Case Study of DP Vessels Performing SIMOPS

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Abstract

A case study for vessels performing simultaneous operations (SIMOPS) of an example deep water oil field have been performed. This included calculating the probability of collision between DP & DP vessels, DP vessel & a permanently moored semi-submersible, and DP vessel & subsea structures. Quantifying the consequences if such collisions were to occur was also performed as part of this study. Collision risk was classified using probability and consequence criteria determined by practical engineering experience and literature review.

There are two critical failures that potentially cause a DP vessel to lose station so that an emergency disconnect from the well is required: a drift-off and a drive-off. A drift-off, is a total loss of power, i.e. blackout, that causes the vessel to move off location in the direction of the prevailing environment. A drive-off, is a near instantaneous position adjustment by the DP system generally caused by an errant position reference input which makes the DP system think the vessel is off station.

The methodology for assessing DP units is to apply scenario information i.e. critical weather direction, vessel drifting speed, and distance to collision in order to derive the probabilities of particular consequences. Risk for collision is classified by the probability of occurrence and the resulting consequence, hereby represented by impact energy.

In general, the analysis has indicated that the probability of collision and resulting impact energy respectively, decrease and increase with distance. Usually SIMOPS activities occur at large distances, which greatly reduces the likelihood of collision, but when the DP vessels are massive such as drill ships, the resulting impact energies become very large with severe consequences that shouldn't be disregarded.

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