BOP Alignment System

Engineering design, manufacture and installation of two BOP alignment systems to ensure correct alignment of the BOP with the manifold and XT.

Client: TOTAL E&P

Time: 2012–2013 & 2018–2019

Location: Laggan Tormore & Glendronach, West of Shetland, UKCS

In 2012, ***Neptune*** was contracted to design and manufacture a BOP alignment system for TOTAL's Laggan Tormore campaign. The system was used to replicate the wellhead and template on the deck of West Phoenix semisubmersible rig, to allow the Tubing Hanger Orientation Joint (THOJ) to be correctly aligned with the BOP pin. This ensured correct line up of both the BOP and XT when they were landed out subsea.

The BOP has an alignment pin in the central bore. The Tubing Hanger is run subsea using the THOJ which has an outer cam sleeve with slot. The THOJ cam aligns with the BOP pin and is set in the correct orientation. This alignment is to be set topside, and is specific to each BOP due to variations in tolerance stack-ups.

The subsea template has an upward facing 'tombstone' which is used for alignment between the BOP and the template, when the BOP is landed out. To facilitate this alignment, the BOP will have a lower downward facing alignment guide which will interface directly with the template tombstone subsea and ensure fine alignment, to complement the rough alignment provided by the guide posts.

The BOP Alignment System was successfully engineered, built and installed on the West Phoenix rig in 2013 and provided correct and effective alignment for the BOP as expected.

Our scope of supply included:

- Developing a conceptual design of the BOP Alignment System including designs of auxiliary equipment
- Carrying out rigorous tolerance stack-up calculations to ensure the required fitting tolerances
- Conducting offshore survey to gain dimensional details of the BOP, BOP skid and BOP pit to allow the design of the BOP Alignment System
- Carrying out finite element analysis (FEA) to verify the structural integrity of the components under installation and operating conditions
- Manufacturing, assembly and testing of all the components
- Developing offshore installation procedure for the complete system
- Providing offshore supervision and technical support during the installation process
- Interfacing with the client, OEM's, third-party verification bodies and rig personnel

In 2018, ***Neptune*** was contracted by TOTAL to develop a similar BOP Alignment System to be used onboard the Stena Don semisubmersible rig for the Glendronach drilling campaign. The system was installed in early 2019.

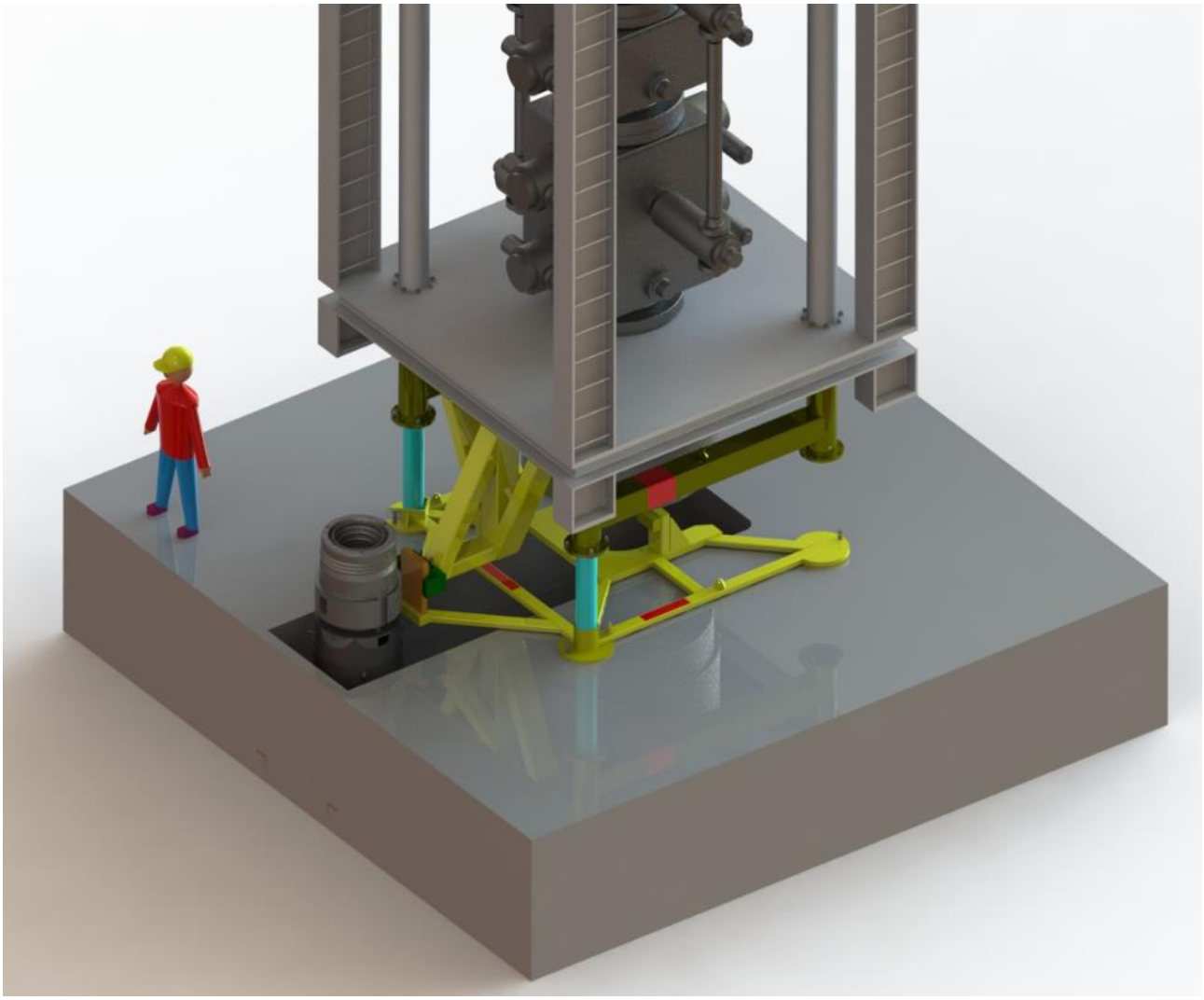

Figure 1: Neptune-engineered Alignment System installed under the BOP onboard TOTAL's West Phoenix rig.