New initiatives aim to increase the safety of oil and gas offloading operations

The Offloading Operations Joint Industry Project bridges the gap between real world operations and numerical tools.

Offloading oil and gas at sea, from one vessel onto another, is a complex operation. Its success depends significantly on the environmental loads present and how these loads influence the vessels involved in the operations.

Due to the inherent complexity, to date very little comparison could be made between desk studies and actual operations in the field. The Offloading Operations JIP aims to further increase the understanding of mooring loads during offloading operations and to bridge the gap between real world operations and numerical tools.

The full-scale time-domain data obtained during this JIP will provide opportunities for both the detailed and comprehensive examination of real world events and for validation and verification of simulation software.

Currently, instrumentation is being prepared for a year-long monitoring campaign off the coast of equatorial Africa, at a location known for its challenging combination of swell, wind sea and current conditions. Offloading at this site is side-by-side, where the turret-moored FPSO is typically used to shield the export tanker from waves, wind and current. Nevertheless, differences in vessel sizes can lead to significant variations in response to swell, posing extra challenges to the operators. Moreover, waves between the FPSO and export tanker may be amplified compared to the ambient sea state as the gap between the vessels may be as narrow as 4 m, causing it to act like a funnel.

Instrumentation will focus on getting a complete picture of local metocean conditions, vessel motions in six degrees of freedom and mooring line forces during offloading operations, which typically occur every two weeks. Continuous monitoring will also allow derivation of response characteristics of the vessels involved, as well as properties of the mooring lines. On the one hand the results will provide valuable material for tuning recent software developments such as SHUTTLE and its aNySIM core, and on the other, the data will combine crew experiences and event logs to link human decision-making and perception to quantifiable operational parameters.

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