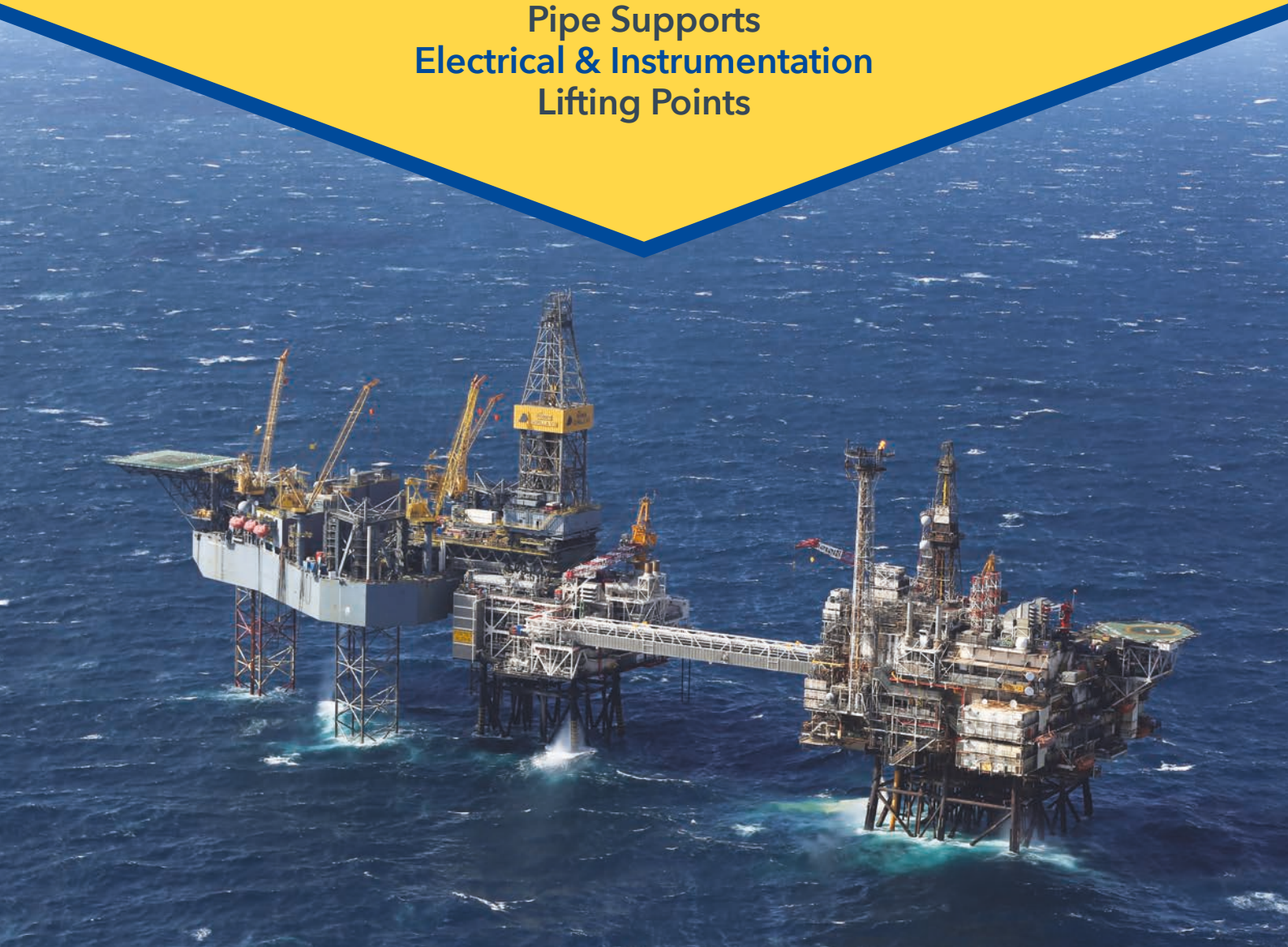
Pioneering reliable, high strength steelwork connections

OFFSHORE AND SUBSEA APPLICATIONS

by lindapter®

Steelwork Connections
Pipe Supports
Electrical & Instrumentation
Lifting Points



TECHNICAL INNOVATION IN STEELWORK CONNECTIONS

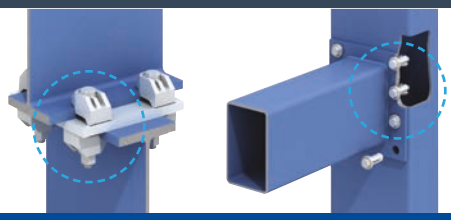
Inventor of the Girder Clamp Est. 1934 Lindapter Accept no substitute and Hollo-Bolt®

For over 80 years, Lindapter has pioneered the design and manufacture of steel-to-steel connections, providing a safer, faster and more convenient alternative to on-site drilling and welding. Lindapter products are specified worldwide for connecting steel-to-steel on subsea engineering projects, in the Oil & Gas and Renewable Energy sectors.

