



## Railway Arch Bridge over the Tajo River in the Alcántara Reservoir

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### Summary

Placed in the High-Speed Railway Line Madrid-Extremadura, the bridge has a total length of 1488m. The span distribution is influenced by the crossing of the Tajo River, which takes place with an arch, 324m long, and dividing the deck over it in six spans of 54m each one. The approach spans are 60m long, inserting two transition spans of 57m. The emblematic element of the bridge is aforementioned arch. With curve directrix, it is formed by a hollow variable section between (4.00m – 3.50m wide; 12.00m – 6.00m high). With its main span length of 324m, it will surpass the bridge over the Contreras Reservoir, currently the largest railway arch bridge executed in Spain.

**Keywords:** Arch bridge, concrete, high-speed railway, cable-stayed, cantilever launching,

### 1. General description

The bridge is placed in the P.K. 4+061.00, and has a total length of 1488m, with a span distribution of 45 + 9x60 + 57 + 324 + 57 + 7x60 + 45m.

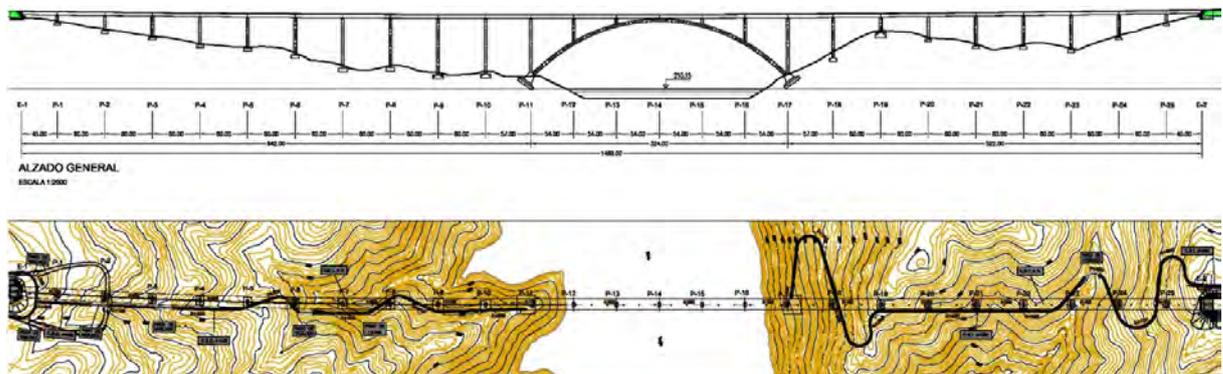


Fig 1. General definition

#### 1.1. Deck

The deck consists on a hollow prestressed concrete section with a height of 4.00m. This slenderness allows the structure to save appropriately the 60m approach spans, and so the 54m spans over the arch which, due to its flexibility, causes complementary bendings. The lower slab is 5.00m wide, and 6.50m the upper one, completed with cantilevers to reach a total width of 14.00m. The web thickness is 0.50m. Concrete HP-50 is used in the approach spans. Concrete HP-70 is necessary in the track over the arch.