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The Design and Construction of Lockmeadow Footbridge, Maidstone

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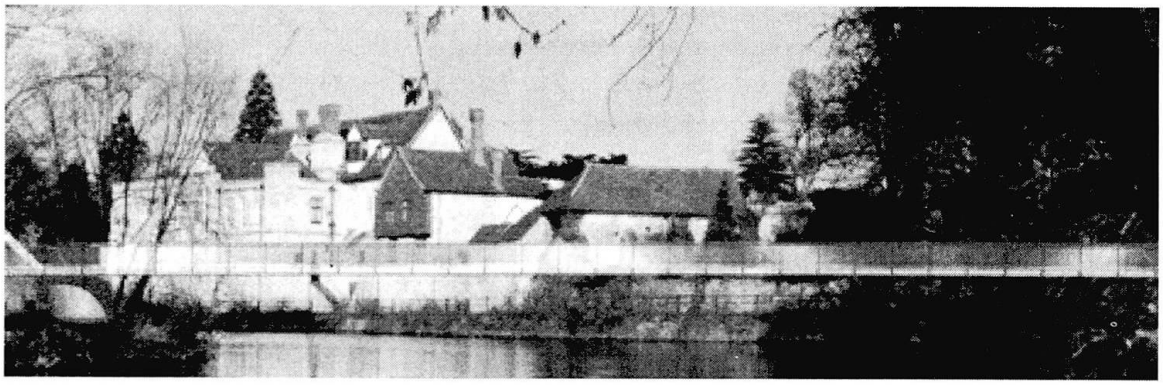
Ian Firth graduated from the University of Bristol in 1979 and obtained a Master's degree in Structural Steel Design at Imperial College in 1982. He has been responsible for many bridge projects with Flint & Neill Partnership, including the Poole Harbour Bridge in England. He is also responsible for the design of two other footbridges soon to be constructed in Maidstone.

Abstract

The construction of this unusual twin span cable stayed footbridge is due to be completed in the Spring of 1999. The design is the winning entry in an invited design competition held by Maidstone Borough Council in early 1997, and is an elegant response to what has been described as one of the most sensitive sites for a bridge anywhere in England.

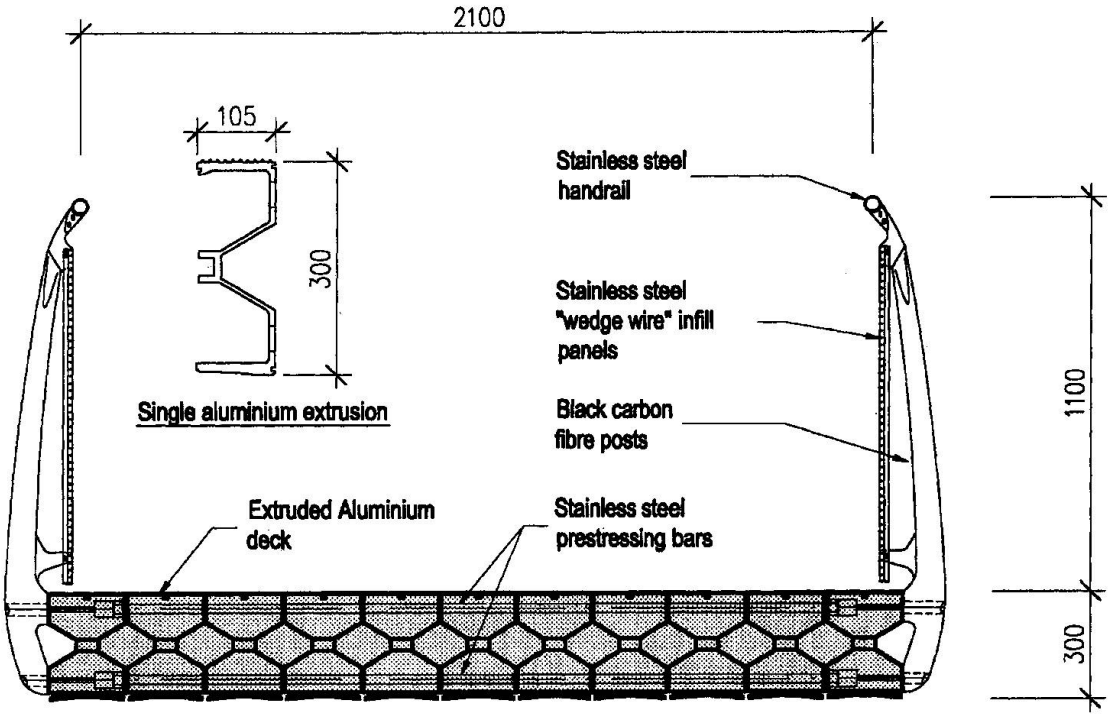
The bridge crosses the River Medway at a bend adjacent to the Grade 1 listed Archbishop's Palace at a location where historical and archeaological issues predominate. Slenderness and lightness became the governing design criteria, and the bridge solution adopts a unique and very shallow aluminium deck system in a direct response to these factors.



The bridge spans both the river and the adjacent floodplain on one side, and is 90 metres long overall. The sculpted form of the central concrete support cuts the floodwaters like the bow of a boat and carries a stair on its back. This "cutwater" pier stands on one bank of the river and supports twin skeletal steel masts inclined outwards in a wide V shape from which galvanised steel locked coil ropes support the lightweight deck.

The aluminium deck is formed from a series of longitudinal 300 mm deep extrusions assembled together and prestressed transversely with stainless steel bars. The outermost extrusion accommodates a novel carbon fibre and stainless steel parapet, and the top

flanges of the extrusions are ribbed and cross-cut to form an attractive slip-resistant aluminium surface. In this way there is no need for secondary structure or any added finishes, as the aluminium extrusions are the primary structure and the finishes all in one, and this leads to greater economy. There is no need for added corrosion protection, except to the steel masts and stays, and the design has been conceived and developed with minimum maintenance in mind.



The modular system of assembly and the light weight of the structural components has led to greater simplicity in the construction method, and this was part of the original concept. The bridge is being built with close co-operation between the parties, and the client has taken a share of the risk in certain aspects of the construction in order to achieve greater economies.

This paper will address the environmental issues and the visual design as well as the technical design and construction aspects, and will examine ways in which this innovative aluminium deck system can be adapted for footbridges and other applications elsewhere.