TYPICAL CONNECTION APPLICATIONS

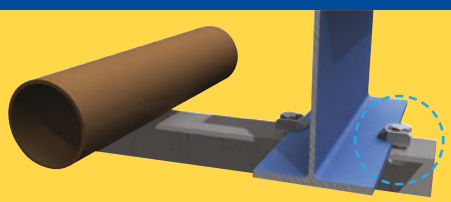
STEELWORK CONNECTIONS

Lindapter's popular Girder Clamp and Hollo-Bolt® connections are regularly specified for connecting steel sections in permanent or temporary applications.



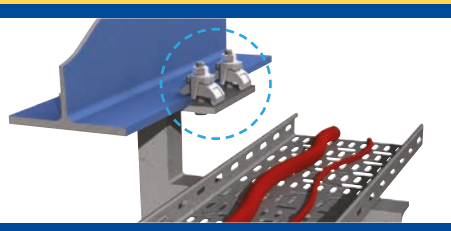
PIPE SUPPORTS

The adjustability of Lindapter Girder Clamps allows contractors to quickly align pipes before tightening the clamps with hand tools to complete the installation.



ELECTRICAL & INSTRUMENTATION

Lindapter connections provide quick-to-install solutions for securing cable systems or electrical equipment to a steel frame or instrumentation sled.



LIFTING POINTS

Lindapter's lifting points are often used to lift and lower equipment, for example lowering risers off an offshore platform.

REASONS TO USE LINDAPTER CONNECTIONS

- Quick and easy to install
- High strength products
- Superior corrosion protection
- Adjustable for precise alignment
- Independent product approvals
- Free connection design

CONVENTIONAL METHODS vs THE LINDAPTER METHOD

WELDING / DRILLING / BOLTING

- ✖ No adjustability without additional work, e.g. repeated tack welding and grinding
- ✖ Damage to steelwork and coatings
- ✖ Time consuming
- ✖ Power source required
- ✖ Requires skilled workforce and specialist equipment
- ✖ Hot work results in area closures

STEEL CLAMPING

- ✔ Fast installation and lower labour costs
- ✔ Adjustable on-site for precise alignment
- ✔ Steelwork is undamaged, maintaining strength and corrosion protection
- ✔ Power is not required so all areas are accessible
- ✔ Installation requires hand tools only, reducing labour and equipment costs
- ✔ No hot work, minimises fire risk and no need for area closures

CASE STUDY

AVIAT GAS FIELD DEVELOPMENT NORTH SEA

Lindapter's Girder Clamps were selected by Apache North Sea Subsea Engineers and then installed by divers more than 100m below sea level to secure the production riser on the Forties Alpha platform to the base support frame for the Aviat Field Development project.

Apache's Structural Design Engineers were tasked with finding a robust connection to secure the production riser's supporting framework. The brief required a connection that would withstand high loads and outlive the production riser, while providing a quick way for the divers to carry out the installation while wearing thick gloves underwater. Corrosion resistance and fatigue life were of paramount importance as the application needed to be able to support the weight while

