

## Kent Messenger Millennium Bridge, Maidstone



This unique and innovative bridge forms part of a multimillion pound river park project along the Medway in Maidstone. The bridge, together with its neighbour downstream, provides access to Whatmans Field, a previously inaccessible area locked between a railway embankment and the river. The bridge is the world's first 'cranked' stressed ribbon, one of only about 20 stressed ribbons in existence world-wide and only the second to be built in the UK. Flint & Neill Limited worked closely with specialist Czech bridge designers Strasky Husty and Partners and Polish architect Cezary Bednarski on this project. The client was Maidstone Borough Council and the main contractor was Balfour Beatty Construction Ltd. The bridge was opened in July 2001.

Although deceptively simple in appearance stressed ribbons are relatively complex structures. The deck comprises a set of post-tensioned pre-cast concrete planks, resting on two sets of bearing cables whose geometry is pre-set to achieve the desired profile after deck erection. The bridge is very slender and has no bearings or expansion joints. Nonetheless, it creates substantial horizontal forces, which need to be anchored at the abutments, and a high proportion of the cost is directly related to the foundation conditions.

The two-span cranked arrangement adds further complexity to the engineering. The inwards horizontal force at the crank is resisted by the concrete staircase acting as a strut, with a stainless steel tie to deal with out of balance forces under a variety of live load conditions. This prop support accommodates large horizontal, vertical and torsional loads arising from the pre-stress and the varying thermal and live load conditions on the two spans.

The design was strongly influenced by the landscape conditions at this stretch of the river which is lined with mature, dense trees. The bridge, by its nature, has a restrained sculptural form with no overwhelming structural elements which would interfere with the user's enjoyment of landscape views along the river. Both engineering and aesthetic beauty of this bridge lies in the fact that the suspended walkway itself is the structure. It carries itself without the need for props, masts or stays, and its stiffness and stability result from its geometry.

