Bible Christian Bridge, Bodmin, Cornwall – Column Wrapping Trials

Bible Christian Bridge is a typical dual carriageway over bridge

Fibre Reinforced Polymer Column Wrapping

Bible Christian Bridge is located just to the South of Bodmin in Cornwall and carries a local road over the dual carriageway of the A30. The bridge is a three span reinforced concrete structure supported on two sets of three circular reinforced concrete columns.

The Highways Agency through it's Area Agents, Cornwall County Council, commissioned the application of three fibre reinforced polymer strengthening systems to one set of three columns on the Northern side of the bridge. The three systems were carbon fibre, aramid fibre (Kevlar®), and glass fibre.

The columns were exposed down to pile cap level and the concrete was prepared by a light abrasive blasting and the application of a penetrative primer resin. The three systems were applied by hand wrapping, resin pre-impregnated unidirectional tape of the structural fibres onto the surfaces of the columns, both vertically and horizontally in a designed number of layers.

A reinforced concrete collar was cast onto the pile cap to capture the lower layers of reinforcing and the excavation was made good.

The purpose of the application was as a demonstration project for the Highways Agency to assess the concept and the application of materials for the strengthening of bridge columns against impact damage. Structural evaluation of the Kevlar system followed in a separate project, also applied by Balvac at the Transport Research Laboratory which demonstrated the capability of the material and the technique.

Kevlar® application to columns

A Highways Agency Interim Advice Note on the use of Advanced Fibre Reinforced Polymers for the Strengthening of Highways Bridge Support Structures has been issued following this work. The first application of the technique on a structure is covered in our project sheet on Coopersale Lane Bridge.

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