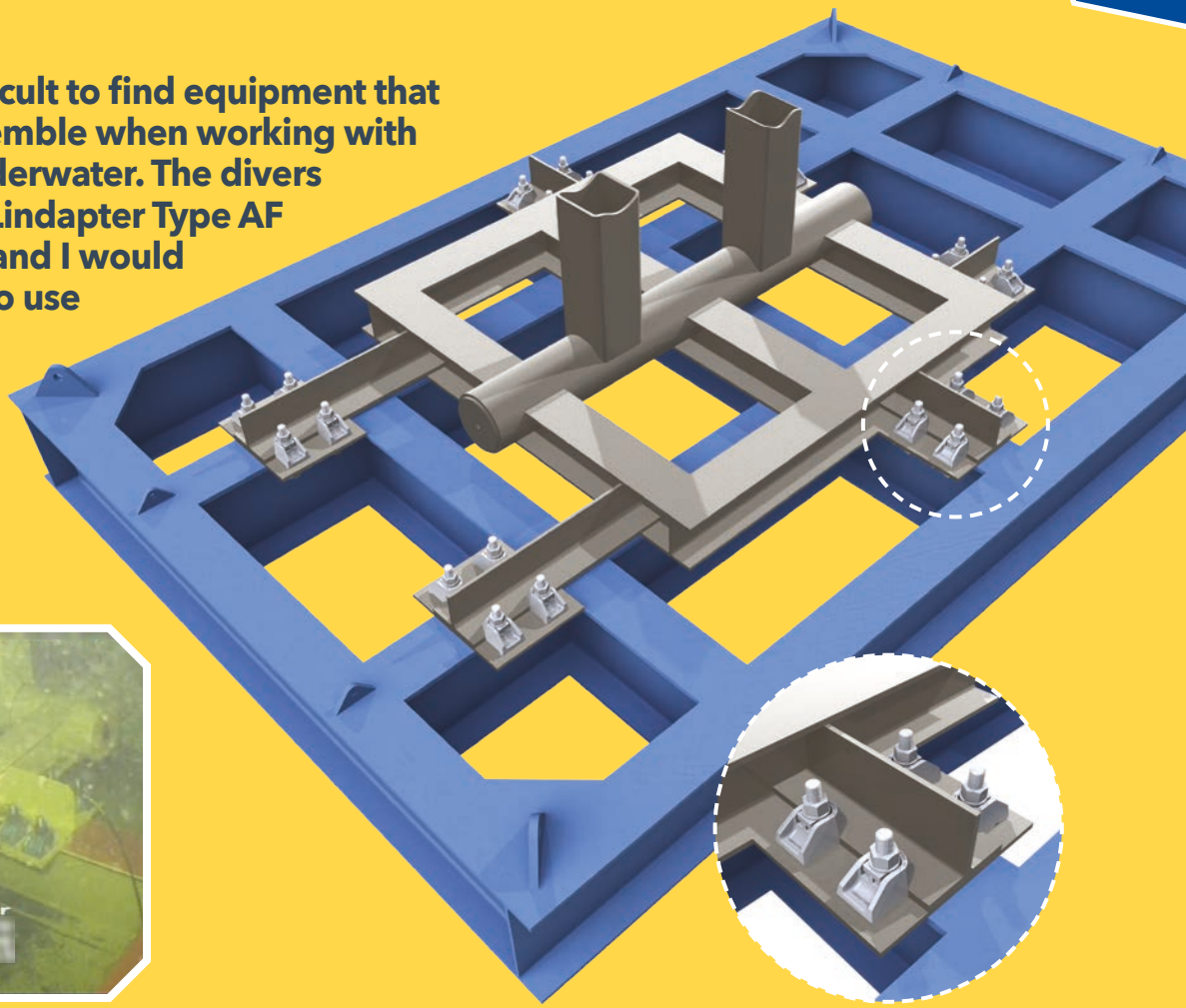
PROJECT OVERVIEW

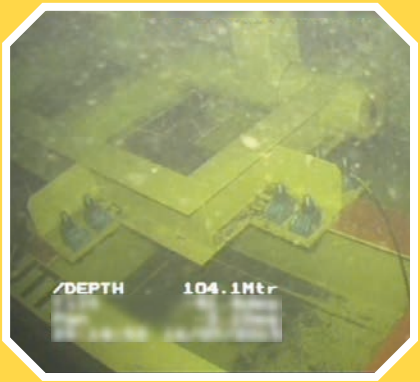
APPLICATION
Securing the framework for the subsea riser.

PRODUCT(S)
Type AF High Slip Resistant Girder Clamps

"... it is very difficult to find equipment that is simple to assemble when working with thick gloves underwater. The divers assembled the Lindapter Type AF clamps quickly and I would be very happy to use products of this design going forward."

