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## 1. International Gadiana Bridge (Portugal – Spain)

**Owner:** Highway State Administrations of Portugal and Spain

**Engineers:** J. L. Cândia Martins, Lda

**Contractors:** Teixeira Duarte Lda  
Huarte y Cia SA  
Hasa

**Works duration:** 30 months

**Service date:** 1991

### General

The bridge under construction near Castro Marim (Portugal) and Ayamonte (Spain) will be one of the most important connections between the Portuguese and the Spanish road systems. At present the crossing is made by ferry. Bad soil conditions worsened by the possibility of liquefaction under seismic loads lead to the choice of a cable-stayed bridge.

### Bridge Deck

The prestressed concrete bridge deck consists of a continuous girder over 666 m with a main span of 324 m. The spans suspended by cables every 9 m have a single cell box girder as gross section stiffened by diagonal struts every 4.50 m. The transition spans between piers and abutments have the same cross section but due to their support conditions two inside beams replace the stiffening struts. The deck will be constructed out of 4.50 m long cast-in-place segments. It will be fully prestressed, a request made by the owner.

### Pylons

The A – shaped pylons (P2, P3) will have a height of approximately 100 m above water level. Each leg is supported by a massive pile cap on 13 cast-in-place steel lined concrete piles with a diameter fo 200 cm.

At pylon 3 piles with an average length of 50 m will be used.

### Stay cables

The stay cables are made of 15 mm strands, their number varying between 22 and 55. They are anchored at the deck and at the pylons.

(J. Cândia Martins)

### Quantities

#### Concrete

Infrastructure	13 000 m <sup>3</sup>
Superstructure	7 900 m <sup>3</sup>

#### Reinforcing steel

Infrastructure	700 t
Superstructure	1 000 t

#### Prestressing steel

Infrastructure	160 t
Superstructure	400 t

#### Stay cables

530 t



Fig 1 Composite picture

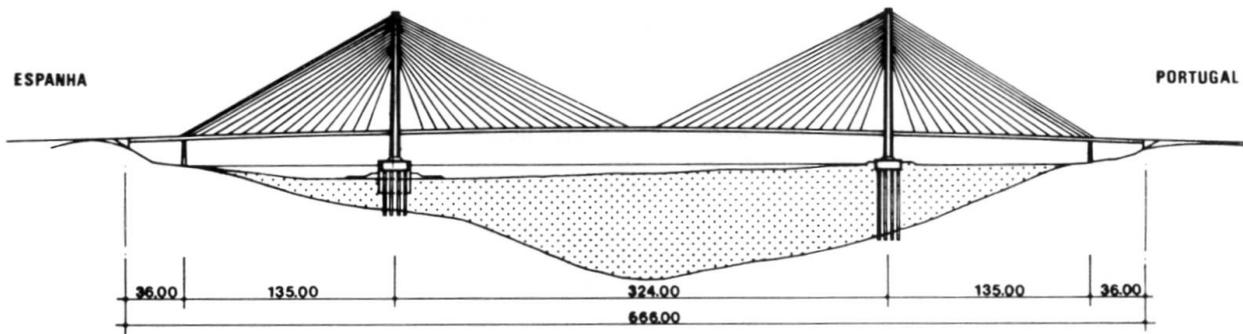


Fig. 2 Side view of the bridge

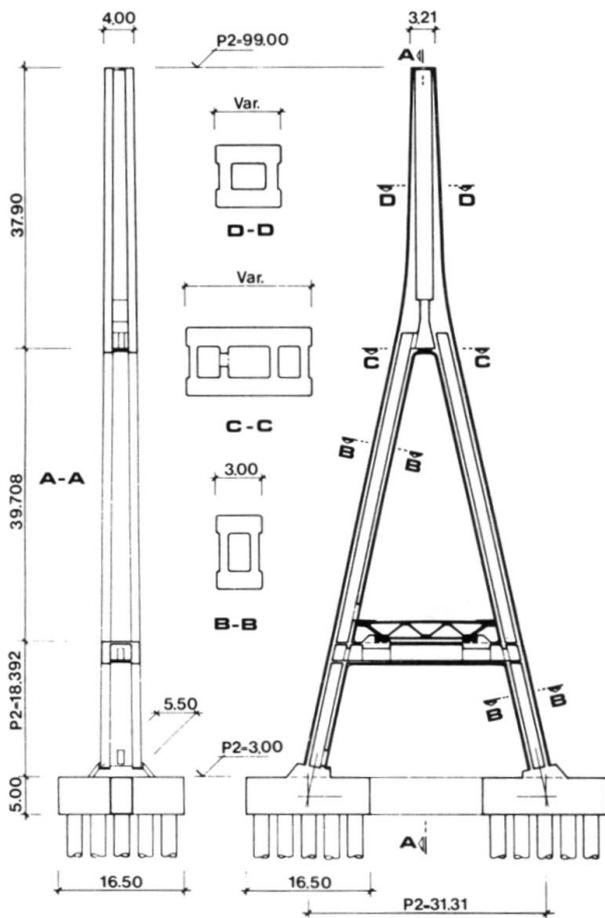


Fig. 3 Geometry of the pylons

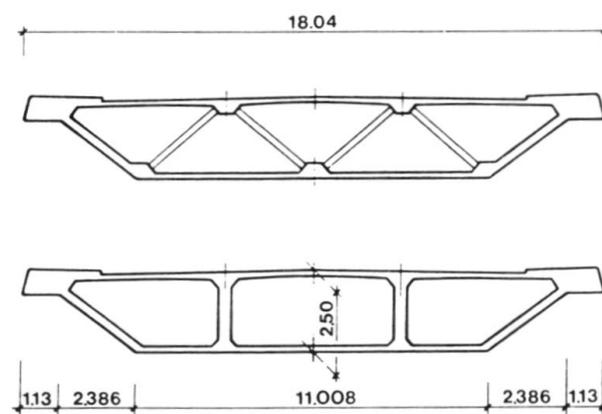


Fig. 4 Cross-section of the deck