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ABI EQUIPMENT LIMITED

In February 2022 ABI Equipment Ltd were contracted to supply a combination of driven piling rigs and drilling rigs to BAM Nuttall working in joint venture with Mott MacDonald for much needed flood defence works at Avonmouth in the Southwest of England.

Major work was undertaken to strengthen the flood defences along the River Severn estuary, at Bristol in Southwest England. The work involved the installation of 26,250 linear metres of steel sheet piles along 2100m of shoreline. In addition to this, concrete walls and flood gates were constructed as part of the battle to protect 2,500 homes against rising sea levels. As part of the work, 80 hectares of new wetlands for birds were created. This was achieved by flooding land at Northwick, South Gloucestershire and Hallen Marsh, Bristol.

As part of this work BAM Nuttall called upon ABI Equipment to help with the piling solution for the project. The ground conditions on site were mudstone, sandstone and lias (a mixture of limestone, shales and clays).

An ABI TM20 Mobilram with powerful MRZV36VV variable speed, variable static moment vibrator undertook the sheet piling work. The installed piles were Arcelor AZ36-700 pairs up to 14.5m long which were driven in conjunction with vibration monitoring at key nearby structures. The ability to adjust vibrator frequency and static moment 'on the fly' offered tremendous benefit in this situation particularly with the variable ground conditions.

ASEA Ecology Mitigation and Flood Defence Project

Client: BAM Nuttall Ltd

Equipment: ABI TM20 Mobilram with MRZV36VV vibrator.

Delmag RH28 drilling rig.

Technique: Piling with Vibration

Coring work to remove underground obstructions.

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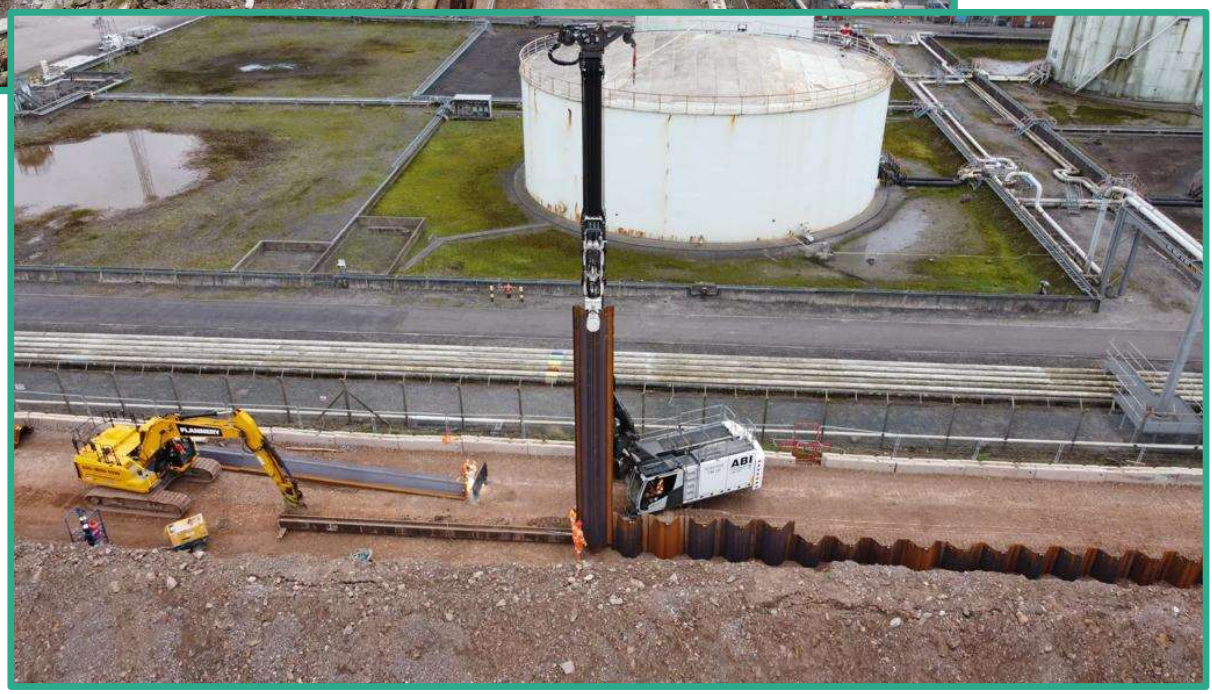
The rig's EU Stage V diesel engine combined with ABI's unique Efficiency Drive System meant that during the piling operation the rig was able to run for 4-5 days between refuelling. This compares very favourably with older technology machines which typically require daily refuelling. This much reduced fuel consumption from the ultra-efficient EU Stage V engine ensured very substantial reductions in exhaust gas emissions were achieved throughout the project.

Efficiency Drive also reduces operational noise levels. So, given the environmentally sensitive site location, the overall performance and operational efficiency of the TM20 was a perfect solution for the contractor. As a bonus, piling production rates also met or exceeded expectations.



During the piling works it was discovered that on some parts of the site there were several deep ground obstructions that prevented the installation of the sheet piles. BAM Nuttall realised that these obstructions would need removing but they were too deep for normal excavation work to be carried out. Having taken advice from ABI Equipment it was decided to core through these locations using a Delmag RH28 drilling rig.

The rig carried out the coring work on a 500m stretch of made ground utilising a guide frame at ground level for precise positional control. The ground was found to comprise high quantities of steel reinforced concrete to a depth of 8-10m, which was cleared using the RH28.

Once the coring work was completed our TM20 returned to site and finished installing the sheet piles.

Adrian MacDonald (Works Manager) from BAM Nuttall commented:

“The team at ABI have been a great support to us during this project.

We found the new TM20 to be a very powerful but precise machine with incredible fuel efficiency. We made excellent progress with our piling work. We have also been impressed with the power of the MRZV36VV vibrator and in particular the ability to vary both the amplitude and frequency of pile vibration during installation. This help us to deal with critical ground vibration limits in key areas and to also adjust vibration characteristics to best suit the changing ground conditions.

The project was not without its challenges, and the discovery of a section of ground with hidden obstructions required us to think on our feet. The Delmag RH28 was more than up to the job of removing them.”