Jack Marston,
Project Engineer



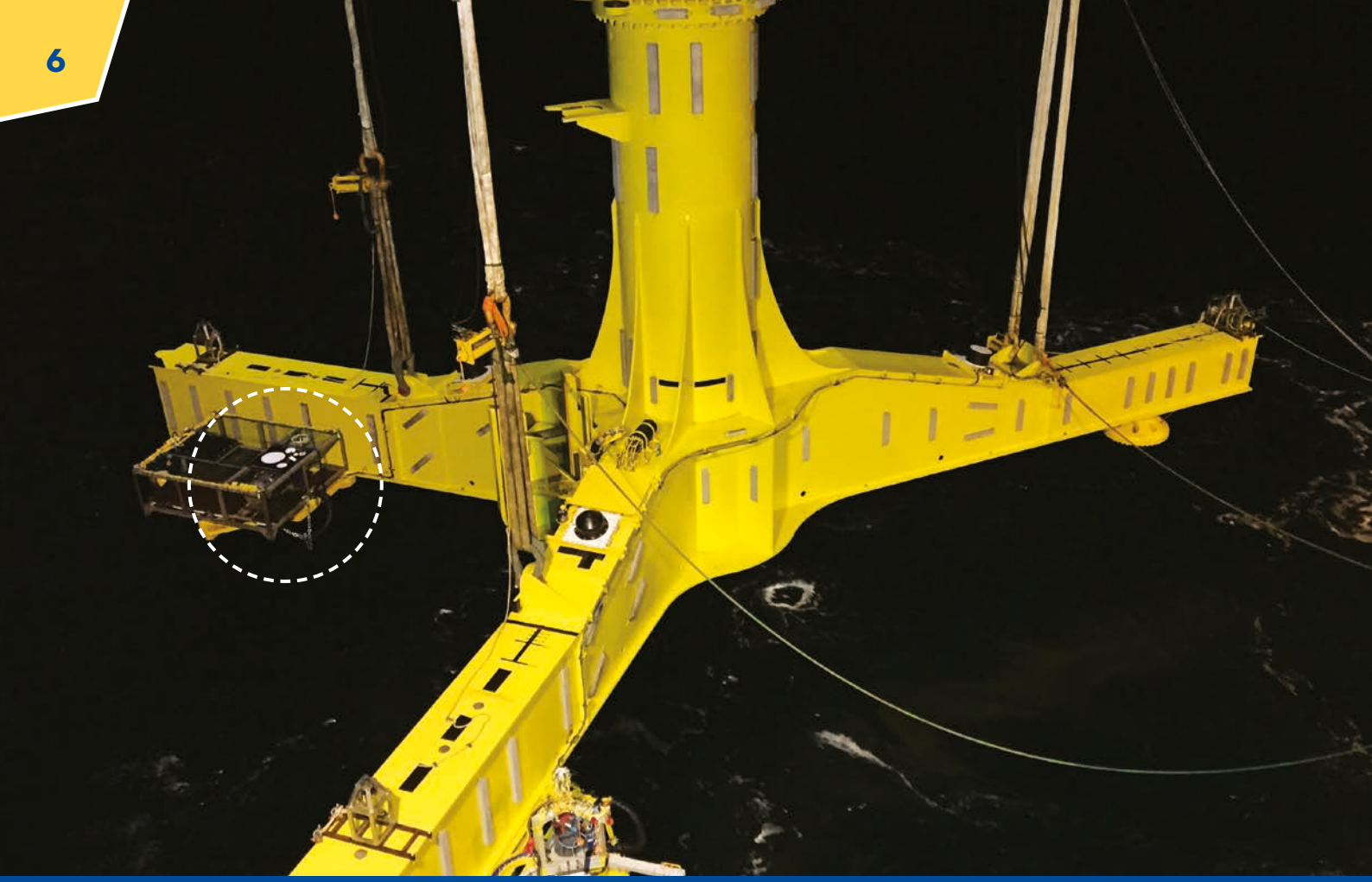


handling wave action on the host platform and movements from internal pressure in the production riser for over 15 years.

Various conventional connections were evaluated and some were immediately rejected because the exact position of the joint was unknown whereas the adjustable Lindapter clamping systems prevented this from being a problem. Apache took advantage of Lindapter's free connection design service and they quickly received a detailed proposal which was secured with heavy duty size M24 Type AF Girder Clamps, manufactured from SG iron with a hot dip galvanised coating as standard.

Lindapter's proposed solution was specified because it provided the tensile and slip resistance that was required for the loads anticipated during the life of the production riser. The clamping method simplified the design issues, installation process and operational activities for improvements in long term reliability, such as a reduced need for inspection and maintenance. Engineers were sure Type AF was the right choice as it offers independently approved safe working loads and superior corrosion resistance, which is ideal for subsea applications.

During installation, the divers benefited from the Type AF's lateral adjustability which allowed the framework to be quickly positioned and tightened using just simple hand tools. Jack Marston, the Project Engineer, commented on how quick and simple it was to secure the application with thick gloves underwater and that they will use Girder Clamps by Lindapter for future projects.



