



CASE STUDY – ROTHERHAM INTERCHANGE MULTI-STOREY CAR PARK

Project Cost: £2,200,000.00

Project Client: Interserve / SYPTE

Specified products:

Deck Coatings: DeckProtect+Blueshield, DeckProtect+Rapidflex,

Anti-carbonation Paint: Nufins Covercrete

Movement Joints: UCP 70

Concrete Repairs: Nufins specialist repair mortars

Duration: 40 Weeks

Project Start: May 2018

Project Finish: March 2019

Warranty: 10 years Deck coatings & movement joints, 15 years Concrete Repairs and Corrosion Prevention.

INTRODUCTION

StructureCare were appointed to carry out car park refurbishment works including concrete repairs, corrosion mitigation and deck waterproofing/protective coatings by the Main Contractor Interserve.

The Rotherham Interchange (and multi-storey car park directly above) was constructed in the late 1960s and provide parking for 638 No. vehicles over 8 No. split parking levels. Consistent with many similar structures built during this period the concrete elements had experienced significant levels of degradation and required life extending repairs and improvements.

An added complication, in terms of the significant structural repairs was the use of pre-stressed reinforced concrete slabs during construction. These simply could not be 'broken out' and repaired like typical and more common cast insitu concrete due to the pre-stressed nature of the pre-cast units, where the pre-stressed elements must not be disturbed during breaking out.

Added to this the Interchange had experienced an arson attack in 2016, which had caused significant internal damage, and the entire facility also needed to be brought in line with current building regulations and Equality Act requirements.

The much-needed refurbishment of Rotherham Interchange has provided the town with greatly improved public transport and parking facilities. The tired 1960's building has been transformed, bringing it in line with modern standards, creating a significantly improved customer experience.

SCOPE OF WORKS & METHODOLOGY

In order to deliver the works in the anticipated overall duration the following processes were followed; a general description of each element of the works is given below.

Removal of Existing Deck Coatings - Deck Coatings, where present were removed to allow the substrate to be assessed. The presence of coatings made it difficult to understand the structures true condition. The removal was achieved using surface scarifying and grinding methods to expose the existing concrete topping throughout. The majority of areas were prepared by our specialist subcontractor SSP who use task designed equipment to lightly grind the surface, removing any existing material. Smaller areas were removed by surface grinding using floor grinders with dust extraction.

The removal process is controlled by the segregation of areas, and while the equipment is designed to suppress dust, further controls were implemented through segregation and PPE where necessary to ensure that the work was undertaken in a safe and controlled manner.

Task specific Method and Risk Assessments were provided for these activities and the removed material was recovered and disposed of using a licenced waste carrier.

Survey and Identification of Concrete Defects - In conjunction with the removal of the deck coatings a full chain and hammer survey was undertaken to identify the true and current extent of repairs throughout all levels. The findings of the survey were recorded and taken forward for final review and creation of final designs.

This allowed us to consult with both Interserve and Arup to create a set of final designs for the works, while also confirming the need for any changes or deterioration that may introduce temporary works and propping.

During the survey all repairs were recorded and marked out in preparation for the repair works to commence.

Removal of Defective Concrete - The defective areas of concrete within the decks accounted for the larger part of the concrete repair works. The defects were mostly within the concrete topping, with the overall conditions of the pre-cast T-beams appearing to be in sound condition. The lack of a deck coating system was thought to be the primary cause of failures.

The perimeter of any areas where defective concrete was to be removed were saw cut to provide a control point to which the removal would stay within. The presence of a cut also contained the removal and assisted in preventing unnecessary removal that can be encountered through conventional removal methods.

Hydro-demolition - Noting the large quantities of defective concrete, and the need for a controlled removal process in order to protect the remaining elements; in particular the pre-cast beams which were seen to be performing well and in good condition we elected to use hydro-demolition.

StructureCare consulted with Yorkshire Water and found a suitable water supply to the site through Fire Hydrants and Wash Out points. Water was taken from these points using a licenced standpipe, with supply being provided to level using the dry risers within the car park.

We also obtained consent to discharge the waste water into an appropriate drain, once the water had been suitably filtered. The Hydro-demolition works were segregated in the immediate area where the work took place using heras fencing and debris netting along with acoustic barriers to minimise noise. Signage was erected around the MSCP to warn of the noise when hydro-demolition was taking place. During the concrete removal process ongoing surveillance was applied to ensure that only defective materials were removed.

On completion of excavation the prepared recesses were inspected, and an assessment made of the condition of the reinforcing, with any reinforcing that was in need of replacement being done so in line with the tender requirements.

Installation of the Corrosion System - As part of the tender requirements a corrosion mitigation system was to be designed and overseen by a Level 3 Corrosion Engineer. The general process is outlined below, with further details available upon request.

Anode Installation - Once concrete removal had been completed the installation of the anodes took place, with anodes installed in accordance with the manufacturer (CPT) Guidelines.

There were two types of anode that were installed on this scheme. The first PatchGuard Anodes were installed within repairs around the perimeter; the others were PatchGuard Connect Anodes that were installed to areas where corrosion activity is present, but defects in the concrete are not present.

Application of Migrating Corrosion Inhibitor (MCI) System - In conjunction with the Corrosion Strategy Nufins MCI-2020 was applied to all remaining deck areas where a low risk potential existed.

The application of the MCI was only required in the decks as the combination of Anodes within Concrete Repairs, new Deck Waterproofing and Anti-Carbonation coatings provided sufficient protection to the soffits.

MCI-2020 is a surface applied migrating corrosion inhibitor that is applied to exposed areas of concrete that is able to penetrate through the pore structure and provide a protective molecular layer on embedded reinforcement. The MCI was spray applied via backpack spray equipment and the application of the MCI was undertaken immediately prior to the application of the new coatings, which ensures that the system can be applied to a prepared surface for maximum effect.

Concrete Repairs - The installation of concrete repair materials included both the use of Nufins proprietary repair mortars, and the use of a grade 32/40 concrete in bulk for the larger areas within the concrete topping in the decks.

Anti-Carbonation Coating - Once all repairs had been completed to the concrete elements, and before the deck coating works commenced the new anti-carbonation coating was applied.

Preparation of the existing surfaces was undertaken through high pressure washing, and through mechanical abrasions to ensure that all failed sections of existing coatings were removed.

The new coating was then applied in 2 coats, plus local priming where necessary in accordance with the Nufins Covercrete guidelines.

Expansion Joints - On this scheme we proposed the use of the UCP Expansion Joint for the treatment of the expansion joints. The UCP is a proven expansion joint system that is extremely robust and watertight, without the need for mechanical anchorages.

Deck Coatings - For the deck coatings we based our offer on applying our in-house manufactured BSEN 1504 accredited DeckProtect+ deck coating systems.

DeckProtect+ has the advantage of reduced cost, with a proven track record with a number of major clients such as who have chosen our own system not only for aesthetics and performance, but for the fact that the guarantee is 'one-stop-shop' with StructureCare as both manufacturer and installer. The responsibility is with StructureCare - no arguments regarding culpability between manufacturer and installer. This is a unique offering by StructureCare.

Levels 1 & 1a and 4 & 4a had an existing coating applied which had failed in numerous locations. Our submission included to remove the existing coatings and prepare the substrate via captive blasting before applying our DeckProtect+ Blueshield System.

The internal levels had no existing coatings and consisted of a brushed concrete finish. On these levels we had included for surface preparation only in the form of captive blasting before applying our DeckProtect+ Rapidflex System.

PROJECT PHOTOS



