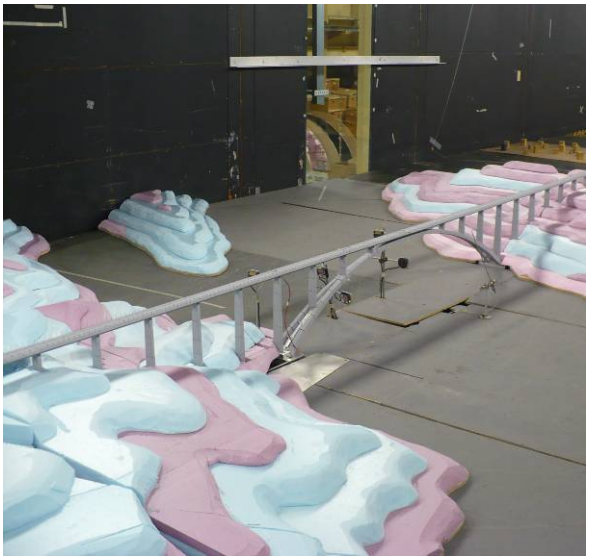
Rio Almonte Bridge, Cáçeres, Spain

Wind Engineering Study



Partner and Client Oritia & Boreas, Spain	*Span* 996 m	*Shipping Clearance* 75 m
Deck Width 14 m	*Year Tested* 2010	*Model Scale* Section Models: 1:50 Aeroelastic Model: 1:210

The Project

The proposed twin-track high speed rail bridge is located between Hinojal and Cáçeres, Spain. The bridge is 996m in overall length with a main span concrete arch of 384m. Flanking the main span are several side spans of 45m and end spans of 36m. The arch and side piers support a trapezoidal concrete box deck section. The 14m wide, 3m deep deck includes a railing and maintenance access-ways, resulting in an overall depth of the deck of 3.25m. The chosen method of construction is based on a cable-stayed mast situated atop the main piers which supports the arch while under construction.

The Wind Tunnel Studies

The wind engineering studies for the Rio Almonte Bridge project included studies of the wind climate at the site, section models of the deck and arch, and a full bridge aeroelastic model for the completed bridge structure and the cantilevered arch construction stage.

The 1:50 scale section models of the deck and arch were tested in both smooth and turbulent flow conditions. The stability characteristics as well as the response to turbulence were evaluated. Equivalent static loads were developed to assist in the design of the bridge deck and arch, both in the completed and under construction conditions.

The behaviour of the full bridge aeroelastic model was tested under two wind conditions: "smooth" flow and turbulent boundary layer flow representative of those at the project site. Topographic features close to the bridge were also modelled in the test. Instrumentation on the model provided estimates of full scale structural responses that could be compared to design capacities.

The Boundary Layer Wind Tunnel Laboratory

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