

Modulift Beam Lifts Tunnel Boring Machine in World First

Modulift provided a custom lifting beam, slings and shackles as specialist pipeline contractor Stockton Drilling completed multiple lifts of a 28t, 18m-long tunnel boring machine (TBM) that was working subsea at the Beatrice Offshore Wind farm / Direct Pipe Landfalls (BOWL) project at Portgordon, Scotland.

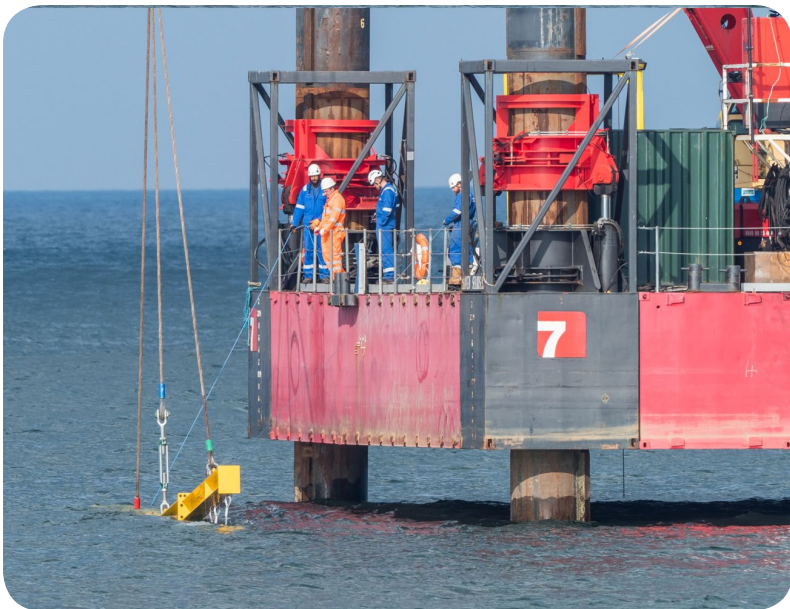


The BOWL project is one of the largest private investments ever made in Scottish infrastructure and produces 584 megawatts from 84 turbines situated in the outer Moray Firth, powering approximately 450,000 homes at a cost of £2.6 billion to its investors SSE, Copenhagen Infrastructure Partners and Red Rock Power.

Stockton's scope of work included the trenchless installation of two independent 48-inch x 450m steel landfalls for high-velocity cables by utilising Herrenknecht's DirectPipe system and AVN1000 micro tunnelling machine. DirectPipe, a hybrid micro-tunnelling and pipe-jack system that lines the tunnel as it advances, was selected due to un-drillable geology.

In a world-first, the TBM was recovered from the sea after each drive using a remote disconnect module. Divers were then dispatched to the TBM's location to attach the 34t capacity, 16.6m-long beam so a 120t capacity crane, placed on a rented jack-up barge, could lift it out of the water and place it on a multi-cat for return to Buckie Harbour.

Modulift was challenged with design and manufacture of a below-the-hook solution to lift the TBM from beneath the surface, where it was to be found four degrees from horizontal. The TBM is made up of 10 modules that each have their own individual lifting points, all of which were to be utilised to provide equal loading and enable the machine to be lifted in one piece.



The beam also had three top lifting points to facilitate rigging to the crane.

Modulift utilised counterweights so the beam tilted when unloaded in order to have the same inclination as the load on the seabed, ensuring all bottom connections were carrying load. However, the beam had to lift the TBM level. It was also manufactured to withstand the dynamic forces present in the demanding, marine environment.

Patric Ridge, business development manager at Stockton Drilling, said:

“The product satisfied the requirements and standards set out at the beginning of the project.”

“Lifting [the TBM] in one piece was a swifter, safer and more efficient process. Weather conditions had to be just right in order to perform the lift, so the lift had to be completed in a timely and safe manner. The process was further complicated by the low depth of water [less than 10m] in the area.”

Ridge explained that the TBM was submerged for less than 48 hours for each 420m drive, approximately half-a-mile offshore. Surface alluvial comprising pebbles and cobbles, overlaying bedrock of weathered sandstone, prevented the use of more traditional horizontal directional drilling methods. Further, the beach area around the landfall site is a designated Site of Specific Scientific Interest (SSSI).

Stockton has retained the beam for future utilisation.



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