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ABI EQUIPMENT LIMITED

In April 2020 ABI Equipment Ltd were contracted to supply a Delmag RH34 drilling rig, plus BT340D rotary head, to their colleagues at BAM Nuttall Ltd for works at Dawlish, Devon.

Dawlish Sea Defences

Client: BAM Nuttall Ltd

Equipment: Delmag RH34 rig
+ BT340D rotary head
+Rotary Spacer

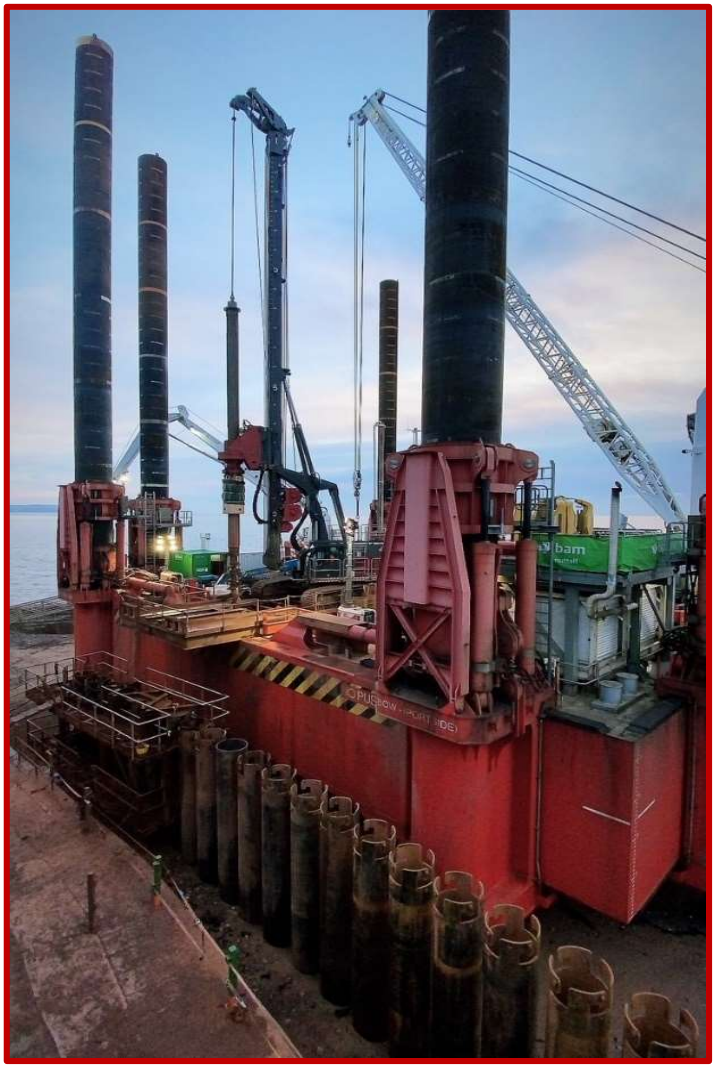
Technique: Piling with Vibration

In February 2014 the Devon coast was battered by storm force winds and extremely high seas. Such was the ferocity of the storm that the sea defences at Dawlish were washed away causing the railway line to collapse, leaving the track hanging in midair. Dawlish is on the First Great Western Line that runs between Exeter St David's and Plymouth and on an average day there are 12,500 passenger journeys. The collapse of the track meant that this main travel route from Cornwall and Devon to the rest of the UK was closed causing considerable disruption. Thanks to the dedication of a team of 300 Network Rail engineers a new temporary sea defense was installed and the rail line reopened after 8 weeks.

Following the storm Network Rail looked at what they could do to improve the resilience of the line and in particular protect the 100m stretch of line that was washed away. The decision was therefore made to build a new, higher and wider, sea wall to protect the line at Dawlish. In 2019 the Department of Transport agreed to fund the new sea wall. BAM Nuttall were awarded the contract to build the first phase covering the stretch of wall to the west of the station from the Colonnade Underpass and Boat Cove. In July 2020 they were also awarded the contract to build the second phase, comprising 400m of sea wall between the Grade II station and the Coastguard Breakwater.

