CASE STUDY

LIGHTER | STRONGER | SMARTER

RISER SEALING MANDREL

PROVIDING PEACE OF MIND

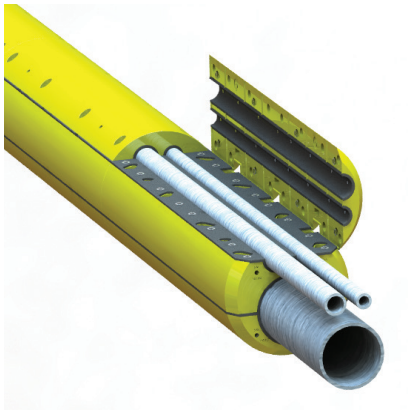
CLIENT
Cooper Energy

PROJECT LOCATION
Casino 5, Bass Strait, Victoria, Australia

PRODUCT
Unbonded Riser Sealing Mandrel

TIME PERIOD
2018

KEY ACHIEVEMENTS
- Design and manufacture of reliable RSM that lowers the risk profile of deepwater well testing operations whilst improving the safety of personnel and assets.



Landing string and umbilicals enclosed in Matrix RSM. The design is adjustable to most string/umbilical configurations.

BACKGROUND

Continuous improvement is the driver for progress and often provides opportunity to look at existing products, tools, and equipment in a new light, maintain what works well, and improve what doesn't work so well. At Matrix that often involves considering new materials, such as polymers and composites, that may be better suited to an application than traditional materials. In this case study we will examine how our material and process experience has been applied to Riser Sealing Mandrels (RSM).

HAZOPS (hazard and operability studies) conducted for deepwater testing programs typically identify the need to close the surface diverter blow out preventer, in case of a pressurised leak from the landing string to the marine riser. With the diverter closed, leaked fluids or hydrocarbons can be diverted away from the rig floor and protect personnel from the associated hazards of leaked fluids.

THE CHALLENGE

During deepwater testing, subsea control umbilicals are run with a landing string which prevents the diverter from sealing effectively. To enable proper sealing, a tool is required that encloses the landing string and umbilicals, whilst providing a circular circumference that the diverter can effectively seal on. This type of tool is commonly referred to as a RSM. The RSM needs to be able to slide through the closed diverter to accommodate relative up-down movement as a result of rig heave and tidal movement.

An Australian oil and gas operator was not fully satisfied with available RSM designs, and approached Matrix to design, qualify, and manufacture a new RSM to suit their 9 5/8" landing string including two umbilicals.

The RSM, in this instance, was to be used on a drilling project located in the Bass Strait, a notoriously rough piece of water between Tasmania and mainland Australia. Downtime due to swell in this area can be significant and the operating envelope of the RSM had to be such that the potential for weather downtime would be minimal.

Preparing Matrix RSM for deep water well test

CASE STUDY

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Single RSM module - highly adaptable design allows for cost-effective solutions

THE SOLUTION

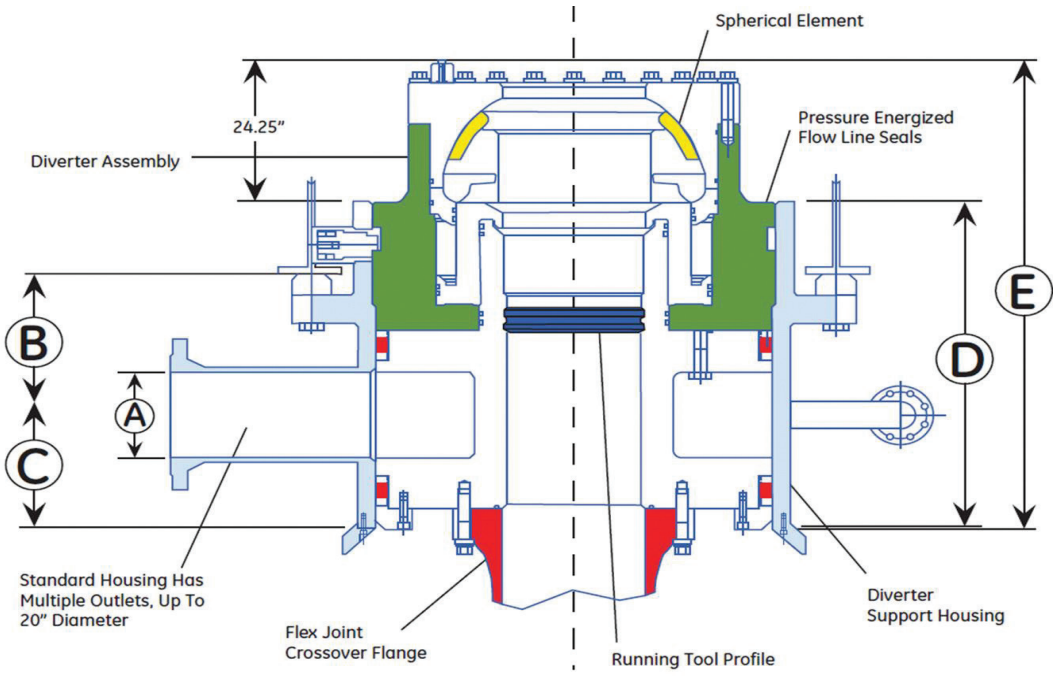
To arrive at the best possible outcome Matrix worked very closely with the Operator to address the sealing ability of the new RSM, but also the ergonomics associated with installation to ensure the RSM could be installed with minimal risk exposure to personnel. In conjunction with the development of the new RSM, a full size test rig was designed and manufactured to allow the final design to be qualified to 500 psi differential pressure. Matrix's extensive experience with polymers and composites allowed the material selection process to be optimised as required to deliver the tool within four months of inception.

THE RESULT

The final design is a modular system that can be mounted on any 9 5/8" casing joint and may be shortened or lengthened to suit the heave/tide movement for a particular drilling location. To minimise critical path time, the main body may be pre-installed on the landing string with the umbilicals enclosed behind a hinged lid while running the string. Initial latch allows safe manipulation of the umbilicals prior to final fastening to achieve the 500 psi differential pressure sealing ability. The body is manufactured of a low friction engineering grade polymer to allow smooth movement of the RSM through a closed diverter, while the seals are made of elastomers selected to withstand the required differential pressure across the range of geometric variations as per API specifications.

Matrix designed, manufactured and qualified the RSM within four months and the RSM was successfully run during the well testing program without any issues encountered. No modifications to the rig equipment or diverter were required to accommodate the RSM in the test string.

The design was performed with application flexibility in mind, and with the body material and sealing elastomers proven, the new concept may be adapted to suit different sizes and configurations of landing string and umbilicals.



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