



## Reading Bridge Structural Strengthening and Refurbishment

 **VolkerLaser**

 **VolkerWessels** company





Supporting a three-lane highway and two footways over the River Thames, VolkerLaser delivered major strengthening works to this historic spandrel arch structure; an essential part of the strategic transport network for the Berkshire area.

Client	Reading Borough Council
Value	£2 million
Duration	October 2014 to July 2015

Services included
Carbon fibre reinforcement Parapet and general concrete repairs Void and filling work

Reading Bridge was built using an early form of reinforced concrete developed by the French engineer François Hennebique during the latter part of the 19th century. Receiving only minor works since its opening in 1923, the structure was in need of major strengthening works in order to extend its longevity, ensuring the busy bridge could remain a strategic route for the thousands of motorists that rely on this vital transport link; carrying around 24,000 vehicles every day.

Following liaison with the Environment Agency due to the bridge's position over the River Thames, scaffolding was installed to allow for a visual inspection and tap testing. The test identified hollow points across the whole bridge structure; these areas were marked and broken out before being repaired. Through identification of the scope of the work, VolkerLaser had the opportunity to understand the scope and mitigate any potential delay.

As part of the necessary works, 1,500m<sup>3</sup> of foam concrete was pumped into the south approach ramp of the structure, then cored through the deck before it was filled in from the top. Grouting then took place three months after the concrete filling to allow settlement of the concrete. To complete the overall strengthening of the bridge, the abutments were thickened utilising a sheer bolt system.

The use of carbon fibre strengthening on the project was innovative; thin, strong and flexible, carbon fibre plates can be designed and installed to provide a cost effective solution which does not detract visually from the original design of the structure. These plates were applied to the soffit of the bridge deck and beams; enabling an increase in the carrying capacity for the bridge. Spandrel columns were also carbon wrapped to assist with the management of the constraints of the loadings and the vehicles above. This mitigated risk to the overall delivery of the project.

As part of the programme, a series of off-peak lane closures were scheduled, including some night-time closures in order to carry out works under the centre line of the carriageway. During a full two-week closure, the above deck was stripped and carbon fibre rods were installed in order to waterproof and strengthen the beams. This closure was planned so that the second week would coincide with the school half-term, when traffic levels were considerably smaller than during term time. This ensured that the number of motorists affected by the works was significantly reduced.

The team maintained a proactive approach throughout, ensuring successful collaborative engagement with Reading Borough Council and their representative Peter Brett Associates throughout the works, ensuring planned closures and technical issues were addressed regularly in order to maintain the smooth running of operations.

The project was completed on time and to a high standard, ensuring that the client's expectations were not just adhered to, but exceeded. Due to the exemplary work carried out on the project, VolkerLaser were shortlisted for the Construction News Awards under the category of Structural Specialist of the Year. Thanks to VolkerLaser, the reinforced and stabilised Reading Bridge will now offer a safer, more durable and trusted route across the River Thames for thousands of vehicles every day, making sure the structure will continue to serve successfully long into the future.

