



Low carbon concrete for new National Rehabilitation Centre

35% CARBON SAVINGS FROM 4000M³

The challenge

Construction of a new National Rehabilitation Centre in located between Nottingham and Loughborough, required a large volume of concrete for the foundations, floor slabs and supporting columns. The building had been designed to achieve net-zero carbon over its life cycle, so minimising embodied carbon emissions during construction was a key priority for the main contractor. The Midlands Readymix Team at Tarmac were asked to recommend materials that would combine a low carbon footprint with the required structural performance. Detailed carbon footprint calculations on materials would also be required as part of the project to contribute to an accurate calculation of the building's overall impact.

Our solution

After working with the contractors to understand the specifications, strength requirements and programmed timescales for the project, Tarmac's team were able to recommend optimised mix designs with major reductions in embodied carbon. This was supported with detailed cradle to gate carbon footprint calculations and sample testing to make sure that the data was in place to support these recommendations. The proposed mixes would deliver a 40% reduction in cement content compared to standard mixes using Ordinary Portland Cement. For the columns and upper floors this would reduce the carbon per cubic metre from 283.18 to 184.19 kg CO₂e/m³, a saving of 98.99 per cubic metre. This would deliver a total reduction for this element of the project of 396 tonnes of CO₂e for the 4000m³ required or 35%.

Results and benefits

As planned, these low carbon concrete mixes were supplied to the site as required during the building programme. Around 3000m³ was supplied to Hillstreet for construction of the foundations and ground floor slabs. A further 3500/4000m³ of low carbon concrete was supplied to Northfield for all the columns and upper floors. Tarmac's Technical representatives were on hand throughout, to ensure that all of the mixes were delivered as specified and to help the contractor get the best possible result. All the carbon savings for the project were fully documented on detailed carbon footprint calculations to help the project delivery team record the total emissions for the building.