



Engineering Structures for Life



TRANSPORTS - BRIDGES & VIADUCTS

Viaducts on the A7 Motorway

ABOUT

GEG was responsible for the structural and foundations conceptual design and detailed design of a set of [4 viaducts](#) (Viaducts III, IV, V and VI), located at the A7 motorway, in the Basto / Ribeira de Pena section (Fafe/IP3).

Structural solution

- Viaducts III, IV, V and VI

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.

The cross-section of the viaduct is as follows, and comprises two separate decks, one for each carriageway, each one about 15 m wide.

FACTS

Year: 2001-2003

Client: Ascendi

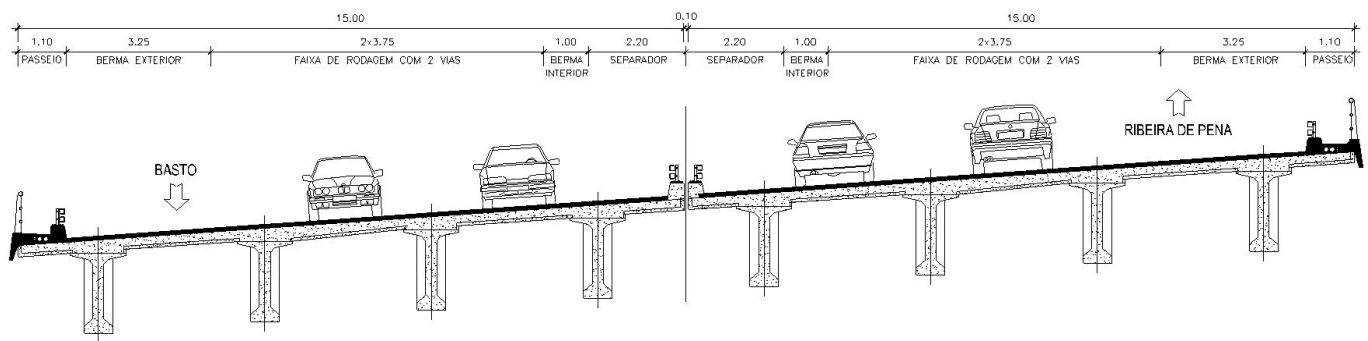
Services: Detailed design, Structural Engineering, Foundations design, Geological and geotechnical studies, Consulting and on-site technical support

TEAM

LOCATION

Basto-Ribeira de Pena, Portugal

CORTE TRANSVERSAL DO TABULEIRO



The spans are divided in the following extensions:

Viaduct III:

422,00 m ($26,75 + 11 \times 33,5 + 26,75$) for the two decks;

Viaduct IV:

154,00 m ($26,75 + 3 \times 33,5 + 26,75$) for the left deck and 205,00 m ($25,0 + 5 \times 31,0 + 25,0$) for the right deck;

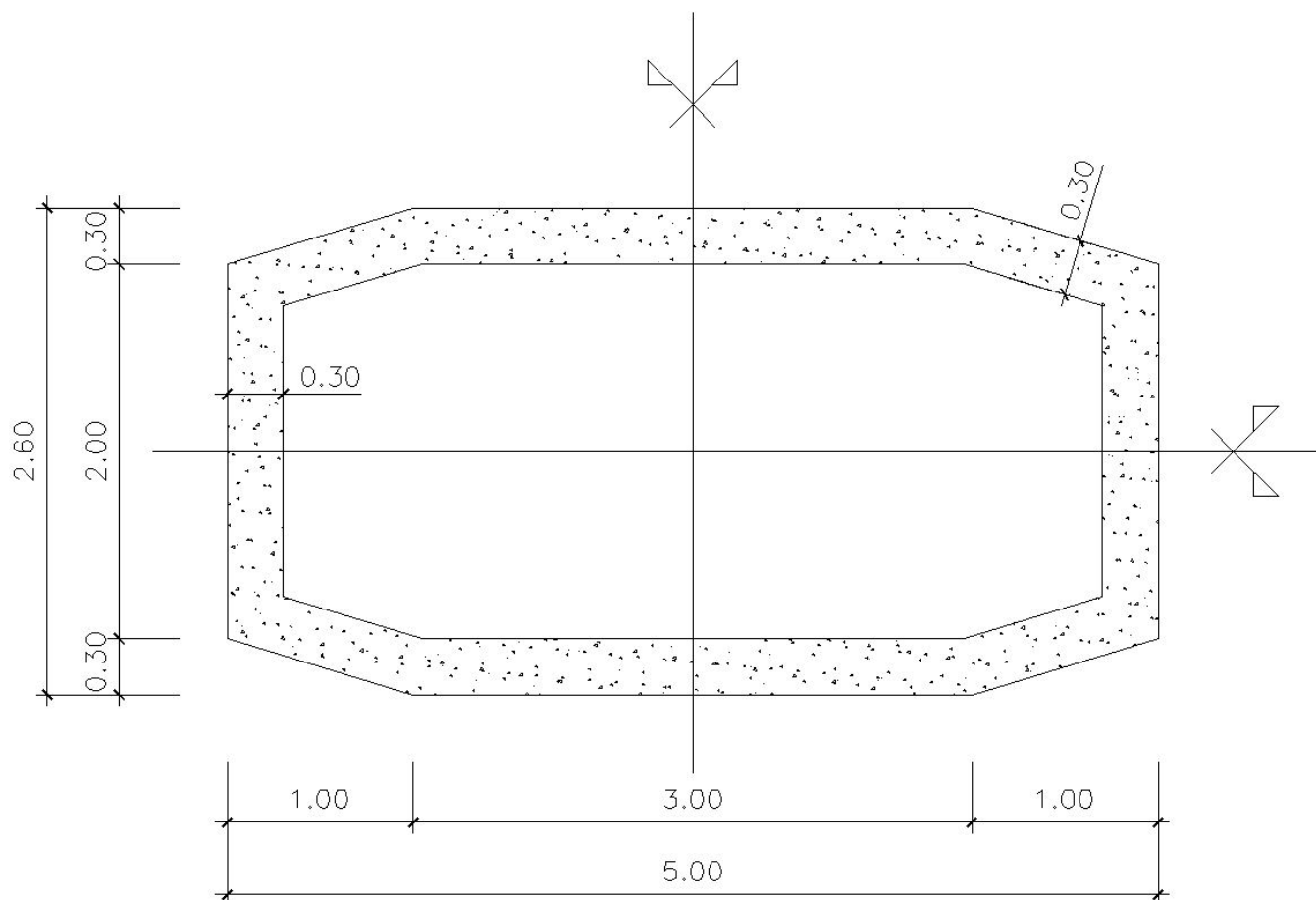
Viaduct VI:

