



This viaduct comprises 7 arched spans carrying a double track railway line which sees both passenger and heavy freight traffic. The structure has significant cracking within the masonry where the spandrels meet the arch barrel.

Strainstall were appointed by May Gurney to devise a two phase investigation to establish the crack behaviour under train loading (dynamic) and long term (static).

A total of 24 locations were identified, where 3 dimensional movements were to be measured across the cracks, i.e. 72 sensors in total. The monitoring locations were selected springing points and arch crowns and the groups of three sensors were mounted using specially designed brackets.

The Phase 1 dynamic monitoring used the Strainstall DART multi-channel high speed data acquisition system. The monitoring established:

- Displacements under train events and different responses under differing types of vehicle.
- Behaviour of the instrumented arches as a train crosses i.e. longitudinal shear was apparent between arch barrel and spandrel, in addition to the expected vertical displacement at midspan.

Upon completion of Phase 1 the sensors were disconnected and rewired into a datalogging system suitable for long term, unattended static monitoring. This comprises a battery powered datalogger with solar charger and is equipped with a GSM modem to facilitate remote data transfer, The system monitors:

- Variations in crack dimensions over time due to temperature effects.
- Development of permanent deformation over time.

The information is used to establish whether the cracks are widening over time, and to assess the relative damage caused by different train types.

Strainstall's team of experienced engineers operate from offices in Cowes, Bath and Aberdeen (UK), Norway, Belgium, USA and Dubai.

Instrumentation Used

- Linear Displacement Transducers Fitted Using Special Bracketry
- Thermistors
- DART Multi-Channel High Speed Data Acquisition System (for Phase 1 Dynamic Monitoring)
- Datalogger with Modem Connection and Solar Power Supply (for Phase 2 - Long Term Monitoring)

Strainstall UK Ltd
Charlton Lane
Midsomer Norton
Bath
BA3 4BE

Tel: +44 (0)1761 414939
Fax: +44 (0)1761 416655
Email: info@strainstallbath.co.uk
Website: www.strainstall.com