

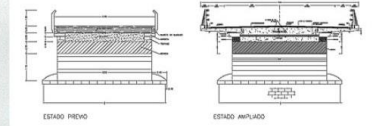


Veral River Bridge repair project

Regional border between Zaragoza and Huesca, Spain / 2002-2003

Structural type
Characteristics
Owner
Client
Scope

limestone masonry vaults
total length: 80,40m / five 13,00m free spans
Ministerio de Fomento - Subdirección de Conservación y Explotación
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rehabilitation / strengthening project



The Veral Bridge in the N-240 road spans over the Veral River and it is close to the limit of Huesca and Zaragoza provinces. The bridge is included in the Ministry of Works General Bridge Inventory, labeled with the numerical code N-240060.

The bridge is composed of five finely cut limestone ashlar circular vaults with constant thickness. The bridge was designed by Gaztelu, at that time Professor of Masonry Arch Bridges at Madrid's Civil Engineering Special School. Both design and construction took place in the second half of the XIXth Century. The bridge's total length is 80.40 m, vaults are 6.00 m wide, and vaults spans are 15.00 m long. Piers height rounds 4.25 m, while width tapers following a 1/10 slope. Piers are crowned by conical limestone ashlar driving caps. The road elevation over the river bed is roughly 8.00 m.

- Functional shortcomings

Veral Bridge functional shortcomings are mainly associated with the short 6.00 m road width, the inefficiency of vehicles retaining system and the inexistent road shallow drainage system.

- Shortcomings in lasting conditions

Bridge inspections showed that pier integrity could be threatened by the existence of significant hollowed inside zones and back lixiviation. The dissolution of trasdos backing material salts, provoked by deficient drainage and impermeabilization conditions, has resulted in a general appearance of efflorescence in vaults intrados.

Intervention Professional Services in the existing bridge was defined trying to join several objectives that could even be opposed if considered isolated. Thus, bridge widening, security conditions included in actual construction codes, and respect towards the existing bridge, led to the 10.00 m wide cross section finally adopted.

This 10.00 m wide new cross-section is divided in two 3.50 m wide lanes, plus two 1.00 m wide verges and two 0.50 m wide barriers. Hollow drainage conditions are guaranteed by road transverse slope and new lateral drainpipes.

Widened platform consists on a series of reinforced concrete slabs that rest on top of the vaults backing. Cantilever lengths reach thus 2.50 m. Slabs were built following two main stages, each one covering one half of the final width, respecting the necessary traffic conditions during construction period. Stability of concrete slabs covering one half of the final width is achieved following some pouring and usage prescriptions.



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