for mooring masters and tug captains to train the main aspects of handling export tankers in close vicinity to offshore structures. Based on a training-need-analysis the program and scenarios are adjusted to the requirements and level of experience of the participants. A regular training includes simulations of approach, departure and residence scenarios under normal and extreme environmental conditions. Furthermore, emergency situations like tug break down; engine and rudder failures are included. During this training the typical operations related to a spread moored and turret moored FPSO, a SPM and side-by-side operations can be exercised.

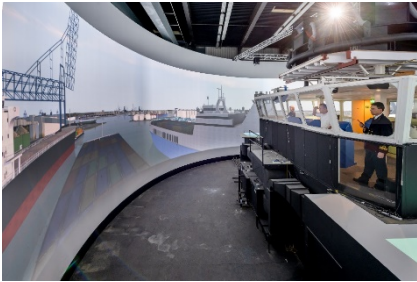
Offloading operations require a unique set of technical, social and cognitive competences. A competency based training method ensures that the trainees can develop the required skills.



Example of tandem offloading operations during simulator training



Example of tug operations simulator training



MARIN's Full Mission Bridge

Training set-up

The training is executed on MARIN's full mission bridge simulator. This facility consists of a fully equipped mock-up of a bridge with a 360° visual projected scenery. Up to four tugs with human operators can be included. These tugs are controlled from Compact Manoeuvring Simulators. Terminal supervisors can be actively involved in the operations or observe from a distance from the debriefing facilities.

During the training a MARIN instructor operates the simulator. He also briefs and debriefs each exercise. The instructors have all proven themselves at sea as Master Mariners and have a lot of experience with offshore training.

MARIN's modelling

To be able to provide complex realistic training the accurate modelling of the simulated vessels and the environment is essential. MARIN uses the DOLPHIN simulation technique, which is developed and maintained based on MARIN's XMF modelling framework. DOLPHIN is flexible and the control of vessels is intuitively done by automats or soft controls. DOLPHIN incorporates a lifetime of experience with hydrodynamic and nautical research. It is able to simulate the most demanding hydrodynamic phenomena in the most realistic way. All MARIN's models are working in 6 degrees of freedom and have an accurate representation in the outside view.

For more information contact MARIN:

Dimitri van Heel

T + 31 317 47 99 16

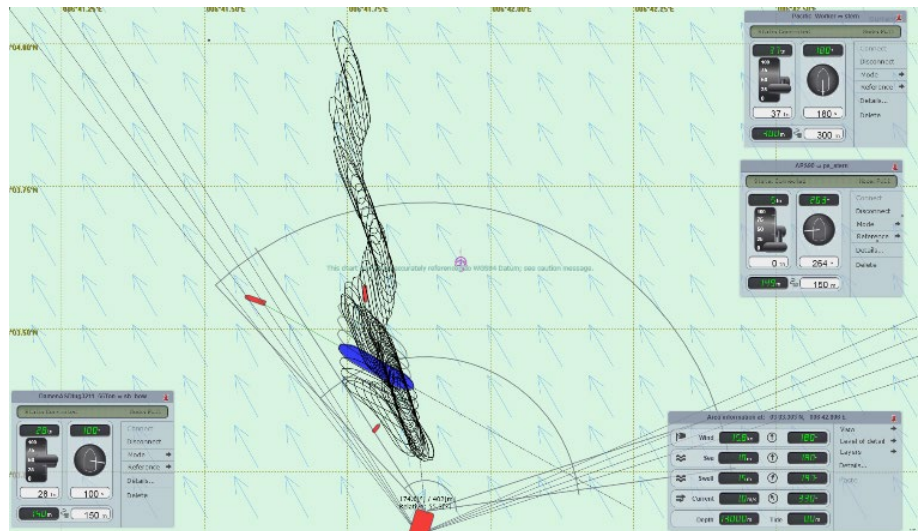
E d.v.heel@marin.nl

or

Maritime Operations

T + 31 317 47 99 11

E mo@marin.nl



Track plot of an approach manoeuvre

Accurate simulation models of FPSOs, the export tankers and the tugs involved are available. The vessels can be sailed in different loading conditions. MARIN has all expertise to scale or adapt the vessels in accordance with the customers' requirements.