

Project case study

Concrete sensors help overcome construction challenges at major new factory

Product

SmartRock digital concrete maturity monitoring system plus 250,000 cubic metres of bespoke concrete including FastTrack

Client

SeAH Wind

Contractor

K2 Consultancy

Overview

The use of our SmartRock concrete maturity sensors helped overcome a range of design and construction challenges at a new wind turbine factory in Teesside's Freeport, Middlesbrough. At least 800 of the sensors are being used to help realise the low carbon design and accelerated build programme.

Project description

SeAH Wind's £450 million factory in Teesside's Freeport will produce bases for offshore wind turbines. It will make monopiles up to 120 metres long, 15 metres wide and weighing 3,000 tonnes that are used to anchor the turbines. When fully operational, the facility, which is reported to be the largest of its kind in the world, is expected to produce between 100 and 150 monopiles a year.

We have set up three on-site mobile concrete plants to supply the material for the facility, with back-up provided by a fourth plant within the Teesside Freeport area. The total volume of concrete supplied is expected to be 250,000m³ and all five bespoke mixes are calibrated for use with our SmartRock concrete maturity sensors at our laboratory in Carlisle.

K2 Consultancy, which is overseeing the project, specified the use of our SmartRock system to help overcome a range of design and construction challenges, including its scale, low carbon design and accelerated build programme. The sensors are being used in the concrete base slabs and other elements that make up the main facility, power station and paint booth. The digital system provides

real-time data that demonstrates the in situ early strength gain of the concrete, giving the confidence needed to move on to the next stage of the project. Using the sensors has allowed areas to be trafficked as soon as sufficient strength has been achieved, helping meet the build's accelerated programme.

The risk of thermal cracking was also a concern with the thick base sections and the SmartRock sensors were supplied with longer probe cables to allow the temperatures from the core of the bases to be monitored. The body of the sensors also record the surface temperature, providing differential analysis reports that give evidence that all temperatures are within the maximum permitted differential to minimise the risk of thermal cracking.

The largest pour sizes are more than 1,250m³ and up to nine sensors have been used per pour, with at least 800 used in total. These are wirelessly connected to two on-site hubs which automatically download data from all probes every 15 minutes, allowing live data across the SmartRock app and 360 portal at all times, without the need for each individual sensor to be scanned by a mobile phone.

