



# Retrofit and widening design of the bridge over Virilla river

San Jose and Heredia, Costa Rica / 2021-2022

Owner  
Client  
Scope

Consejo Nacional de Vialidad (CONAVI), Gobierno de Costa Rica  
UNOPS  
detailed design



The project includes the retrofit and widening design for the Virilla River Bridge at Ruta Nacional 32, between San José and Heredia provinces (Costa Rica). The existing bridge was built during the 80's and has a total length of 285 m. It is divided into 7 spans with the following span distribution 30.60-47.20-82.80-47.20-26.15-25.60-25.30 m and has a total width of 10.60 m. The main bridge is a concrete post-tensioned box girder, built with a balanced cantilever construction. The structure is completed with approach spans composed by post-tensioned concrete I-Girders.

The structure currently presents multiple pathologies, derived from the low maintenance provided during all the structure life. Furthermore, the bridge was designed without considering the seismic action applicable to the country. Furthermore, several test campaigns have been carried out to test the compressive concrete capacity of the main elements. Results show that the main concrete elements have a significant reduction on the concrete compressive capacity.

FHECOR works include the detailed design of the retrofit and widening of platform, placing one extra lane (3 lanes instead of the 2 existing lanes).

FHECOR's design includes the replacement of the post-tensioned concrete I-Girders to new beams with a similar configuration. The main bridge will be retrofit using external-prestressing tendon trough mainly the interior of the box girder except in the main span where the prestressing crosses the bottom slab going under the box girder.

The adopted seismic strategy includes the retrofit of the piers and foundations, and place new bumper guards over each pier. Furthermore, new abutments are designed behind the existing ones and composed by an abutment cap supported on drilled shafts.

Finally, the project includes the replacement of all the bearing pads, as well as the replacement and reduction of the expansion joints. Those measures will also help to mitigate some of the pathologies detected during the inspection works.



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