CASE STUDY

MEYGEN TIDAL TURBINE GLOBAL PROJECT

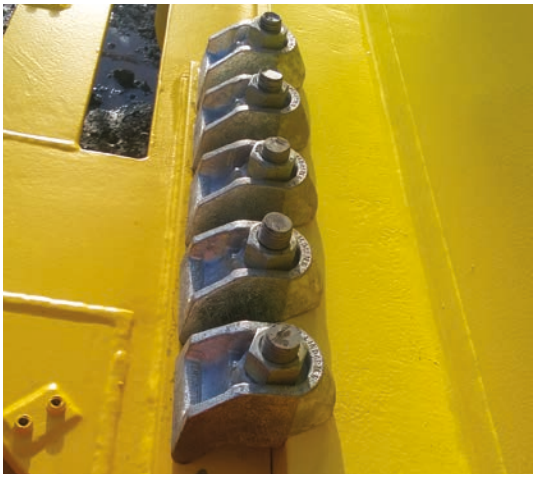
Atlantis Resources Limited is pioneering the development of tidal current power as the most reliable, economic and secure form of renewable energy. Their Structural Design Manager recently specified Lindapter clamping systems for securing a steel platform onto a tidal turbine foundation on MeyGen, the world's most high profile tidal stream project.

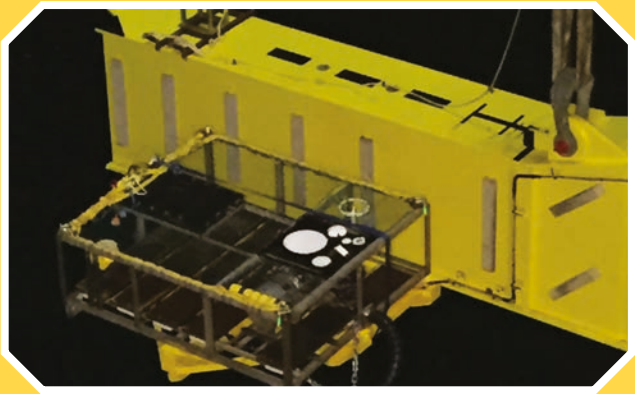
Atlantis was commissioned to design the electrical and mechanical infrastructure needed to tie several subsea measurement instruments into one system in order to monitor the marine environment. Engineers determined that the monitoring equipment would be housed in instrumentation sleds and mounted on steel platforms each weighing up to 4000kgs. Engineers then sought a reliable connection

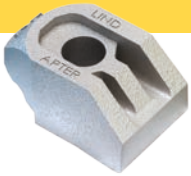
PROJECT OVERVIEW

APPLICATION
Securing an instrumentation sled onto a tidal turbine foundation.

PRODUCT(S)
Type AF High Slip Resistant Girder Clamps







to attach each platform to the Tidal Support Structure (TSS) as the instruments were to be hard-wired to the structure and had to be installed with the foundation. The brief required a weld-free connection that would withstand tidal forces and outlive the life of the instrumentation sled and platform in order to avoid any unnecessary subsea servicing.

Atlantis evaluated several fixings for strength, longevity and reliability and decided Lindapter's clamping systems were the best choice. After contacting Lindapter's technical team, the Engineer was confident that size M24 Type AF high slip resistant clamps should be used to attach the steel platform back to the flange of the tidal turbine support structure. Further reassurance was provided by Lindapter's range of independent technical approvals and over 80 years' experience in designing and manufacturing steel connections.

The Type AF's lateral adjustability allowed the installers to quickly align the platform into position before tightening with hand tools. The simple installation helped the contractor to save time and reduce labour costs on the project.

CASE STUDY

CENTRICA ROUGH 47/8A PLATFORM NORTH SEA

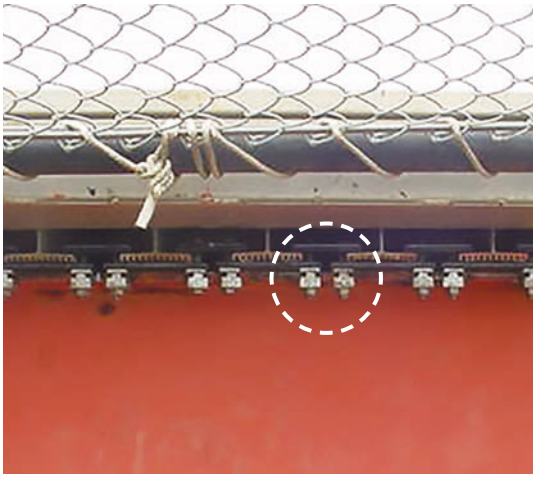
Following a review of the platform, Engineers made the decision to refurbish the corroding helideck. This required a connection that would not create galvanic corrosion from the juxtaposition of dissimilar metals and salt water catalyst.

Lindapter provided the solution in the form of bespoke Girder Clamps, which featured synthetic polymer coatings to eliminate electrical contact between the structural steel and aluminium deck. The CE approved Girder Clamp system was configured with Type A and B clamps to create a series of connections without drilling or welding. The fixings created additional anti-corrosion benefits as the platform's steelwork integrity and protective coatings were preserved.

PROJECT OVERVIEW

APPLICATION
Securing a new helideck to the Centrica Rough 47/8A Platform.

