Structural Components for Bridges

FREYSSINET SUSTAINABLE TECHNOLOGY

Telford Footbridge, Shropshire

Client

Telford & Wrekin Council

Main Contractor Balfour Beatty

Architect Nicholl Russell Studios

Engineer Jacobs

Steel Manufacturer SH Structures

Works Completed March 2019









Telford Footbridge provides a vital connection between Telford Central Train Station and the town centre. The existing footbridge was a single span steel truss structure which had reached the end of its working life and had poor accessibility.

Telford & Wrekin Council approached Jacobs in 2015 with an initial brief to carry out a feasibility study to replace the existing footbridge. The chosen solution was the installation of two steel arched structures, one crossing the railway line and the other crossing the A442 inner ring road, with an underslung suspended deck connected by a central hub.

The new bridges are wider with glazed sides, giving users a pleasant experience whilst creating an attractive contemporary structure. Externally, the bridges have a shallow arched roof which is clad in tensile fabric that opens out to a 'fish tail' at each end.

Freyssinet was enlisted by Main Contractor Balfour Beatty to undertake the following:

BRIDGE BEARINGS

- Design and manufacture of four uplift bearings together with pin key and shear key

EXPANSION JOINTS

- Design, manufacture and installation of seven joint lines including two lines with a curved profile.

The challenge was to adapt a standard straight profile into exact diameter specified by the architects and incorporate the expansion joint into a restricted space. The joints were also designed with project specific requirements using specially adapted ends to prevent water dripping onto pedestrians under the footbridge.

As the expansion joints were to be installed on a pedestrian footbridge, special consideration was given to potential slip and trip hazards. Freyssinet's solution included an anti-slip surface treatment and GRP Hazard Warning Tiles incorporated into the expansion joints installed at the top of the stairs, which warn visually impaired people of the presence of specific hazards i.e. steps.

Installation was done during winter, therefore joints were installed using fast curing materials suitable for low temperatures.

Freyssinet was the only company capable of delivering such a complex and architectural expansion joint to fit the contemporary design of the bridge.

TUNED MASS DAMPERS (TMDs)

- Freyssinet coordinated the design, manufacture and tuning of TMDs with German company Vicoda.

Pedestrian footbridges can suffer from vibrations and oscillations, resulting in discomfort and structural risk. Tuned mass dampers (TMD) offer an efficient solution to control unwanted vibrations and keep oscillations within acceptable limits.

Freyssinet Ltd. Innovation House, Euston Way, Town Centre, Telford, Shropshire, TF3 4LT Phone +44 (0) 1952 201901 Fax +44 (0) 1952 201753 Email info@freyssinet.co.uk

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New Structures



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TMDs with magnetic dampers, which have the benefit of high durability and low maintenance, were used for the first time in the UK on Telford Footbridge.

The installation of the bridge and subsequent installation of structural components were challenging, due to limited space on site. The close proximity of busy roads and a railway meant the development of a practical, safe and efficient construction methodology was critical. Freyssinet worked closed with Balfour Beatty and other agencies to develop a logistics plan.

Assembly areas were established adjacent to the railway and Rampart Way where the two substantially prefabricated bridges were gradually put together on bespoke temporary works. The use of offsite manufacturing minimised the activities on site and the fitting of the architectural finishes, including glazing and the tensile fabric roof, before each lift also limited the work carried out above the road and railway.

The smaller railway span was successfully installed during an overnight road and rail closure in July 2018. The larger road span was then successfully lifted into place on 17 September 2018 using a LG1750 mobile crane, one of the biggest in Europe. The bridge was opened to the public in December 2018 as part of Telford's 50th anniversary celebrations.

A close working relationship between Freyssinet, the steel manufacturer, Main Contractor, Structural Engineer and the Client was key to the successful delivery of the complex and innovative scheme. The ECI procurement route benefitted all those involved and is an example of collaborative working and the importance of developing good relationships in all aspects of project delivery.

> Freyssinet Ltd. Innovation House, Euston Way, Town Centre, Telford, Shropshire, TF3 4LT Phone +44 (0) 1952 201901 Fax +44 (0) 1952 201753 Email info@freyssinet.co.uk