

## New Bridge at Manzanal del Barco

The existing Manzanal del Barco Bridge was built in 1935 to replace an older 1927 bridge which had been submerged in the reservoir after the construction of the Ricobayo Dam. The bridge has a 50.0m span central arch, and eight 25.0m approach spans from each shore. The 3.40m deck width causes traffic problems and widening proposals were initially rejected in a preliminary stage.

The final project corresponds to Proposal II of the preliminary bid stage. Proposal I was a 430.0m long cable-stayed bridge, with a 295.0m main span.

The to-be constructed bridge will be a 479.25 m long, prestressed concrete bridge, executed employing the balanced cantilever construction method. The bridge is divided into four spans 61.25m+114m+190m+114m. The cross section depth varies parabolically between 9.50m over the piers in the main span (L/20) and 3.80m at the central area of the main span (L/50). In span 1 the depth is a constant 3.80m. The deck is 11.00m wide.

The box-girder has vertical webs and the cantilevers are  $\frac{1}{4}$  the deck width. The upper slab tapers transversely, from a minimum of 0.20m at its edge to a maximum of 0.35m at the end of the cantilever with its connection to the box-girder.

The depth of the slab reduces to 0.22m at the centre of the deck. The depth of bottom slab tapers longitudinally between 0.30m and 1.00m.

Cantilever prestressing or deck construction prestressing is located in the top slab, and follows a straight layout. Prestressing in the first and second span follows a parabolic line, and splice cables are situated in the box girder webs. Finally, prestressing in the bottom slab of the main span is parallel to slab axis, and tensioned after the pouring of final segments.

Pier 1 has a hollow rectangular cross section set on a shallow foundation. On the other hand, piers 2 and 3 are formed by a pair of rectangular piers, rigidly connected to the box girder. Construction of the foundations related to these piers shall be fulfilled upon a temporary bedding. Abutments in these solutions are conventional.

The critical phase of construction is the main span foundation construction. Execution of these foundations and the beginning of the pier construction has been planned to be carried out during the summer period, during which, water levels are expected not to exceed an elevation of 665.0m.



### Spain /2008 Project data

Structural Type:  
Prestressed concrete balanced  
cantilever bridge  
Location:  
Ricobayo Reservoir  
Opening date:  
November 2008  
Client:  
Zamora Town Council  
Bidder Contractor:  
FCC Construcción S.A  
Scope of Work:  
Technical Assistance, Tender and  
Construction Project