

'TEME' WORK IN THE UK

FUGRO APERIO'S 'INNER VISION' AVERTS TRAFFIC CHAOS

Fugro Aperio employed Remote Visual Inspection techniques to reveal concealed sections of a major road bridge over the River Teme in Worcestershire, avoiding bridge closure, yet gathering the detailed structural survey data required to plan essential maintenance on the critical river crossing.

The primary road network in Worcestershire is constrained by three major rivers - the 'Severn', 'Avon' and 'Teme'. These create barriers to movement, with congestion focused on bridge crossing points. Closure of the River Teme bridge in the centre of Tenbury Wells would mean enormous traffic disruption, a serious impact on local trade and a 30 kilometre diversion for through-traffic along narrow and hilly roads unsuitable for heavy goods vehicles.

Dating back to the 14th century, the River Teme bridge is a conservation listed six-span structure that has undergone numerous phases of rebuilding, widening and extension. In 1815, the northern three spans were widened during works overseen by Thomas Telford, Shropshire's county surveyor at the time. More recently, the six sandstone arches - each 7-8 metres long - have been widened in reinforced concrete. To avoid weight restrictions on bridge traffic, transverse beams have been installed to strengthen the three southern spans.



A major inspection in October 2005 identified ongoing problems with the stonework and concrete forming the bridge. The southeast wing-wall was also showing signs of movement indicated by a number of cracks in the structure. Records suggested that this side of the abutment had been built with three open arches facing onto a sloping ramp running from road level to the river. Only one of these arches is visible today.

Consulting engineers Halcrow commissioned Fugro Aperio to investigate the concealed arches. A Remote Visual Inspection (RVI) was carried out behind the abutment wall using a specialist Imagescope camera. Fugro also collected Ground Penetrating Radar (GPR) data from the abutment wall and a corresponding section of bridge carriageway above.

The RVI results helped build a picture of the position, dimensions and superficial appearance of the concealed arches, while the GPR measurements contributed data on

construction thicknesses, condition and possible defects. The surveys were completed within a day with just a short period of single lane traffic management across the bridge.



The two non-destructive survey techniques - RVI and GPR - minimised physical impact on the abutment structure, especially since Fugro was able to use pre-existing drill holes and areas of incomplete infill in the arches to gain camera access.

Senior engineer for Halcrow, Stephen Powell, remarked "The surveys have been very useful in determining hidden features and the structural condition of the bridge in the area of the concealed arches. Available records referred to the presence of filled-in arches in the southeast wing, but the survey showed that these are actually open."



The level of detail provided by Fugro Aperio's surveys has helped in designing the most appropriate, most cost-effective and least disruptive scheme of repair works for the Tenbury Wells bridge, which is to undergo a £1 million scheme of masonry repairs and concrete strengthening at a future date.