190,00 m ($27,00 + 4 \times 34,00 + 27,00$) for the left deck and 258,00 m ($27,00 + 6 \times 34,00 + 27,00$) for the right deck.

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

Each beam has its own bearing device for each alignment. In each abutment of the viaduct III, there are two anti-seismic devices per deck aligned with the external beams.

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 2,60 m x 5,00 m and thickness of 30 cm, as shown in the figure below.

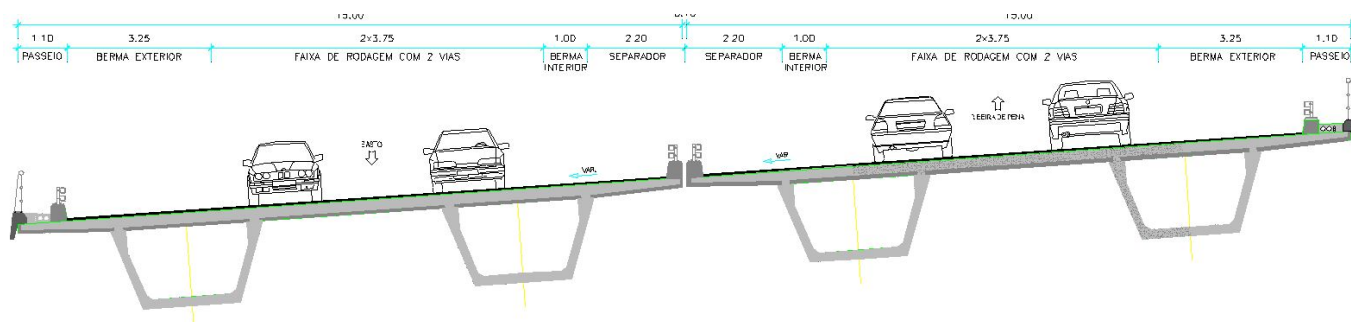


The configuration at the top of the columns was conditioned by the structural system adopted for the deck in the construction process. Thus, the columns have at their top a 2,60 m wide lintel support with dimensions adequate to hold the temporary support devices that bear and stabilise the beams, in addition to the definitive bearings.

• Viaduct V

The Viaduct V overcome two (small) valleys, contrary to what is more usual. The ridgeline between the two valleys has the highest slope roughly perpendicular to the roadway axle. Under the right edge of the viaduct, the height is always greater than 10 m. In the left edge, the roadway passes in excavation, although with a height less than 1 m. The foundation conditions, which are poor in this particular area, make it preferable to perform a small cut on the ground in order to maintain the viaduct solution.

The road platform is divided in two carriageways, one in each independent deck and with the same width. The decks have similar characteristics and a total width of 15 m each.



The viaduct has a total length, between abutments axes, of 288,50 m ($27 + 7 \times 33,5 + 27$).

Each deck comprises two MAPREL C-180 beams, connected by intermediate slabs with 0,30 m of thickness,

including pre-slab. The slab cantilevers, lateral to the beams, have a thickness, including the pre-slab, which varies linearly from 20 cm, at the edge, up to 30 cm, next to the beam.

There is one column per alignment and beam, this being equal for all alignments and both decks. The column has a circular section, with a diameter equal to 1.50m.

The structural solution is identical for both abutments, and it has been found that it was possible and convenient to choose an open type abutment solution, with counterforts.

MORE IMAGES

