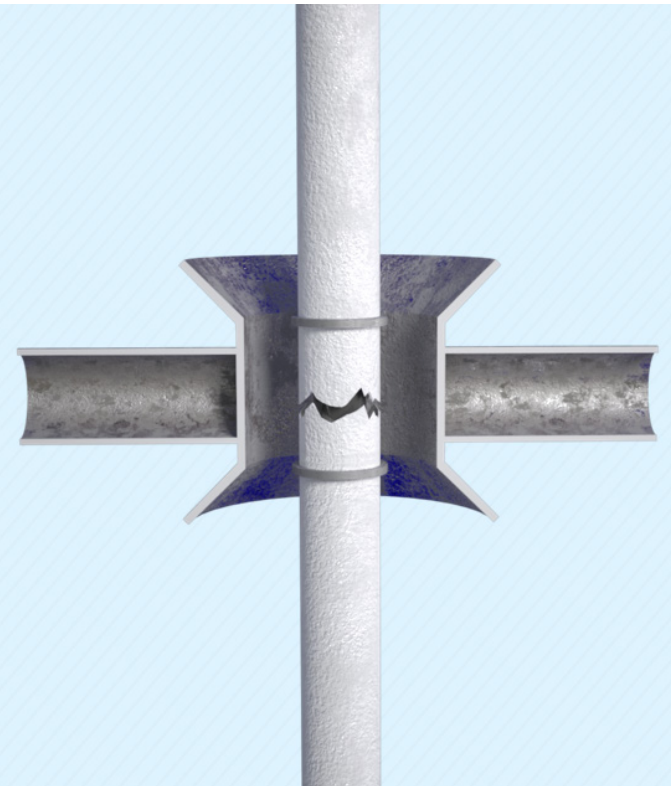
BRINGING A SHUTDOWN WELL BACK TO LIFE – A WEDGE-ACTIVATION BREAKTHROUGH FOR CONFINED-SPACE REPAIR

CASE STUDY

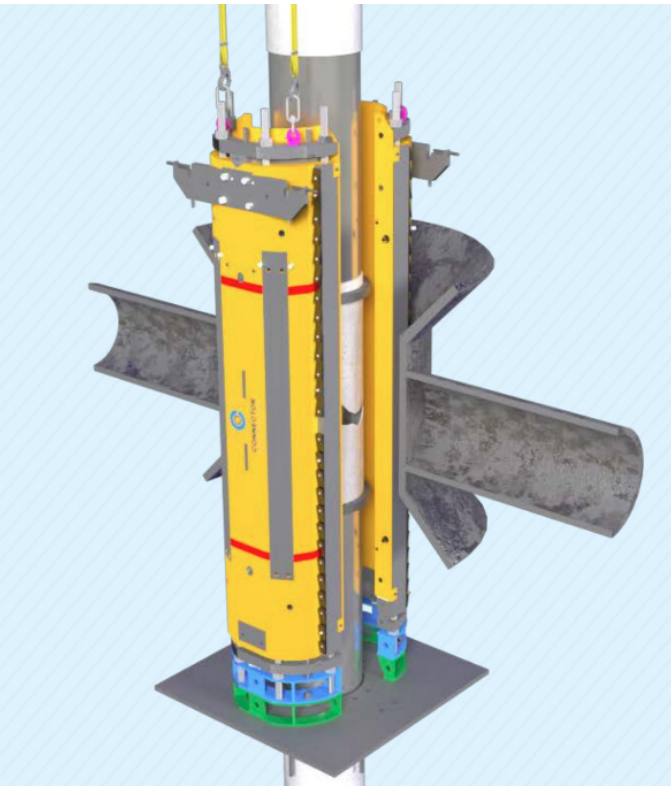
IN THE GUIDE FUNNEL OF A NORTH SEA CONDUCTOR, EVERY MILLIMETRE COUNTS—AND SO DOES DIVER SAFETY. AFTER THE AFFECTED PRODUCTION WELL WAS SHUT DOWN, THE CSS MORGRIP® TEAM WAS TASKED WITH RESOLVING A CRITICAL INTEGRITY FAILURE: A FULLY SEVERED CONDUCTOR WITHIN THE GUIDE.

