



HOW USING RISER ANALYSIS ELIMINATED THE NEED FOR AN ADDITIONAL RIG

CLIENT:

GLOBAL OPERATOR

PRODUCT:

JACK-UP HIGH-PRESSURE RISER ANALYSIS

Our client was scheduled to drill a platform well using a jack-up rig in the Timor Sea, in addition they also needed to re-enter a nearby subsea well. A separate semi-sub rig would traditionally be contracted, as semi-sub rigs are associated with subsea wells. However, our client wondered if it would be possible to utilise a jack-up rig already under contract on a nearby operation. If this was possible, it would mean significant cost savings for their project as a result of not needing to contract a secondary rig.



CASE STUDY / RISER ANALYSIS

BACKGROUND Major operations on subsea wells in the Timor Sea, and often many locations around the world, are typically performed using a semi-sub rig. However, using a semi-sub in shallower waters can often be challenging for Operators when trying to keep project costs down, as operating windows are limited to smaller wave heights only and fatigue damage on subsea equipment is typically higher.

Our client wished to investigate whether or not they could use the jack-up rig already under contract for operations over a platform to re-enter a nearby subsea well. This can be achieved using a high-pressure subsea riser system. The alternative being to contract a semi-sub rig to perform the operation. The platform well was in a water depth of 80m and the subsea well was 85m water depth, both relatively shallow and similar depths.

Benefits of using a jack-up rig for subsea wells in shallow water include the reduced level of motion due to wave loading. As this is a relatively fixed structure in comparison to a semi-submersible rig, there is a significant reduction in bending stress being transferred into the riser and subsea equipment, reducing fatigue damage of the subsea well equipment. In addition, typical jack-up day rates of \$100,000 per day are much cheaper than typical day rates of \$200,000 per day for a semi-sub rig.

SOLUTION We started with a concept evaluation: a high-level assessment to understand if using a jack-up rig and high-pressure riser system was viable for this particular operation. Different classes of jack-up rigs can vary in their capabilities, such as the amount of vertical tension and the tension deck lateral load capacity. The concept evaluation demonstrated to the Operator the pros and cons between the different rigs and showed their contracted rig was feasible.

Our concept evaluation focused primarily on Vortex Induced Vibrations (VIV) and structural integrity during storm conditions, as these typically drive the design considerations for the high-pressure subsea riser system.

Aquaterra Energy's riser analysis team delivered a concept evaluation report containing extensive information on the rig types, which provided our client with the confidence they needed in order to select their jack-up rig for both the subsea well operation and the platform wells, with no need to contract an additional semi-sub rig.

In addition, our analysis also recommended tension values for optimising the high-pressure riser system, which improved its structural integrity by reducing the bending loads at critical locations. This also reduced the wave fatigue damage of both the high-pressure riser system and the additional subsea well equipment. Minimising fatigue damage on subsea equipment is a critical consideration, as it prolongs the lifetime of the well.

RESULTS Using Aquaterra Energy's analysis services, the use of a jack-up rig and high-pressure subsea riser system for the subsea well was validated. This removed the need for contracting an additional semi-sub rig, saving time spent to source the rig and additional hire cost. As the typical jack-up rig day rate was around \$100,000 cheaper than the semi-sub rig, using the jack-up rig for the 120 day subsea operations saved this Operator around \$12 million in rig rates alone.

We were able to successfully demonstrate to the Operator that their subsea drilling operations using a jack-up rig could continue for environmental conditions of up and including a 100-year extreme storm, or a significant wave height of approximately 7m. The risk of rig down time was also reduced when compared to using a semi-sub, which would typically be required to stop drilling with a significant wave height of 4-5m.

This analysis reduced the risk of rig downtime, improved structural response, reduced fatigue damage to existing equipment, and saved significant costs by only using a single rig for both operations.

The savings this Operator achieved from commissioning this analysis project significantly exceeded the cost of the analysis itself.