



Mersey Gateway Bridge

Runcorn – Liverpool, UK / 2012 - 2017

Structural type
Characteristics
Client
Scope

four spans cable stayed bridge
with a main span of 318m and approach viaducts with 70m spans built with MSS
FCC Construcción – Samsung - Kier
tender design and detailed design



Mersey's bridge is a continuous structure 2248 m long without intermediate expansion joints. The central part (around 1000 m) is a four spans cable stayed structure.

The bridge has been designed by a joint venture of Fhecor, Flint and Neill, Eptisa and URS and built by a joint venture of FCC Construcción, Samsung C&T and Kier.

The Mersey estuary has two main flow channels located at the edges of the river bed. For environment conditions the two lateral pylons are outside of those channels which led to two lateral spans of 181 and 205 m. The location of the central pylon was also limited due to environmental conditions. As a result of those conditions the central part of the bridge has 4 spans of 181,294,318 and 205 m long.

As a result the structure has two special issues that made the bridge unique. On one hand as the structure has two main consecutive main spans, there are not any back stays that can control the deformation of the tip of the central tower. On the other hand, the lateral spans have a length greater than a 50% of the adjacent main span. Therefore to equilibrate the flanking pylons during construction is necessary to build the deck by cantilevering till a distance greater than the middle point of the main spans.

Several solutions and spatial configuration of the structure were carried out during the conceptual design of the structure, to achieve the required stiffness of the system. To solve the problem a central pylon, shorter than the flanking towers, and rigidly connected to the deck was chosen to control the vertical deformation of the system although the central pylon attract significant bending moments due to uneven live loads.

Other of the main feature of the bridge is the deck has the same shape in the cable stayed section, and in the approach viaducts. The deck has a single box concrete cross section 34.00 m wide and 4.60 m depth. The deck has enough torsional to solve the 318 m span with only a single central plane of stays. The using of the same cross section across the full structure gives a structural continuity to the Mersey Bridge that enhances also the high visual quality of this bridge.



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