

Bridlington pump station, Yorkshire

Project case study



Product

Specialist concrete mixes (piling, foundations, structural) incorporating Regen

Volume supplied

Over 10,000m³

Overview

Specialist concrete supplied by Hanson has been used to redevelop Bridlington Pump station. The mixes had to provide high-strength and durability, while addressing the challenging ground conditions and ensuring all visible concrete blended with the nearby Victorian Spa.



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Industrial



Project description

Yorkshire Water initiated the works to ensure its assets at Bridlington were not contributing any potential harm to water quality and to ensure that the town's beaches still had Blue Flag status, following the implementation of more stringent EU regulations.

Three sources of pollution were identified from three combined sewer outflows (CSOs) that, under storm conditions, would overflow into the harbour and therefore the bathing water. The aim of the project was to remove these overflows from the system, diverting them into a transfer tunnel that went under Bridlington and into a new pumping station, from where the waste water could either gravitate or be pumped to the new long sea outfall 1.2km offshore.

The pumping station contained the bulk of the complicated concrete work and Hanson supplied a range of complex mixes to meet the demanding engineering challenges of the 10,000m³ required.

Hanson's technical team carried out a substantial amount of development work prior to each of the concrete mixes being supplied, including contingency planning for possible material source and quality changes.

The first phase was the CFA piling, with concrete supplied to subcontractors Bachy Soletanche. Highly absorbent ground conditions required a concrete that could resist water loss into the surrounding substrate and prevent damage to the reinforced cages during placement. This challenge was met by modifying an existing Hanson Easypile design, which was so successful that no cages were lost or distorted during placement.

The bulk of the foundations and structural concrete was placed during periods of high ambient temperatures and the design had to meet a 0.35 water cement ratio while remaining workable at high levels of consistency for up to three hours.

An additional challenge was the aesthetic requirements from the local council: all visible concrete had to match an older Victorian Spa located higher up the beach, which had previously been refurbished using bespoke concrete supplied by Hanson.

The team had to use the white cement, which had been specified for the spa, but, because of durability requirements, Hanson also used Regen, a cement replacement to improve the overall

chemical resistance of the product and to help improve the contract's overall sustainability legacy.

Regen is a ground granulated blastfurnace slag, a by-product of iron-making. Its manufacture requires much less energy and produces around one tenth of the CO₂ emissions of Portland cement. It also prevents thousands of tonnes of waste being disposed to landfill.

Replacing one tonne of Portland cement with one tonne of Regen in concrete reduces the embodied CO₂ by around 850kg. Regen also has a different chemical make-up to ordinary cement, which gives it an inherent ability to reduce the permeability of the concrete through secondary hydration, helping to improve its durability.

Hanson supplied the bulk of the material as self-compacting concrete, helping main contractor Morgan Sindall pour the concrete in difficult locations and reduce construction time. This type of innovative, value-added engineering was a key part of Hanson's customer service package.