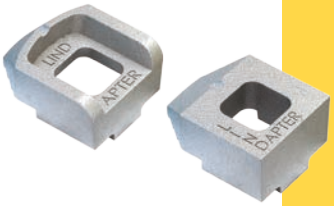
PRODUCT(S)
Type A and Type B Girder Clamps

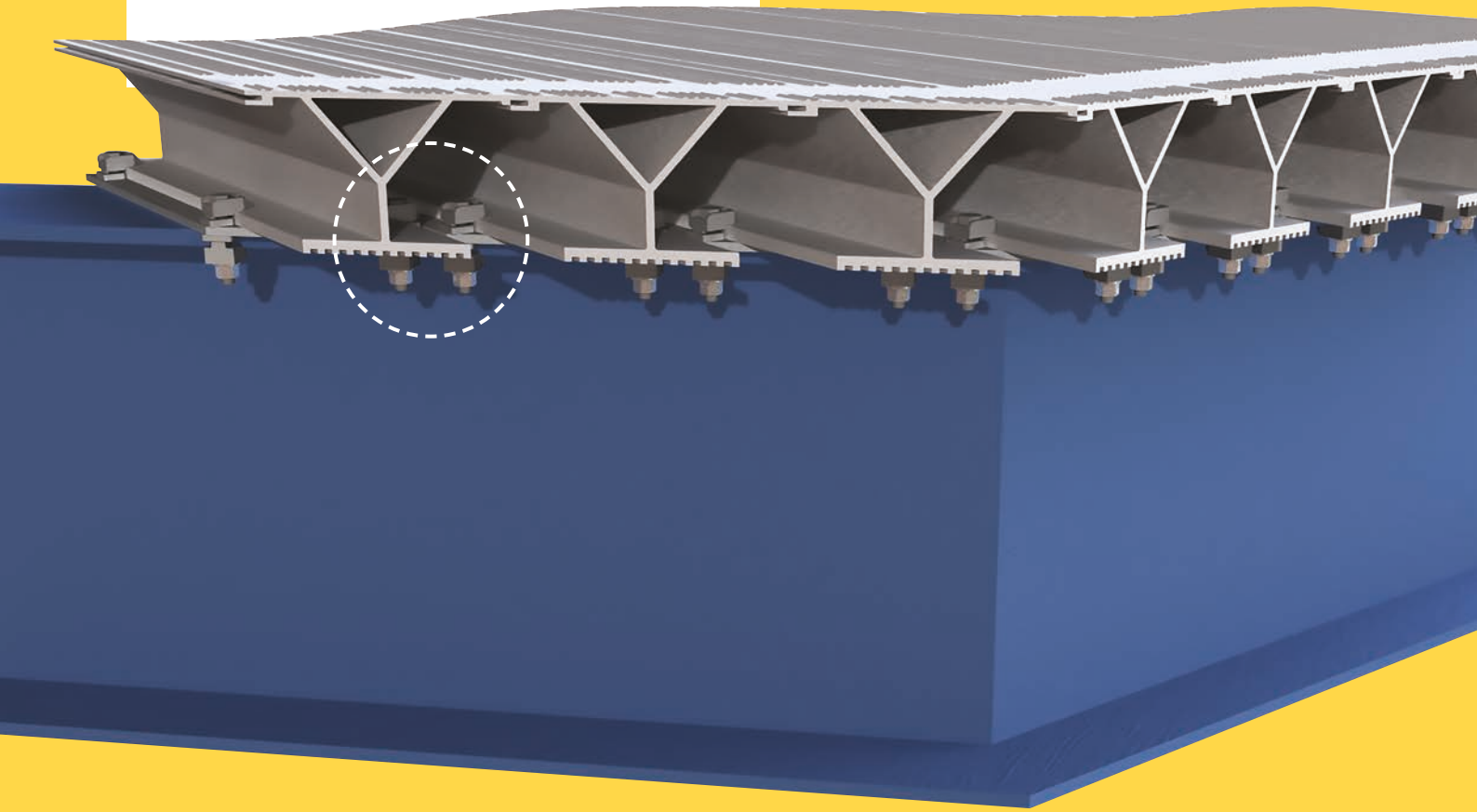


Lindapter's clamping systems provide on-site adjustability which enabled the new deck components to be precisely aligned with speed and ease; this was particularly important for this application as the helideck parts required interlocking.

Lindapter fixings are accompanied with approved safe working loads and in this case were calculated to withstand the dynamic loads associated with the landing and take-off of helicopters.

