Engineering Structures for Life

TRANSPORTS - BRIDGES & VIADUCTS

Barrosas' Viaduct

ABOUT

The Viaduct over Ribeira de Barrosas is located at the A11 motorway, in the Felgueiras-Lousada (IC25) subsection of the Braga-Guimarães – IP4/A4 section.

The viaduct has a total length, between abutments axes, of 445,0 m (30,0 + 11×35,0 + 30,0). The platform is divided into two carriageways, one in each independent deck. The decks have a total width of 15 m and include the respective traffic lanes, shoulders and service walkways.

FACTS

Year: 2001-2003
Client: Ascendi
Services: Detailed design, Structural Engineering, Foundations design, Geological and geotechnical studies, Consulting and on-site technical support

TEAM

LOCATION

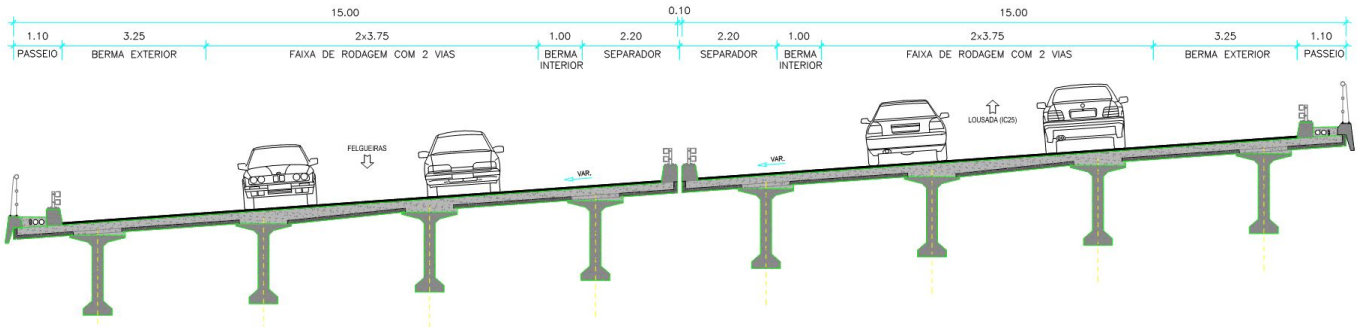
Braga-Guimarães, Portugal

Structural solution

The structural solution adopted in the detailed design was developed taking into account the contractor's request to use a prefabricated deck solution, with spans not exceeding 35 m, so as not to excessively complicating the transport of the beams to the work site.

Each deck is composed of four CIVIBRAL I180 beams, connected by intermediate slabs with 0,25 m of thickness, including the pre-slab. The cantilevers, lateral to the beams, have a constant thickness of 0,25 m.

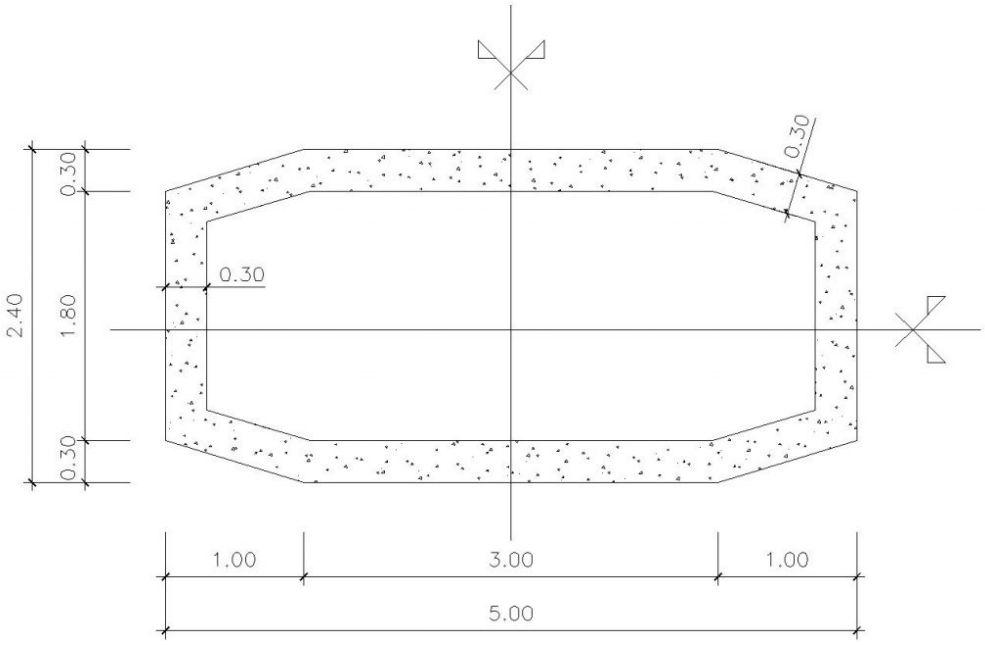
CORTE TRANSVERSAL
Esc.:1/100



The placement of the prefabricated beams was executed with a beam launching system, supported on the structural columns.

Each beam is associated with a bearing device, with a total of four bearing units per deck. In the abutments, there are two anti-seismic devices per deck.

There is one column in each deck for the four beams, this being equal for all alignments and both decks. The column consists of a hollow polygonal section with almost rectangular shape, with slight chamfers. Its dimensions are 2,40 m x 5,00 m and thickness of 30 cm, as shown in the figure below.



The configuration of the capital at the top of the columns was conditioned by the structural system used for the deck's construction process. Thus, the capital has the adequate dimensions to hold the temporary support devices that bear and stabilise the beams, in addition to the definitive bearings.

The column's capital is a reinforced and prestressed concrete unit. The post-tensioning system was defined to be given in a single phase, before loading the deck.

The foundations are materialised by individual footing or pile caps for each column, depending on the terrain resistance conditions. Regarding the abutments' solution, open type with counterforts was adopted.

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