

Recursive Operability Analysis in the Offshore Oil&Gas Industry: the Deep Water Horizon Accident

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Industrial process safety is a topic of great importance, in constant time increasing, especially in relation to construction, commissioning and maintenance of great works such as offshore rigs, which, impacting directly onto the delicate marine ecosystem, make the public opinion very sensitive to its safety management. This work is part of the risk analysis framework in the offshore oil & gas sector and, in particular, aims to analyze the accident happened in 2010 at the Deepwater Horizon oil platform (DWH), applying the Recursive Operability Analysis (ROA) and the related Fault Tree Analysis (FTA), to obtain qualitative and quantitative determination of the probability of occurrence of possible undesirable events which led to the accident. ROA was carried out basing on P&ID of a specific part of the plant, the Blowout preventer, BOP, reconstructed used data retrieved in literature. ROA combined to FTA showed that the two most probable and dangerous incidental events for humankind and for the environment are those leading to the creation of a highly flammable mixture near the operation platform. This flammable mixture, if ignited, can cause a fireball, explosions, and oil spill from the well, which can lead to both enormous damages to the marine environment and serious problems for human health. With this work it was possible to demonstrate how ROA is confirmed to be highly versatile also for the analysis of plants and equipment of the oil & gas industry.