

Trail blazing bridges

Beaver Bridges has supplied two steel footbridges that form an essential element of a new walking and cycling trail built on a former railway line in South Wales.

Traversing 21km of Carmarthenshire countryside, the Tywi Valley Path provides a walking and cycling route that encourages sustainable travel and tourism in South Wales.

Following the route of a former railway line that closed in 1963, the recently opened path connects Carmarthen and Llandeilo, allowing people to enjoy unhindered views of the countryside, wildlife and local landmarks.

The scheme was delivered through a £16.7 million investment from the UK Government, alongside funding and support from Carmarthenshire County Council and regional contractors.

Cllr Edward Thomas, Cabinet Member for Transport, Waste and Infrastructure Services, says: “The Tywi Valley Path is a project that brings together active travel, tourism, and sustainability.

“By connecting with the Heart of Wales railway line, which stops at Ffairfach and Llandeilo, and encouraging walking, cycling, and wheeling, it gives people more choice in how they travel while opening up the beauty of the valley for everyone to enjoy.”

Two **steel footbridges**, spanning the Tywi and Cothi rivers respectively, form an important element of the scheme between Cwmgwili and Ffairfach. Both structures are located within a 4km-long section, which was delivered by main contractor Walters with subcontractor Beaver Bridges **fabricating** and installing the steelwork for the bridges.

The first of the two bridges to be installed was the 57m-long × 4m-wide Tywi Footbridge. Fabricated and delivered in three pieces, the bridge structure is formed with hollow section steelwork with UB cross members, diagonal angle bracing, steel metal decking and **steel parapets**.

Once onsite, the three bridge sections were temporarily supported on blocks, which allowed them to be bolted together and facilitated the installation of additional underside **bracings**.

Prior to the bridge elements arriving onsite, the project team had already completed the foundations for both the bridge and its approach ramps.

Supported on 10 steel columns, the two steel-framed ramps are each 50m-long × 4m-wide and were delivered to site in seven pre-assembled sections.

Given the sensitivity of the working environment, main contractor Walters worked closely with Natural Resources Wales (NRW) throughout the planning process, particularly when designing the temporary works. This included the crane pad which was installed on one bank of the river and within a floodplain. It required extensive environmental assessment, flood risk planning, and strict compliance to ensure a safe and sustainable

construction programme.

Positioned on the pad, a 350t-capacity crawler crane lifted the complete bridge into place.

The slightly longer Cothi Footbridge (measuring 67m-long × 4m-wide), which does not require approach ramps, was fabricated, delivered, assembled and lifted into position in a similar procedure to the Tywi structure.

Commenting on the completed scheme, a spokesperson for Walters says: “By working transparently with the Council, NRW, landowners, and local stakeholders, we developed safe and efficient solutions for complex lifting operations and floodplain constraints.”

Beaver Bridges Global Development Director Richard Hinckley, adds: “The project was delivered under challenging weather conditions, requiring close coordination between site teams, lifting operatives and logistics management.

“Despite these constraints, all works were completed safely and in accordance with programme requirements.”

Summing up, Councillor Hazel Evans, Cabinet Member for Regeneration, Leisure, Culture and Tourism, says: “The opening of these new sections marks an exciting step forward for the Tywi Valley Path. This project not only connects communities but also showcases the beauty, history, and culture of the Tywi Valley. With two new bridges now in place and more sections opening this year, we are well on our way to creating a world-class walking, cycling and wheeling route for residents and visitors alike.” ■



The Cothi Footbridge did not require any steel-framed approach ramps.



The fully-assembled Tywi Footbridge is lifted into place.



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FACT FILE

Tywi Valley Path footbridges, Carmarthenshire

Main client: Carmarthenshire County Council

Main contractor: Walters

Steelwork contractor: Beaver Bridges

Steel tonnage: 220t

All about the truss

The two Tywi Valley Path footbridges use Warren trusses with hollow section members to achieve spans of 57m and 67m. Max Cooper of the SCI discusses what makes the trusses, and the Warren configuration in particular, well suited to footbridges.

Footbridges carry modest loads relative to highway or railway bridges, but they may still require long clear spans where stiffness and self-weight become the governing design considerations. The [truss](#) addresses both of these issues; it carries load primarily as axial forces in its members, making efficient use of material, and it allows span-to-depth ratios that would be impractical with solid webbed cross sections. Where spans exceed about 25m to 30m, trusses and [box girders](#) are typically the only viable all-steel options, and the truss has the advantage of a lighter, more open appearance.

The Warren truss form, as used in the Tywi Valley Path footbridges, is used to describe a truss where the top and bottom chords are linked with diagonals only (i.e. no vertical members). It is a particularly structurally efficient arrangement,

providing a direct load path between the point of load application and the supports – for further information see Reference 1.

At spans of the length seen on the Tywi Valley Path, through-truss construction is the natural choice, where the top chords are braced together above head height to provide direct lateral restraint to the compression chord and to carry wind loads back to the supports. At shorter spans, however, designers may wish to consider half-through construction, where the truss depth is less than the overhead clearance needed for pedestrians and no top bracing is provided. In this case, lateral stability of the top compression chord relies on U-frame action, where each cross-member at deck level acts together with the adjacent truss members to form a discrete lateral restraint.

Structural hollow sections (both CHS and RHS) are common choices for truss footbridges. The bottom chord is typically an RHS, chosen for its flat faces, which simplify connections to deck cross-members and floor plate. CIDECT Design Guides 1 and 3 provide guidance on the design of welded hollow section joints.

Finally, the designer must consider the dynamic response of the structure. Natural frequencies should be checked against the comfort criteria in NA to BS EN 1991-2 and PD 6688-2. Although trusses are inherently stiffer than plate girders of comparable span, a formal dynamic assessment is generally required for spans exceeding 30m. ■

1. William F. Baker, L. L. B. (2015). *Structural Innovation: Combining Classic Theories with New Technologies*.