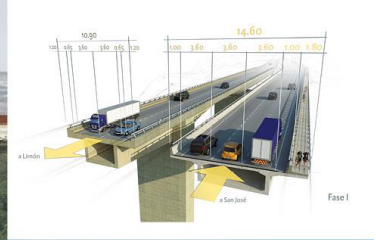
Saprissa Bridge over Virilla River in RN32

San Jose, Costa Rica / 2016

Structural type	variable width post-tensioned concrete box girder
Characteristics	bridge of 14.3 width, spans of 77.15+129.75+78.10, with a total length of 285.00 m
Construction sequence	balanced cantilever method
Owner	CONAVI
Client	UNOPS
Scope	detailed design

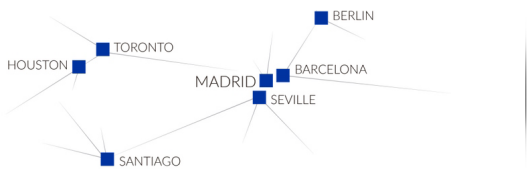


The bridge over the Virilla River on National Route 32 near its approach to the Capital, San José, consists of three spans of 77.15 + 129.75 + 78.10 m. The bridge belongs to the doubling of the RN32 which is currently served by a similar bridge parallel to the new one, dating from the 70s. To avoid affecting the existing foundations the distance between the axes is limited above a minimum value and to avoid an excessive visual impact in the valley the piers are placed in the same position as piers in the existing bridge.

The deck, of 14.30 m, houses 3 lanes and a sidewalk and consists of a post-tensioned concrete box with variable height, between 1.55 m and 6.50 m.

The bridge is built by segmental cantilever construction from both piles with moving scaffolding and segments executed in situ. A street that passes next to abutment 1 limits the height of the deck to 1.55 m. The height of the deck in the two center-spans is 2.60 m. This imbalance determines the geometry and length of the segments as well as the order of execution of the closing segments and tensioning of the lower prestressing cables.
Another important condition is the seismicity of the area. To absorb the forces due to earthquakes, the piers are designed to form plastic hinges at their base. These plastic hinges must be inspectable in the event of an earthquake, so that access wells to the base of the piers are also designed. For the calculation of the plastic hinges, a pushover was made on the piers to guarantee that the displacement required by the earthquake can take place by avoiding brittle failure modes.

The project also includes a pedestrian access ramp to the bridge, integrated into the left wing wall of abutment 1, which takes the shape of a U of variable height.



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