

Kangaroo Point Bridge – Design of Brisbane’s New Landmark Pedestrian Bridge

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Abstract

Brisbane’s newest river crossing, the Kangaroo Point Green Bridge, is a landmark pedestrian and bikeway shared path bridge. The bridge is located at the heart of Brisbane and links the central business district at Alice Street to the peninsula suburb of Kangaroo Point.

With a striking structural form, the elegant bridge has a single sculptured pylon, and a cable stayed main span that limits the number of piers in the Brisbane River providing benefits for flood performance. The 460m overall bridge length has a 183m main span and 90m asymmetrical back span, plus approach spans.

This technical paper discusses the development of the bridge structural form including the foundations, pilecaps, and design and detailing considerations for the main pier cradle structure and the architecturally integrated family of piers. The arrangement of slimline steel composite deck cross section is provided including the structural analysis undertaken in developing the bespoke details for the stay cable anchorage supports.

For the steel pylon structure, the mid height cruciform offered improvements to the structural performance and constructability while also being a striking architectural feature. The structural analysis of the steel mast head for stay cable load transfer is presented, along with the detailing considerations of mast head architectural cladding, feature lighting, and other elements incorporated for safe bridge operation and maintenance.

The wind engineering considerations are presented in this paper including the specification of the wind tunnel tests, a summary of the wind tunnel test findings, and the validation undertaken by designers using numerical wind buffeting analysis methods. The assessment of stay cable vibration performance is also discussed, including the design considerations for architecturally integrating the cable vibration damping devices.

Criterion for pedestrian comfort, relating to bridge dynamic response under pedestrian footfall, is presented including the design provisions made in the design for a tuned mass damping device.

The paper concludes with a summary of the benefits of design and construct delivery approach, and some key lessons learnt in delivering the structural design of the bridge.

