

Ponte Das Lezírias Bridge Internacional Tender over Tagus River

Carregado, Portugal / 2004

Owner	ministerio de obras públicas de portugal.
Constructor	dragados-sopol-opca-hagen.
Scope	tender design

The proposal presented for the new bridge over the River Tagus in Carregado is divided into three structures; the main bridge over the river and the north and south approach viaducts. The total length reaches 11,545.0m divided into 1,442.5m for the North Viaduct, 965.5m for the main bridge and 9,141.0m for the South Viaduct.

The main bridge deck is divided into a series of span lengths thus: 75.00+ 25.00 + 98.50 + 25.00 + 85.00 + 25.00 + 70.00 + 25.00 + 70.00 + 25.00 + 70.00 + 25.00 + 70.00 + 25.00 + 60.00 m, as the triangular-shaped piers (V-shaped closed with a head lintel) allow a reduction in spans to be employed in the deck. The structure employs a single 29.4m wide deck to accommodate the 2 carriageways and is composed of 2 box girders with an upper slab which varies in depth between 0.25 and 0.35m. To reduce the depth of the deck, the box girders work with a mixed double action, casting a lower 25m slab on each side of the pier axes. The deck rests upon both extremes of the pier lintels so making its behavior independent regarding seismic actions except in the two main spans where they are liable. In the typical 95.0m spans the deck has a constant 2.60m depth in the steel section and 2.95 for the complete section, the spans crossing the river are tapered running between 2.95m and 4.95m.

The South Viaduct, which is 9,141m long, is subdivided via expansion joints into nineteen 500m structures, formed up by 70m main spans (exceptionally 60m conditioned by the location of paths and channels to be crossed) and compensation spans with lengths running between 41.5m and 56.0m. The structure has been solved with a single 29.40m wide deck for the two carriageways, composed of 4 pretensed prefabricated double-T girders which are 2.70m deep and are placed 7.60 apart with a 0.25m slab placed atop. As it was impossible to prefabricate a 70m girder due to manufacture, transport and assembly motives, it was decided to divide the span into two elements, one for support 34.3m in length and the other central 35.7 or 25.7m in length for spans of 70m or 60m. The different stretches of girders maintain continuity via pretensed bars in assembly and continuous post-tensioning via two sets of sheaths, one inside the beam which is parabolic in shape made up of 4 cables of twelve 0.6" strands and the other which is located in the upper slab on the piers made up of 4 oval-shaped adherent sheaths with four 0.6" strands. To guarantee stability of the prefabricated elements throughout the assembly process, the piers are composed of two 1.5m diameter shafts for each girder. The foundation consists of 1.5m diameter piles below each shaft which are braced between one another via square beams with a 1.7m side length.



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