Engineering Structures for Life

TRANSPORTS - BRIDGES & VIADUCTS

Motorways in the North of Portugal - Zone 2

ABOUT

This project comprises a set of 10 road structures, consisting of 1 agricultural underpass, 6 roadway underpasses, 1 railway underpass, 1 roadway overpass and 1 footbridge.

These works are located on the A11 motorway, in the Barcelos – Braga Oeste (A3) – Braga (Ferreiros) section. GEG was responsible for the development of the structures and foundations conceptual design and detailed design for the set of referred structures, as well as the geological-geotechnical studies and on-site technical support.

FACTS

Year: 1999-2006
Client: Ascendi
Services: Detailed design, Structural Engineering, Foundations design, Geological and geotechnical studies, Consulting and on-site technical support

TEAM

LOCATION

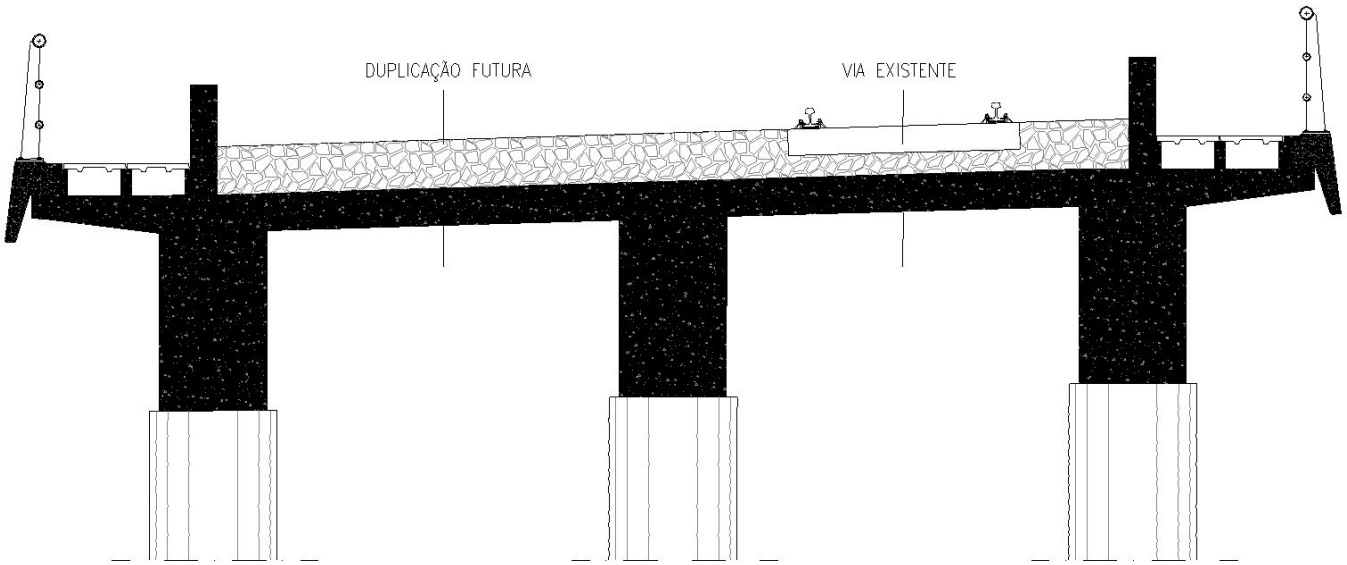
Barcelos-Braga, Portugal

Structural solution

The structural solutions applied in these projects are the most common in this type of works: prefabricated box-culvert and Matières (prefabricated arch systems) in the agricultural underpass and footbridge, prefabricated decks simply supported on two abutments for the roadway underpasses, and decks with I-shaped beams concreted in situ with 3 to 4 spans for the roadway overpasses.

The design and construction of the railway underpass (PICF3) deserves a particular focus, as it allows the resettlement of the Minho railway line over the motorway. The demanding construction sequence reflected the demand to maintain the railway platform in service during construction.

Below we present a cross-section of the railway line:



The final cross-section of the deck, with a total width of 12 m, comprises the existing track, an additional area for future duplication and service walkways on both sides.

The entire design and the proposed construction process were conditioned by REFER's impositions, in order to limit the necessary periods of circulation interdiction in the line. It was also intended that all tasks to be carried out during the periods of interdiction were well defined and may be interrupted to restore the rail traffic in the occurrence of unforeseen events.

The structural solution adopted an *in situ* reinforced concrete deck, composed of three I-shaped beams, connected by intermediate slabs with 0,35 m thickness, which incorporate the HE300B profiles, spaced by 2 m. These profiles served as temporary support to the steel structure with integrated rails. The slab extends beyond the beams, in cantilever, having a thickness of 0,35 m close to the beams and 0,20 m at the edge.

In order to carry out the suspension of the railway track, it was necessary to build a temporary earth retaining system for the existing railway platform, using Berlin-type retaining walls.