Heidelberg Materials

Project case study

One St Peter's Square

Product
FastTrack paired with Sika plasticiser

Volume
160 cubic metres

Client
AJ Morrisroe

Contractor
Slipform International

Overview

Heidelberg Materials worked with Slipform International to develop a bespoke early-strength concrete mix using Heidelberg Materials' FastTrack and Sika admixtures for the 65-metre-high central lift shaft at One St Peter's Square in Manchester. Extensive trials ensured the mix delivered controlled setting, high slump, and excellent surface finish, enabling successful slipform construction for this BREEAM Excellent development.

Project description

The use of Sika concrete admixtures has played a key role in the construction of the 65-metre-high central concrete lift shaft at One St Peter's Square, a major new development being built in the centre of Manchester. The 270,000 sq ft BREEAM Excellent (sustainability standard) building will incorporate office space on the upper floors together with an active mix of uses at ground floor level, including cultural space for public exhibitions and a stunning double height reception area.

The concrete core, which will incorporate eight lifts, has been constructed using slipform construction. Slipform construction involves vertically raising self-contained formwork on hydraulic jacks, while extruding the reinforced concrete section. It is a fast and cost-effective solution suitable for the construction of core walls such as lift shafts in high rise buildings.

Successful slipform construction relies on a well designed concrete mix, a skilled workforce and a reliable delivery from the concrete supplier. The concrete needs to have controlled setting to match the rate of climb of the formwork.

It requires a soft consistence to obtain full compaction around the steel and give an excellent surface finish but without segregation and grout loss. To retain the excellent surface finish, the concrete also needs to be 'drag free' as it leaves the formwork, eliminating any surface damage caused by friction.

Heidelberg Materials UK
Second Floor, Arena Court
Crown Lane
Maidenhead
Berkshire SL6 8QZ
heidelbergmaterials.co.uk

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To achieve the correct concrete mix to meet all requirements, Slipform International, specialists in slipform construction working for A J Morrisroe, specialist reinforced concrete and groundwork contractors, carried out extensive trials in conjunction with concrete suppliers Heidelberg Materials using Sika admixtures.

Dave McFarland of Slipform International said: "The quality of concrete produced and supplied is instrumental in achieving a successful slipform; in other words the key to successful slipforming is in the concrete. With the demand for higher concrete strengths and the associated reduction in the w/c ratio to achieve these strengths plasticising admixtures play a vital role in the production of a quality mix suitable for slipforming. The high slumps and set time needed for pumping and placement require careful selection of the plasticising admixtures and these were established using concrete trials.

The trials were carried out both on-site and at the plant and the combination of Heidelberg Materials' FastTrack and two Sika plasticisers produced a quality concrete that gave both the slump and set time required. This mix was suitably adaptable so that variations in the dosage rate accommodated for changes in the ambient temperature and produced a consistently good concrete finish."

The resulting concrete mix enabled the slipform process to be carried out successfully with a consistent rate of rise of 4.2m per 15-hour shift being achieved. This involved placing up to 160 cubic metres of concrete.

One St Peter's Square, which is designed by Glenn Howells Architects, will contribute to Manchester City Council's £185m redevelopment of the Square, Library Walk, Central Library and Town Hall extension.