01 // *The first-of-its-kind diver-friendly CSS MORGRIP® Conductor Repair Clamp*

Conventional clamps, with longitudinal flange bolting, force divers to work between the conductor and its guide, creating an unacceptable safety risk. To mitigate this risk, CSS developed and introduced a wedge-activated repair clamp with a retrofit centraliser. Our unique wedge-activation mechanism moves bolting from within the guides to the clamp's outer ends, positioning it away from the guide structure to facilitate easy diver access.



02 // *Fractured conductor in vertical guide*



03 // *CSS MORGRIP® Conductor Repair Clamp during installation*

PROJECT BACKGROUND

The affected conductor, operating in the UK sector of the North Sea, featured a vertical guide at a subsea elevation of -17.5 m.

Examination showed that loss of the centraliser subjected the conductor weld to excessive fatigue, leading to an outer-casing fracture within the guide and forcing a shutdown of the production well.

The client required a diver-installed solution that would structurally repair the conductor to full load-bearing capacity, be fully pressure containing and centralise the pipe to prevent excess motion and fatigue loading from re-occurring.

PROJECT GOALS AND DELIVERABLES

1. **Structural Reinforcement:** Engineered to restore the conductor's full load-bearing capacity, handling both axial forces and repeated wave-induced stresses.
2. **Leak Retention:** A robust seal system to effectively prevent seawater ingress under subsea pressure fluctuations.
3. **Conductor Centralisation:** An integrated centraliser keeps the pipe precisely centred in its guide, eliminating lateral movement and reducing seal fatigue over time.
4. **Diver Safety**: Eliminate the need for bolting operations inside the confined guide.

TECHNICAL CHALLENGES AND REQUIREMENTS

1. **Restricted Access:** The guide's internal diameter allowed tight access for the clamp halves.
2. **Diver Entrapment Hazard:** Working inside the guide posed a serious safety risk under North Sea currents.
3. **Fatigue Considerations:** The repair needed to reinstate the centralisation and allow the conductor to withstand millions of load cycles with limited degradation.

04 // *CSS MORGRIP® Conductor Repair Clamp onshore SIT*

05 // *CSS MORGRIP® Conductor Repair Clamp hydrostatic test*

KEY DESIGN FEATURES

- **Patented Wedge-Activation Method:** Simplifies diver activity, reduces installation time and eliminates the need for bolting in confined spaces—forming the foundation of CSS's proven subsea clamp solutions.
- **Rapid Activation:** Thorough FAT and SIT meant the offshore work was completed in under 12 hours of diver time, inclusive of pressure test.
- **Fatigue-Resistant Design:** Proven for cyclic loads, extending asset life without welding or hot-work.
- **Integrated Centralisers:** Limits lateral pipe movement under hydrodynamic forces to reduce stresses in the conductor.

PROJECT OUTCOME

The clamp restored the production on the well to its original operating condition, meeting the specified pressure and fatigue criteria. Further verification and leak testing shows that the well could safely return to production, avoiding prolonged downtime.

"CSS's unique wedge-activation approach enabled a safe and fast repair in a confined guide, minimising offshore time and supporting an early restart of the well." –Client Project Manager

Since installation, no maintenance interventions have been necessary, and the asset continues to perform reliably.

LESSONS LEARNED AND FUTURE OUTLOOK

The patented wedge-activation concept is now being applied to other confined-space subsea repairs, and CSS is refining a next-generation clamp for both diver and ROV installation markets. By pioneering its patented wedge-activation system alongside bespoke installation aids and an integrated centraliser, CSS delivered the first diver-friendly conductor repair clamp of its kind—restoring a critical North Sea asset and establishing a new industry benchmark for safe, efficient and fatigue-resistant subsea clamp installations.

06 // *CSS MORGRIP® Conductor Repair Clamp post repair ROV survey*