



Widening of Los Santos Bridge

Ria del Eo between Galicia and Asturias, Spain / 2008

Structural type
Characteristics
Owner
Client
Constructor
Scope

prestressed concrete bridge built by cantilever construction widened by means of a steel structure and external prestressing.
widening of a deck from 12.0m to 24.60m on a 600.0m long viaduct with 150.0m spans without interrupting traffic flow
ministerio de fomento
Dragados
Dragados
detailed design and construction support



Los Santos Bridge is a five span structure located in the North of Spain at the border line between the Autonomous Communities of Galicia and Asturias. The bridge was built by cantilever construction at the beginning of the 1980's. It is currently the subject of a project intended to duplicate its capacity.

When the duplication of the bridge was studied by FHECOR Consulting Engineers, the conclusion was reached that it was possible to use the current structure with local reinforcement of foundations and external prestressing as well as an additional reinforcement of the deck using a superimposed steel structure. This solution was found to be 80% cheaper than previous proposals based on building an independent structure.

The widening of the bridge is achieved by building an extension of the upper slab supported by inclined struts which carry the additional load to the central box girder.

The study of the bearing capacity of the existing structure concluded that it was able to carry the present loads but that the bearing capacity was very strict with a very limited capacity for additional loads. For this reason, the widening project proposed a strengthening of the structure by means of external prestressing, a longitudinal steel box connected to the existing structure and filled with self-levelling concrete and a third web located at the centre of the deck intended to take the additional hanging load coming from the inclined struts and transmit it to the reinforced structure.

The external prestressing is located within the box girder. It is formed by 8 tendons carrying 31 strands of 16.00 mm of nominal diameter. The prestressing is anchored to the pier and abutment diaphragm walls. Its layout is polygonal and shaped by means of deviators located at span thirds.

The longitudinal steel box is located at the deck centre in contact with the bottom slab. Its width varies from 1.20 to 1.00 m and its depth is 0.90m. The concrete filling of this steel box is needed in order to increase the compressive bearing capacity of the bottom chord in the neighbourhood of the piers. At the centre spans the concrete also is needed as corrosion protection for the vertical anchor bars, connecting the steel box to the third web.

The slab is widened by means of inclined struts with a square cross section of 0.45´0.45´0.01 m. These elements are anchored to the top slab by means of a steel plate and supported at the bottom by means of transverse cantilevers embedded in the longitudinal steel box. Due to the variation in depth of the structure the inclination of the struts is variable along the bridge axis.



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