



Cable Stays – Queensferry Crossing

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Abstract

The Queensferry Crossing is a new cable stay bridge with a total length of 2700m with two continuous spans of 650 m. The bridge is designed by a joint venture composed of Leonhardt, Andrä und Partner, Rambøll and Sweco UK.

The Queensferry crossing is composed of 144 pairs of stay cables and the last 10 pairs overlap each other in the middle of the main spans. This particular arrangement brought stiffness to the structure but also created challenges where stay cables required de-stressing during construction up to 600mm. Concept and resolution of this challenge will be detailed.

The slenderness of its structure and its location in severe environmental conditions has brought dynamic issues for the stay cables system with important cable service rotation. VSL friction damper has been selected thanks to its ability to address important cable displacements.

Integration of the VSL Vibratest system in the bridge erection sequence to measure stay cable force and damper performance and will be presented in the last section.

Keywords: Bridge, Cable stay, Queensferry crossing, Cable dynamics, Friction damper, De-stressing,

1 Project description

Crossing the estuary of the Forth north of Edinburgh, the Forth road bridge is a critical link between the South and North of Scotland.

Projects to replace the Forth Road Bridge emerged due to constant increase in traffic paired with structural and corrosion issue.

The construction of the Queensferry crossing started in September 2011 and opened to traffic in 2017 allowing repair work to be carried out on the Forth Road Bridge (Fig.1).

Key facts about the Queensferry crossing:

- Stay cable No : 288
- Cable unit size : 55 to 109 strands
- Cable length : 100 to 420m
- Deck width : 40m
- Total length : 2700m
- Main span : 2 x 650m
- Pylon height : 207m
- Strand tonnage : 6600 Tons