GOLDHAWK
A DIVISION OF THE STRESS GROUP

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BRISCOE'S UNDERBRIDGE

CLIENT: Network Rail
LOCATION: Reading, Berkshire
MAIN CONTRACTOR: AmcoGiffen Ltd
COMPLETED: 2020

Briscoes Bridge was designed and built by the engineer Isombard Kingdom Brunel as part of his east -west rail network and lies just west of Reading, Berkshire. Due to general wear and tear the brickwork arch was found to be deflecting excessively as trains passed over. Network Rail enquired to see if our unique MARS system could stiffen the arch and allow the bridge to achieve Route Availability 10 status.

Historic masonry arch rail bridge strengthening and rehabilitation

The challenges and solutions

The bridge had to, if possible, remain open to rail traffic during the strengthening works.

Two specialist techniques had to be deployed to achieve the required structural rehabilitation of the bridge.

- Stiffening and strengthening the fill over the arch.
- Installing the reinforcement MARS system to the arch to increase it's capacity and to repair existing crack damage.

Working with minimal disruption

It was necessary to core the brick barrel of the arch to confirm it's thickness and to sample the nature of the fill behind and over the arch prior to design work.

Remedial works were designed to allow the bridge to remain in service for the standard passenger and freight train timetables whilst the strengthening works were carried out.

To insure a safe system of work it was deemed essential to install a designed temporary works system of props to safeguard the technicians working on the underside of the arch. To ensure the arch functioned correctly during the works a 25mm thick a neoprene gasket was fitting between the arch and the prop heads. This ensured the arch could still flex naturally.

Ongoing monitoring

To measure deflection throughout the strengthening process the arch was dynamically monitored.

An effective solution

The unique ReFORCE system was adopted and specifically designed to inject a defined volume of geotechnical polymer grout into the fill behind the haunches of the arch to stiffen it's response to loading and reduce arch deflection. The control of grout spread during the injection phase was critical to ensure the rail lines we're not lifted and that the track bed was not contaminated.

In combination with the ReFORCE geotechnical system the MARS system was used to strengthen to arch to increase it's load carrying capacity and improve it's elastic response

The benefits

By carrying out all works from beneath the bridge it was possible for Network Rail to maintain it's normal timetable of trains. The cost saving from this benefit alone was significant.

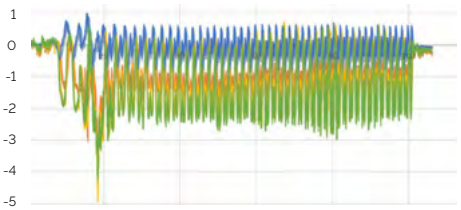
The techniques of permeation engineering (ReFORCE) combined with masonry arch strengthening (MARS) resulted in a huge cost saving for the client.

Measurable results

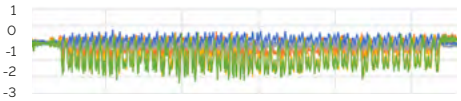
Using a combination of our unique geotechnical and arch strengthening special techniques the bridge was uprated from **Route Availability 0 to Route Availability 10 without the need to cancel any rail services.**

The project was delivered on programme and on budget at a far lower cost than more conventional alternatives.

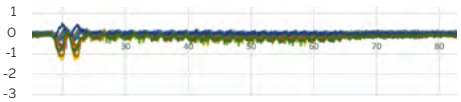
>85% REDUCED DEFLECTION



▲ Prior to the commencement of works



▲ Post-installation of the ReFORCE system



▲ Post-installation of ReFORCE & MARS systems

- Prior to any strengthening works the arch deflection was measured as just above 6mm vertical movement.
- After the fill had been treated and strengthened using the ReFORCE system the deflection was reduced to just over 2mm.
- Once the MARS system was fitted the deflection reduced further to less than 1mm under freight train loading.

Visit our website to see more case studies. **bridgerestoration.co.uk**

10 YEAR REFORCE™ Insured Guarantee

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MARS SYSTEM

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