

### **Abstract for Oceaneering Pipeline Repair Systems-Technical and case study overview by Giuseppe Rizzo, Oceaneering**

The United Kingdom Continental Shelf (UKCS) contains a considerable amount of oil, gas and condensate fields. The North Sea Oil Province, for example, is one of the world's major producing regions. Thus, it is paramount for the operators to ensure that the pipelines' integrity is maintained through the field life.

Although, proper Asset Integrity Strategies are put in place, (cathodic protections, Predictive Failure analysis approaches etcetera), pipelines can be subjected to damages.

For minor damages such as pin hole, corrosion, dents, Oceaneering Energy Product can provide reparation by the use of structural SMART CLAMPS which are installed on a localized damaged section of the pipe.

In the event that the extent of the damage does not allow the installation of smart clamps, the damaged section of the pipeline needs to be cut away and replaced with a spool piece and structural Repair Connectors (SMART FLANGE) on both side.

Both SMART CLAMP and SMART FLANGE can be either diver or ROV operable, hence they are suitable for both shallow and deep water, however today trend is to reduce divers' intervention to minimize both associated costs and potential hazards, hence hydraulically activated equipment is also provided for shallow water operations.

During the initial setting of the connector, the seal piston is driven axially to set the main and test seals around the pipe. The pressure is then increased to drive the slip piston axially in the opposite direction from the seal piston to set the gripping mechanism on the pipe. Both pistons are locked into final position by a series of spring-energized ratcheting locking mechanisms positioned radially inside the connector housing.

The elimination of repair through welds reduces considerably the reparation lead time by also eliminating the NDT procedures required when using standard methods.

Recently Oceaneering Offshore Project Group had successfully carried out repairs activities on a water injection line by the use of ROV installable Smart Clamps where some leaks have been identified. The activities have included seabed preparation by fortifying also foundations to bear weight of clamp.

### **Abstract for Friction Stir Welding of Steel for Pipelines presented by Stephen Cater, TWI**

Existing welding processes for the fabrication and repair of offshore pipelines are well established and largely understood. Despite this, they frequently experience problems and this is largely due to a common Achilles' Heel. As Richard Pargeter, TWI Ltd is fond of saying, "Steel is a sophisticated material whose properties are governed by precise alloying, careful control of grain structure during casting and rolling, and the use of very specific heat treatments. Welders then heat it to the melting point and re-freeze it in a few seconds and yet we still expect it to perform..." So, if there was a means of welding steel without melting it, would all our problems go away?

## **Abstract for Engineered solutions and innovative technologies to solve complex pipeline integrity challenges presented by Ron James, STATS Group**

Clients often approach STATS Group to develop engineered solutions and provide innovative technologies to solve their complex pipeline integrity challenges. STATS extensive experience of developing world leading patented pipeline isolation, hot tapping and plugging technologies featuring dual elastomer seals and taper locks provide fundamental components to solve many integrity issues.

STATS extensive history of providing process and pipeline repair and mechanical connection technology has allowed the company to develop innovative solutions to safely and efficiently solve complex process and pipeline issues. Many client problems require the use of a combination of STATS products that are engineered and adapted to overcome and address specific project issues.

This webinar will discuss real world examples and case studies where STATS engineered solutions solved some of our client's biggest challenges, often when alternative solutions did not exist.

Examples include:

Removal of a two-tonne pig launch tray from a 48" high pressure gas transmission pipeline. STATS engineered solution allowed the tray to be safely retrieved 600 meters while the pipeline remained at full pressure and under production flow.

Bespoke engineering interfaces to allow a new 36" gas pipeline to be pulled-in through the existing entry point in the platform gravity base structure, 180 meters below sea level, whilst still providing full isolation between the inside of the platform leg and the seawater pressure outside.

Leak-tight pipeline isolation services on a range of pipelines from 3" to 54" as part of a larger restoration project at a major refinery in the Middle East. This scope presented many challenges that would push the limits of STATS current isolation technology and require further research and development to provide an engineered solution capable of isolating each pipeline including high temperature steam lines.

Hot tap installed double block and bleed isolation of high pressure 30" liquid CO<sub>2</sub> pipelines operating at 148 bar. This allowed the safe retrofitting of launch and receive stations along the pipeline while production continued uninterrupted through a temporary bypass.