Barn Way, Lodge Farm Industrial Estate, Northampton NN5 7UW England
sales@abi-eqp.com www.abi-eqp.com
+44 (0) 1604 586960
+44 (0) 1604 586961

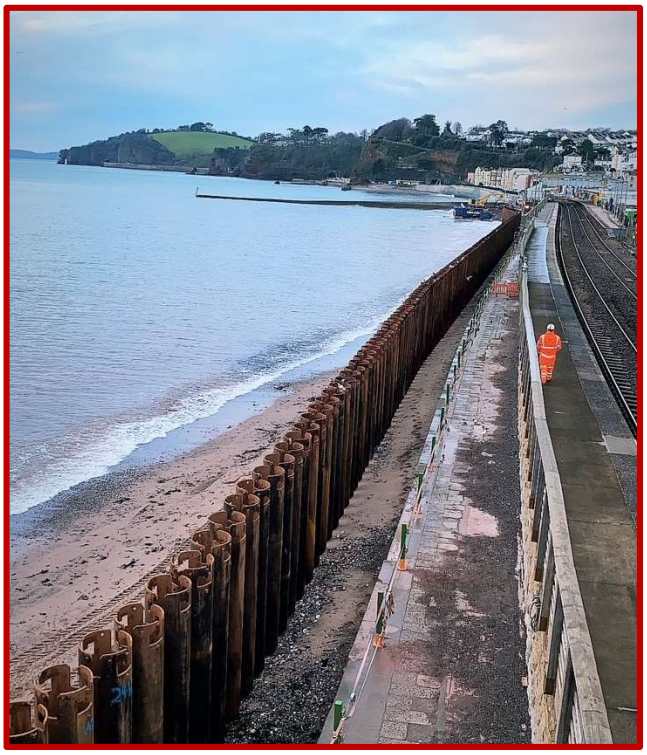
BAM Nuttall called upon ABI Equipment to help with the piling solution for the project. Given the ground conditions that were beach deposits covered Alphington and Heavitree Sandstone Breccia, (Coarse rock fragments held together by silts) the decision was made to undertake a series of test piles in the station carpark to find the most appropriate piling method. In April 2020 our Delmag RH34 arrived in the station car park and carried out a series of test piles using both Ø1,220mm CHS piles with 30mm wall thickness and Ø762mm CHS piles with 25mm wall thickness. The tests quickly revealed that the Ø1,220mm pile could not be installed productively into the ground to the required level. The piles were also trialed with and without cutting teeth. The trial piling confirmed that the Ø762mm piles with teeth offered the best technical solution.



The weight and reach of the piling rig were important considerations as it was going to be used on the unique 'walking jack-up barge' "Wave Walker". At 110t the Delmag RH34 was an ideal selection as it offered the right drilling performance and excellent extended reach capability. The Wave Walker allowed construction of the sea defense to continue no matter what the height of the tide. Due to the tidal range the Delmag had to be positioned over the side of the platform to install the piles. The team at BAM Nuttall constructed a bespoke cantilever piling dolly that projected 3m over the side of the barge to accommodate this. This also enabled the plies to be driven the final 2 meters into the seabed without conflicting with the external legs of the barge. The permanent tubular

piles were Ø762mm x 25mm wall thickness up to 16m long installed into sandstone breccia. The pile toe was prepared so as to form a cutting edge, with the piles screwed to final depth in the breccia without the use of vibration or impact driving and they were not grouted into position so it was important to control the quality of the installation process.

The main work on the project was carried out over the winter of 2020/21 working 24/7 alongside a live railway track with ABI's own rig operators and service support team. Given that this was also during the Covid-19 pandemic one of the challenges the ABI team faced was how they could quickly sanitize the operator's cab between operator changes (4-changes per 24-hours). The solution that the team arrived at was to use a new misting system to hygienically clean the cab and to wipe down all common grab points.



Adrian MacDonald (Works Manager) from BAM Nuttall

"The team at ABI were a delight to work with. Their input in coming up with a workable solution and assistance with the testing phase of the project was invaluable.

The Delmag RH34 coped admirably with the challenges that the ever-changing tide brought and worked brilliantly from the deck of the Wave Walker. Despite the challenges that the Covid-19 pandemic brought, we were able to run 24/7 and this has meant that the project was completed on time. Working together we have also delivered a top quality result."