

STRUCTURAL MONITORING

CLIENT: HIGHWAYS ENGLAND | BALFOUR BEATTY | A21 TONBRIDGE TO PEMBURY



THE CHALLENGE

The old A21 single carriageway, located just south of Tonbridge, is a 7.3Km long piece of highway which carries 35,200 vehicles every day. The road was never designed to carry this volume of traffic and a solution was required to relieve congestion and improve on the safety and journey time for road users. As part of a £15B government road investment strategy a dual 2-lane carriageway, broadly following the line of the existing A21, was proposed which will also carry a bridleway for pedestrian and cyclists.

As part of this dualling scheme, Highways England also required a system to detect any potential movement of two new reinforced earth bridges (Longfield and Fairthorne) to confirm that the structures behave in line with expectations and to affirm future design for similar structures. The construction works were awarded to Balfour Beatty and began in April 2015 and based on several successful deployments elsewhere for Balfour Beatty, Senceive were approached to provide a solution.



FlatMesh™ tilt beams

OUR SOLUTION

Senceive proposed monitoring the bridges using their high precision wireless tilt sensors to obtain the relative displacement in the vertical and two orthogonal horizontal directions.

In total 36 FlatMesh™ tilt beams, at 1.5m lengths, and nodes were used on the abutment face and between the bank seat and coping of abutment face. To eliminate the risk of accidental damage or vandalism, the tilt beams were covered with a durable steel U section which also makes the system more discreet. Senceive provided antenna extenders to ensure the mesh network was interrupted.



Solar panel
for 3G gateway

Each bridge had its own solar 3G gateway, which receive data from the wireless nodes and use the mobile GSM network to transmit this data to a secure cloud server, which can be viewed by registered users of Senceive's WebMonitor software.

THE OUTCOME

Senceive's FlatMesh™ tilt nodes were the ideal choice, as they could be installed with ease and efficiency using a wide array of bracketry to suit any surface and position. This reduces man-power, time and saves on costs. Senceive continue offer comprehensive customer and technical support throughout the life of the 5 year project. The extremely reliable and robust system also eliminates the need for any further maintenance or visual checks.

Although monitoring is required for a period of 5 years, Senceive's tilt nodes offer a battery life of between 12-15 years, so the option is available to extend the length of monitoring further. The system also has the ability to be reconfigured remotely to change trigger levels and reporting rates, which provides Balfour Beatty with maximum flexibility.

