TECHNICAL ASSISTANCE DURING CONSTRUCTION

High-speed railway bridge over Almonte river

Alcántara-Garrovillas

CLIENT	**ADIF**: Spanish Railway Infrastructures Administration
PROJECT DATE	**2013-2015**
LOCATION	**Alcántara-Garrovillas, Spain**
FIELD OF ACTION	**Technical Assistance during construction**

The high-speed railway line Madrid-Extremadura, section Alcántara Reservoir-Garrovillas, crosses the Almonte River through a 996 meters viaduct.

Up to its construction date, the structure holds the world record for largest span in the high-speed railway bridge category, being of 384 m, and is the third biggest concrete arch viaduct ever constructed.

The span length distribution is influenced by the river. The bridge deck flight over the river is composed by 8 spans 45 m long supported by the world record arch and reaching a maximum height 84 m above water level. The first two access spans are 35 m long, being the rest 45 m long.

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The deck is an statically overdeterminate structure, with a prestressed box girder cross section of constant 3,5 m depth, and a total width of 14 m.

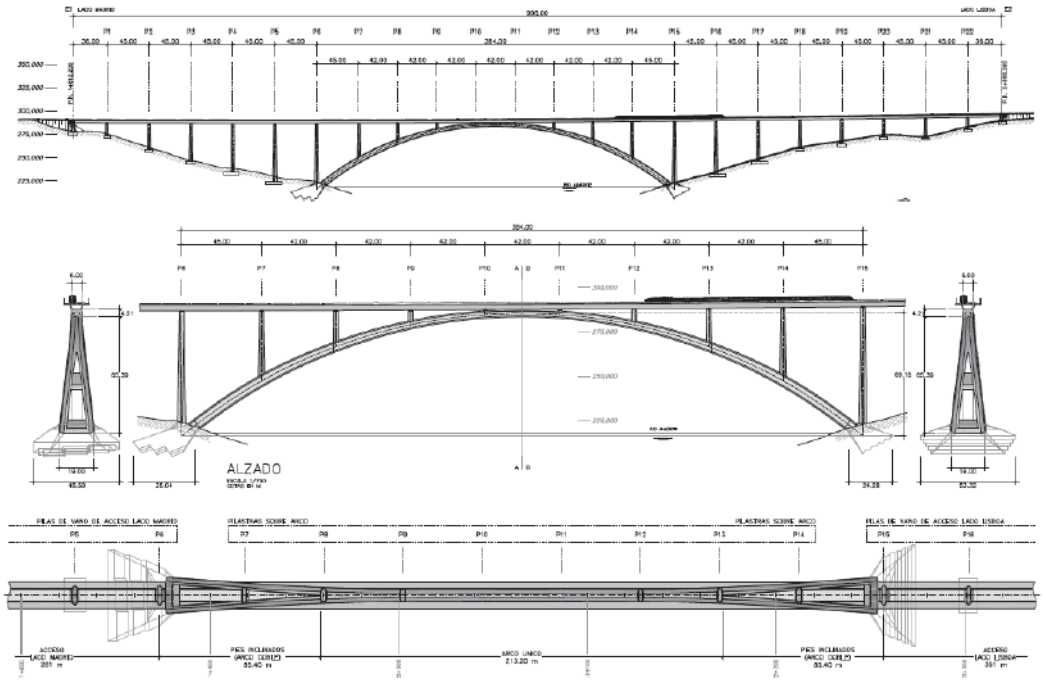
The arch has an orthogonal cross section varying in depth and with as it approaches the keystone. As the arch reaches the lateral supports, the cross-sections splits in to two hexagonal, hollow core legs. All piles have orthogonal hollow cross sections, with variable dimensions.

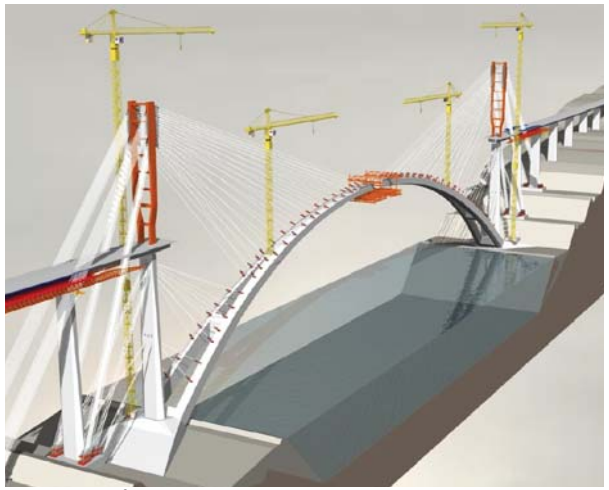
The arch is being built by incremental launching. The movable formwork allows increments 4 m long. The arch is supported by cables tied to provisional piles until reaching the keystone of the arch.

After closing the arch, piles over it will be built with the same construction process that the one used to build the access spans, by means of a movable formwork.

The central span is to be built using a formwork directly supported by the arch.

Due to the complexity of the bridge, and in order to consider aeroelastic effects on the structure, wind tunnel tests have been carried out on scale models.





3D simulation views

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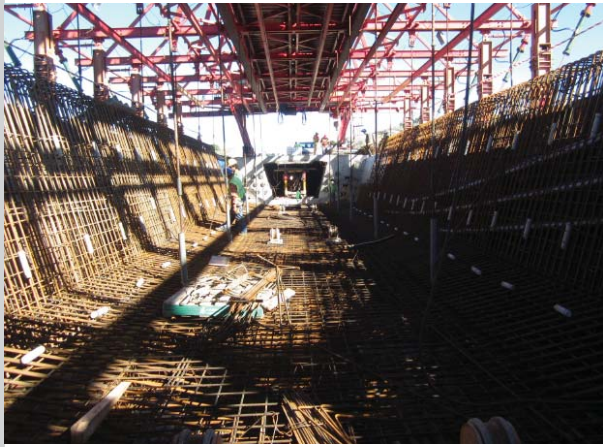
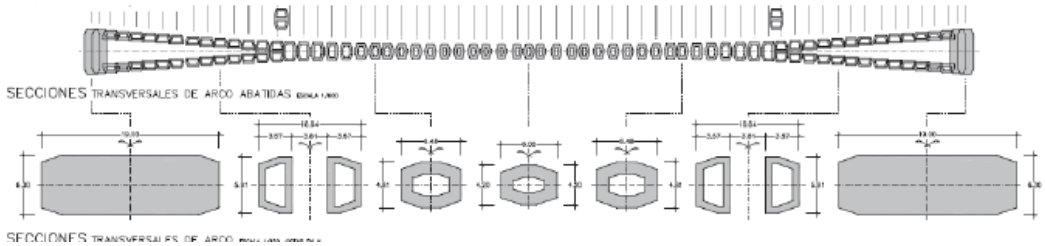


Because of the changing structural behaviour in different construction stages, several models have been tested, as it can be seen in the figures. INES Consultant Engineers has been responsible for the technical assistance in the field of structures playing a key part in the management during the construction works of this spectacular viaduct.



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