



Design and Construction of San Marcos Viaduct in the Nueva Necaxa – Avila Camacho Highway

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Summary

The San Marcos viaduct, which is located into the Mexico D.F. – Tuxpan highway, crosses the San Marcos river gorge. The bridge stands out due to the height of its piers and the environment of the river. The tallest pier rises to 208 m and at the moment of the end of construction it has been the highest pier in the world for a bridge constructed with the balanced cantilever method.

Keywords: Mexico, piers of great height, piles, prestressed concrete box girder, balanced cantilever method.



Fig. 1. General view of the viaduct.

1. Description of the viaduct

1.1 Description of the corridor

In Mexico a new highway is under construction between Mexico DF and the city of Tuxpan on the Gulf of Mexico. A segment of this corridor is the highway between Nueva Necaxa – Avila de Camacho in the north of the Puebla state. It consists of 36 km of dual carriageway through the mountains of Sierra Madre Oriental. This region is a very mountainous place with a deep rain forest that has forced the construction of six tunnels and twelve bridges to be crossed. This region of Mexico is under the hazard of seismic

effects and it is affected by great winds that come from the Gulf of Mexico.

Auneti, a joint venture between Spanish company Globalvia and Mexican company ICA, was awarded the concession contract for the motorway by the Mexican Ministry of Communications and Transportation, and its construction has been carried out by Connet, a joint venture between Spanish contractor FCC Construction and Mexican ICA. The design of the bridge and the technical support during construction has been carried out by FCC Technical Services.

Viaduct over the San Marcos River is one of the most challenging parts of the contract. At this point the river runs through a very steep canyon with a elevation difference between the river and the top of the hillside of 800 m. The slopes of the hillsides are near 45°. The road crosses the river in a meander to reduce the length of the structure, thus, the total length of the viaduct is 850m.