Hot work permits are not required, which means there is minimum interruption to productivity and work can be carried out safely and quickly, without the need for on-site power or specialist tools. Rapid installation with minimal impact on the rig's output creates obvious cost benefits for offshore platforms of this nature.





CASE STUDY

SNORRE OIL FIELD PLATFORM NORTH SEA

The Snorre B platform is a semi-submersible PDQ floater operated by Statoil ASA and lies about 7km north of Snorre A. Oil is piped to Statfjord B via Snorre A into the Statpipe / Norpipe system.

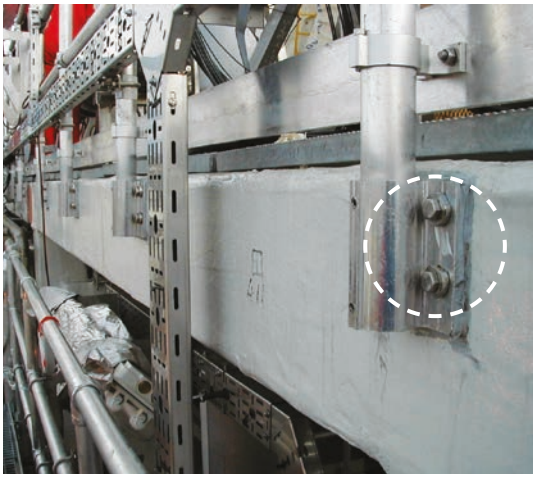
Engineers working on the Snorre B Platform sought a method of safely securing hand rails in various parts of the rig. Welding was deemed highly undesirable due to the inevitable disruption and possible delays that area closures would cause.

After evaluating several options, Engineers specified Lindapter's CE approved Hollo-Bolt in stainless steel due to its high strength, corrosion protection and wide range of technical approvals.

PROJECT OVERVIEW

APPLICATION
Securing handrails alongside new walkways throughout the Snorre Oil Field Platform.

