OUR WORK

BRENT BARRIER RISER PROTECTION SYSTEM

Head Office: PDL Solutions (Europe) Ltd

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THE RPS IS A MOORING SYSTEM DEPLOYED IN THE NORTH SEA TO ACT AS A VISUAL DETERRENT FOR APPROACHING VESSELS

PDL is a global provider of exemplary engineering design and analysis consultancy services. Our engineering capabilities mitigate risk, shorten development timescales and reduce development costs.

PDL Engineers supported the RPS (Riser Protection System) project which was in operation around a gas platform in the North Sea. The RPS is a mooring system deployed in the North Sea to act as a visual deterrent for approaching vessels.

PDL engineers spent a number of weeks on site in Aberdeen, Scotland as part of the customer's offshore design team. The work was carried out in in OrcaFlex® Global analysis software. The protection system consisted of an eight point mooring system made of chain and polyester rope attached with spar and pull-through buoys at the surface. PDL engineers were responsible for assessing the ULS (Ultimate Limit State) and FLS (Fatigue Limit State) of the existing system.

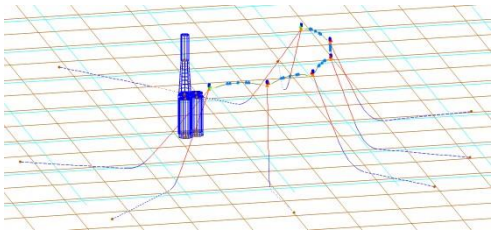

Figure 1: Global set-up of BBRPS 8 point mooring system

PDL'S FIRST TASK TO WAS TO ASCERTAIN WHAT CAUSED THE EXISTING SYSTEM TO FAIL

The RPS was currently deployed at the platform and the fatigue life requirement for the system was not being met. In order to understand the current system and generate an effective solution, PDL's first task to was to ascertain what caused the existing system to fail. This involved creating an 'as built' model of the system, including all details of spar buoys, pull-through buoys and accurate representations of all structural components, master links and shackles.

Figure 2: View of current system in operation around Brent platform

Once the base system had been replicated, a range of environmental conditions were applied to the model using input macros. Irregular wave theory (JONSWAP), was used to run multiple analyses accurately modelling North Sea storm conditions and to capture the tensions in the system. In order to reduce run time and estimate a design life for the system, 1, 10

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and 100 year return period storm conditions were used to analyse the system. Results for submergence, grounded length, contact forces and tensions were extracted. Multiple environmental directions were run and results collated to determine the suitability of the system. This included the detailed assessment of each component's expected fatigue life. This allowed the reason for the failure of the initial system to be accurately and confidently understood.

PDL iterated the design and configuration of the system to deliver an acceptable solution which met the customers' requirements.

PDL engineers delivered the project in half of the allocated time and schedule allowing for faster deployment of the revised mooring system.

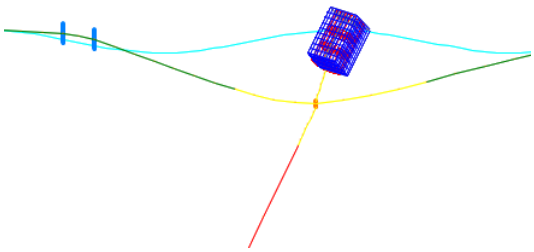

Figure 3: Spar buoy under hydrodynamic loading

For further information regarding PDL's engineering capabilities please email: solutions@pdl-group.com or phone our head office.