Ship-to-ship (STS) transfer of crude oil and petroleum cargoes has become common practice within the marine industry. The operation at sea involves two large seagoing tankers moored alongside each other. Special transfer areas are in use in which the operation can be carried out safely.



## Weather impact assessed in ExxonMobil STS study

ogether with an enthusiastic group of specialised mariners, MARIN (literally) stepped on board of an interesting STS study for ExxonMobil.

Numerous standards, guidelines and recommendations, concerning mooring practices, mooring fittings and mooring equipment, exist throughout the worldwide marine industry. However, little can be found on the limiting factors when it comes to weather conditions for a ship-to-ship transfer because of the many parameters involved such as: ship size, loading conditions, fenders and mooring arrangements. In addition, the exact sea, swell, wind and current conditions, are very important when considering such weather limits.

Concerns regarding the suitability of market tanker mooring arrangements for ship to ship operations resulted in ExxonMobil and Seariver sponsoring a numerical motion study of typical large tanker ship to ship mooring loads.

The kick-off was at a suitable place: a ship-to-ship transfer operation in the Gulf of Mexico. This, together with the input of an enthusiastic group of specialists from ExxonMobil, was a key factor in



Numerical simulation of STS Offloading.

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the success of the project. It was a tremendous help to obtain a full appreciation of the complexity of such an operation at sea, as well as a better understanding of the simulation results by the mariners.

A large series of time domain simulations were carried out to examine the impact of different environmental conditions on the motions and line loads of large tankers, including: VLCCs, Suezmax and Aframax tankers.

Each simulation covered three hours of irregular sea to investigate the statistics of the extreme mooring loads. The results of the simulations were presented in "Weather Threshold" graphs, which indicate by the colour (red) when the Safe Working Load (SWL) of any of the side-by-side mooring lines is exceeded (i.e. 55% of Maximum Break Load, MBL). The results, conclusions and recommendations, may be considered appropriate to include in the latest edition of the OCIMF STS Transfer Guide.

A better understanding of the weather limits of such an operation was very welcome.