PRODUCT(S)
Lindapter Hollo-Bolt®



Hollo-Bolt® by Lindapter®

ICC ES ESR-3330 Seismic Approved

LA DBS Department of Building and Safety

Deutsches Institut für Bautechnik DIBt

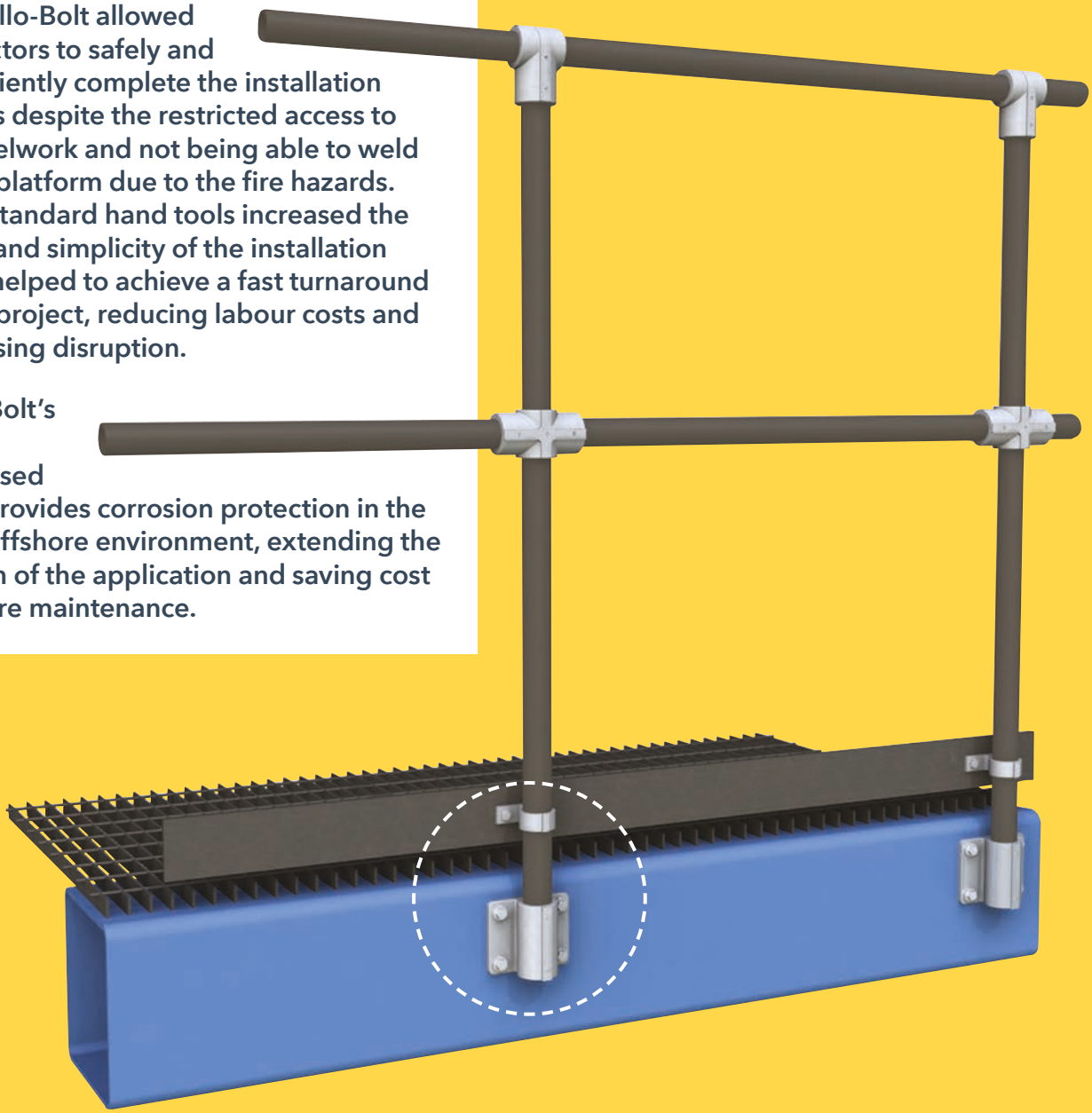
CE TÜV NORD

The Hollo-Bolt is the original expansion bolt for structural steel and it is the **only** expansion bolt that is approved by ICC-ES for resisting wind loads and seismic loads in all US seismic design categories (A to F). Lindapter's extensive experience in the Oil & Gas industry and pioneering steel connections, provided further confidence for the specifiers.

Contractors used brackets and size M12 Hollo-Bolts to quickly attach the hand rails to the sides of the pre-drilled steel hollow sections that support the walkways.

The Hollo-Bolt allowed contractors to safely and conveniently complete the installation process despite the restricted access to the steelwork and not being able to weld on the platform due to the fire hazards. Using standard hand tools increased the speed and simplicity of the installation which helped to achieve a fast turnaround on the project, reducing labour costs and minimising disruption.

Hollo-Bolt's hot dip galvanised finish provides corrosion protection in the harsh offshore environment, extending the lifespan of the application and saving cost on future maintenance.



INDEPENDENT PRODUCT APPROVALS

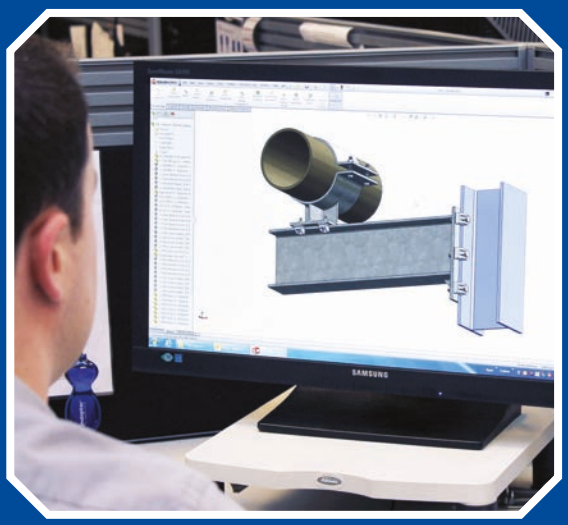
Lindapter's Girder Clamp is the only steelwork clamping system to have the **CE Mark** approval.

Lloyd's Register Type Approved products for resistance to shock and vibration.

The Hollo-Bolt may be used to resist wind loads, and seismic loads in **all** Seismic Design Categories (A to F).

Other independent product approvals include **DIBt, TÜV Nord, FM** and **VdS**.

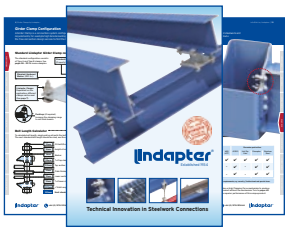
ENGINEERED SOLUTIONS



As part of Lindapter's extensive service, a team of experienced Engineers can advise a suitable connection for you free of charge, providing drawings in 2D and 3D formats as well as CAD files that can be imported into all major software programs. For more information, please email Technical Support on support@Lindapter.com

Lindapter's full service includes:

Free design proposal › **2D / 3D drawings** › **Quotation** › **Global distribution** › **Installation guidance**



Contact Lindapter International

Request the Lindapter product catalogue for full design information:
+44 (0)1274 521444 | support@Lindapter.com | www.Lindapter.com
Lindsay House, Brackenbeck Road, Bradford, West Yorks BD7 2NF

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