ABI Equipment Limited

Piling Equipment Specialists

Sales - Hire - Parts and Service - Project Support

ABI Equipment Limited was asked to supply specialist piling equipment consisting of two ABI Mobilrams, a TM14/17V and a TM16/20B, running VDW double auger systems.

The piling works were carried out over a number of weeks between the time period July 2015 and January 2016.

Walney Onshore Substation, Heysham

Main Contractor: Amey

Client: Dong Energy

Piling sub-contractor: Deep Soil Mixing Ltd

Piling Equipment supplier: ABI Equipment Limited

In addition ABI Equipment supplied two grout batching plants manufactured by the German manufacturer STS Scheltzke GmbH together with flow meters and data recording systems. Each rig was customised to include new depth measuring systems, automated feeding control and additional feedback for the operator.

The project

This was to build an onshore substation for an Offshore Wind Farm. The initial foundation works required the ground to be stabilized to prevent settlement. Piling contractor Deep Soil Mixing was awarded the sub contract and chose ABI Equipment Ltd to supply their specialist equipment to carry out the work. The ABI Mobilram system is a highly versatile multi-purpose piling rig which is suited to numerous piling applications. The rigs were specially adapted by ABI for this project and provided a technically sound equipment solution.

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The Piles

There were a total of approximately 1250No wet-mixed columns to be installed. These were to be arranged in a grid pattern on 2 – 4 m centres. Over 30,000 m2 of land required to be stabilized. The columns were Ø1500mm and varied in depth up to 10.0m, of which the majority were approximately 7.5m long. The ground conditions were clay on top of alluvium silts on top of sands and gravels.

Wet Soil Mixing

The technique of wet soil mixing was used. This process is an insitu ground improvement technique that enhances the characteristics of weak soils by mechanically mixing them with a cementitious binder. The action of mixing materials, cement and water to form grout, with soil causes the properties of the soil to become more like soft rock.

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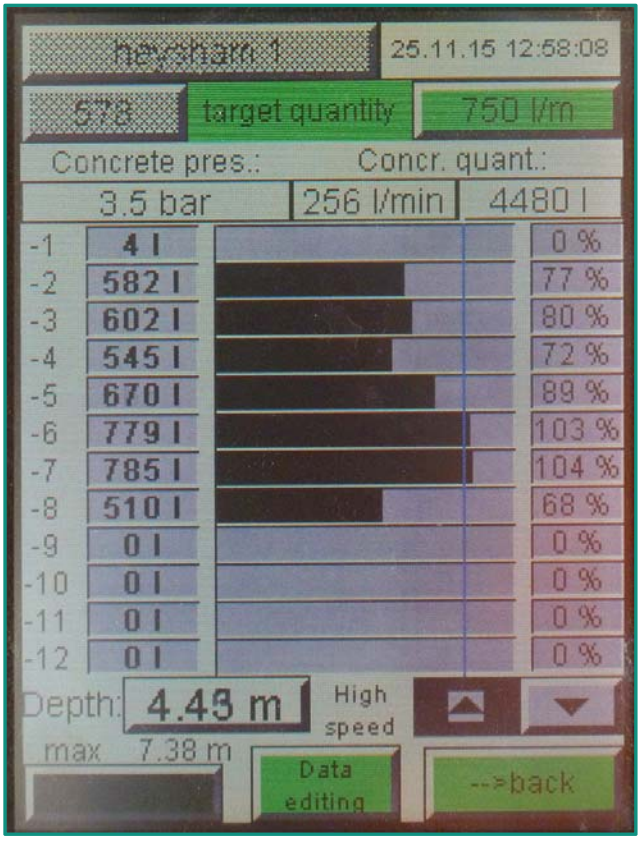
VDW Procedure

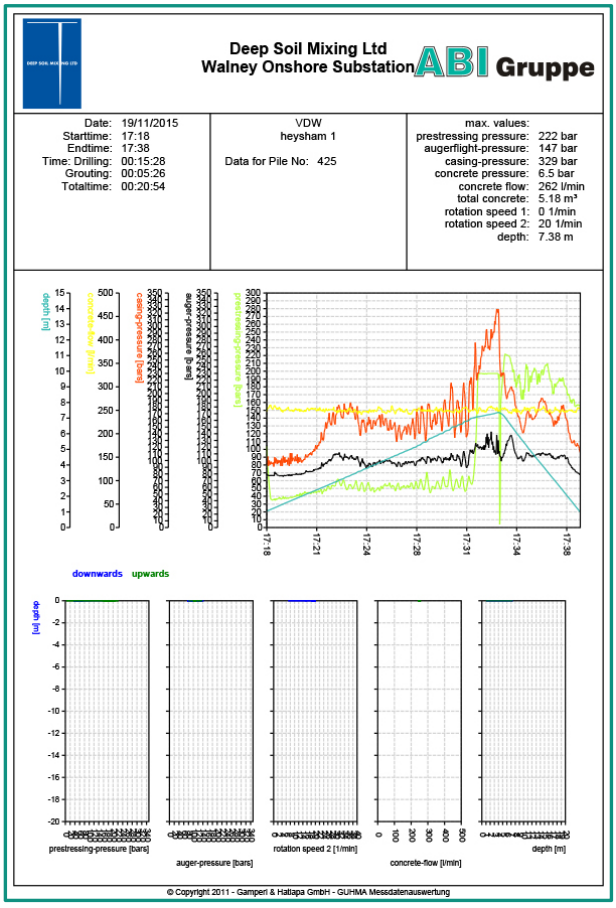
The ABI "VDW" double auger head system consists of two vertically arranged auger drives. The upper auger drive propels the central auger or paddle, whilst the lower one turns the casing or outer paddle in the opposite direction. As the rig operator starts the drilling process, cement and water (grout) is pumped through the drill stem to the counter-rotating mixing paddles in order to mechanically mix with the soils. The grout is injected through nozzles that are fixed to the mixing paddles and the process continues as the tools are advanced into the ground.

The process is totally controlled by the operator in the cab with feedback via a monitoring and data recording system. A flow meter on the rig allows the grout flow rate to be set as required whillst also measuring grouting pressure.



A graphic display indicates how much grout is injected per metre. The target was set at 750 litres per minute. The grout mix used 70% water to 30% cement. Each seven metre mixed column contained 1.35 tonnes of cement.

The close monitoring and control of the process ensured that the integrity of each pile was guaranteed.



An example of a rig report produced by the Column Installation at Walney. Here one can see where the casing pressure is rising rapidly and therefore how one can tell that a pile / column has been completed to the full depth.

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