

Monitoring Solution Keeps Britain's "Last Great Railway Bridge" Healthy

— PRODUCTS

Variohm
Displacement
Sensors

UNIT

Lifespan
Management

LOCATION

United Kingdom

TIMELINE

08-2020 - 09-2020

SCOPE

Supervision
Testing
Installation

DYWIDAG provided a monitoring solution to determine the bearing health of the King Edward VII Bridge, in Newcastle upon Tyne, UK, which was constructed in 1902.

Context

DYWIDAG provided a bespoke monitoring solution for the King Edward VII Bridge, a truss-style railway bridge in Newcastle upon Tyne, in northeast England. The solution provided up to 6 data monitoring points on each bearing plate located at the end of each span, due to the unique construction it was important to capture each element of every bearing plate to see if movement was still being allowed as it was intended when construction began in 1902.



Scope

- Monitor the health of bridge to identify immediate and/or long-term needs

Solution

The King Edward Bridge consists of four lattice steel spans resting on concrete piers with a total length of 350m and sits 34m above the high-water mark. All bridge spans sit on bearing plates, but the King Edward bridge is unique in its design. The bridge design includes a rocker bearing at one end of the span and a roller bearing at the other, so when a train crosses the bridge, the rocker bearing moves and the roller bearing slides on the rollers, allowing the bridge to become less rigid. Rigidity in an ageing structure is a big problem and needed to be addressed. DYWIDAG was tasked with determining if the plates were still moving and working as designed – if there was no movement, extensive bearing replacement would be needed to avoid further damage.

When the monitoring period concluded, it was determined that although the bearings had some movement, they do not move well enough to avoid damage. BAM have created a three-year plan to upgrade the bearings of the bridge, which due to the success of the monitoring conducted by DYWIDAG, we will have more involvement with the works.

Going Further

The King Edward Bridge is also the home of a peregrine falcon, a protected bird, so work needed to be completed after mating season. DYWIDAG installed a bespoke bird box, using rope access to gain access to a secluded location under the Redheugh road bridge further upstream, also one on the King Edward bridge was installed to house the peregrine so that work could be completed without disturbing the nest.

The bridge was designed and engineered by Charles A. Harrison, chief civil engineer of the North Eastern Railway, and built by the Cleveland Bridge & Engineering Company in Darlington in 1902. It opened to general traffic in 1906.