

NEW APPROACH TO DELIVERING LIGHTWEIGHT HIGH-PRESSURE REMOTE CLAMPS

CASE STUDY

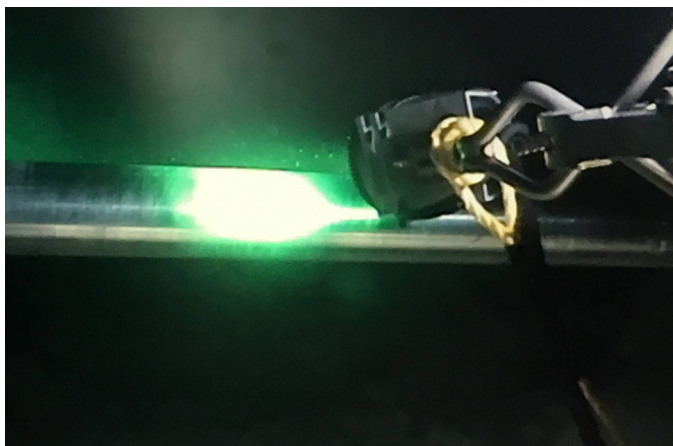
A MAJOR OPERATOR IN WESTERN AUSTRALIA EXPERIENCED A DEEPWATER PIPELINE FRACTURE WHICH REQUIRED AN URGENT REPAIR. THE OPERATOR COMMISSIONED CONNECTOR SUBSEA SOLUTIONS (CSS) TO DEVELOP A NEW CLAMP SOLUTION TO MEET THE SPECIFIC DEMANDS OF THE PROJECT.

THE CHALLENGE

The fracture was detected on a 4" MEG line, located in deepwater at 830 m, well beyond the reach of diver intervention. Rated to 400 barg, the high-pressure system would require a high integrity remote clamp to be deployed. Reliability and quality assurance was a priority, so DNV-GL Product Certification for Subsea Pipeline Repair (F101/F113) was demanded. The unique CSS Deepwater Coating Removal Tool was used to ensure correct pipeline surface preparation for the clamp installation.

To achieve a high-pressure repair, the clamp body needs to be substantial with suitable bolting to activate and seal, which is achieved through high pressure remote tension systems. The higher the pressure, the larger and heavier the repair system required. However, the 4" MEG line would only be capable of a very limited clamp weight to prevent over stressing and further damage.

A new approach to remote clamps was required and CSS was selected.



01 // Coating removal inspection



02 // CSS MORGRIP® 4" Deepwater Coating Removal Tool

“We reinvented how a remote clamp can be operated. Remote technology is often evolved from shallow-water applications. By developing a solution from the outset to address the unique challenge of deepwater, our solutions are simply more optimised. Lighter, more reliable and safer for the operation”

Pål Magne Hisdal

Chairman, CSS

OUR SOLUTION

To remove the weight from the clamp, a new approach was needed. By separating all the remote hydraulic and control activation and testing systems into a retrievable unit, upon completion only the sealed clamp body would remain on the pipe. Designing this retrievable unit to double as an installation frame would further support and control the loads experienced on the pipeline, mitigating risk of further damage.

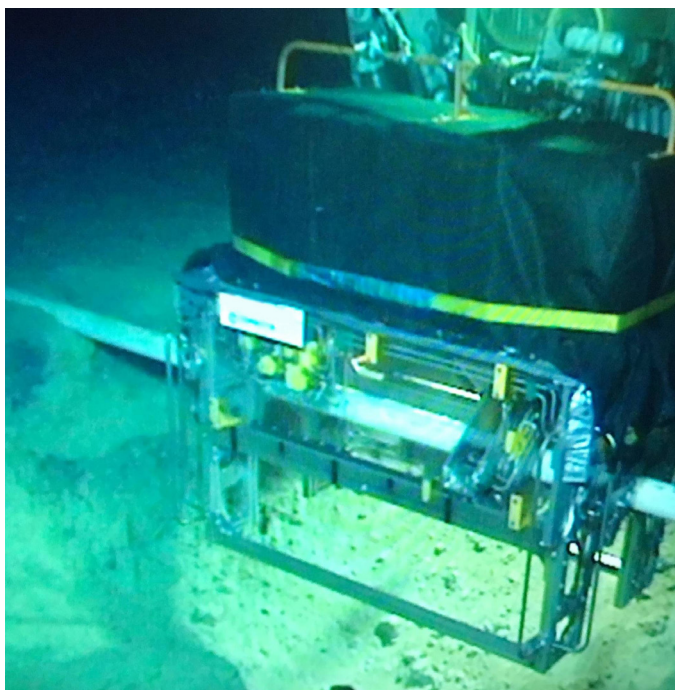
This approach was achievable due to the recent development of a new clamp activation system. Traditionally clamps are activated by tensioning the bolts along the two halves of the body. This process required field proven remote tensioners that can both tension and ‘de-tension’, and a separate nut running gearbox. For additional control, these systems might include transducers or visual aids for monitoring the procedure. Tensioners require

high pressure feeds to achieve the required bolt stress.

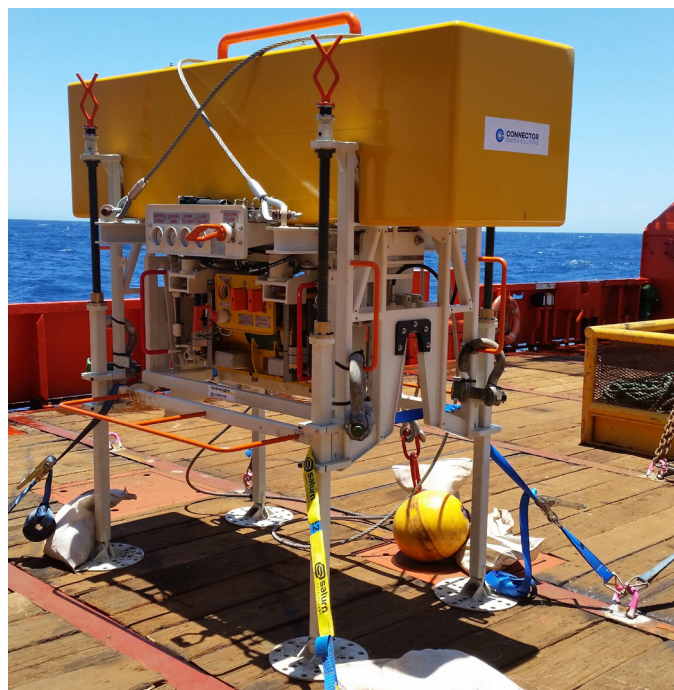
CSS had recently delivered the new C-Bar System. This activation method mitigates the need for multiple tensioner units and controls the activation from a single location, ideal for enabling separation of function.

A DNV-GL Product Certified Clamp was custom fabricated to the specific requirements of the operator and field location.

To further mitigate risk to the repair operation, CSS also supplied our high-performance and fully remote Deepwater Coating Removal Tool. Mounted with a unique patented cutting head, the coating removal tool is guaranteed to remove 100% of the coating without any damage to the parent material—a critical requirement when installing remote clamps or connectors.



03 // CSS 4" Deepwater Coating Removal Tool operation at 830 mwd



04 // CSS MORGRIP® 4" C-Bar Remote Clamp mounted on installation frame

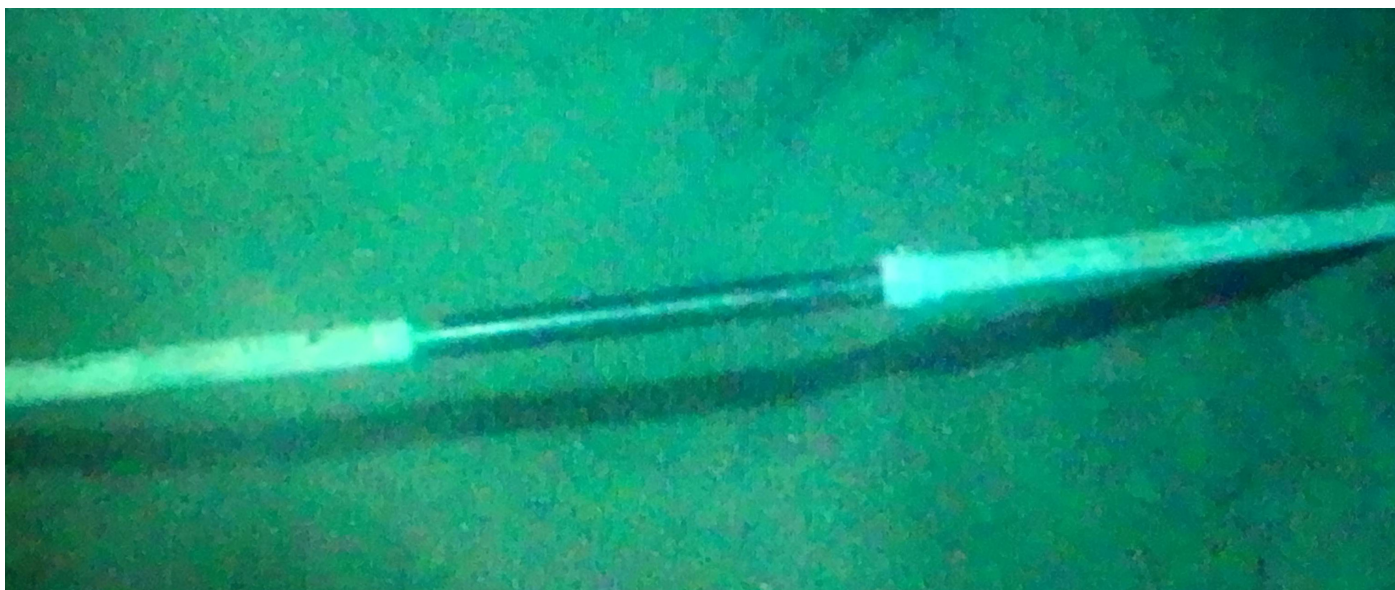


05 // CSS MORGRIP® 4" C-Bar Remote Clamp repair complete

PROJECT EXECUTION

Following extensive factory acceptance and system integration testing, including multiple pressure tests to exceed the 400 barg requirement, all equipment and tooling was mobilised.

The coating removal operation was conducted first, providing a bare pipe onto which the clamp would seal. The clamp mounted in the installation frame was then deployed. Lowered directly onto the repair location, the frame supported the weight of the system during activation and testing. Upon completion, the frame disconnected and was retrieved to the vessel, leaving only the clamp as a permanent repair on the pipe.



06 // Repair location with coating removed



07 // CSS MORGRIP® C-Bar Remote Clamp