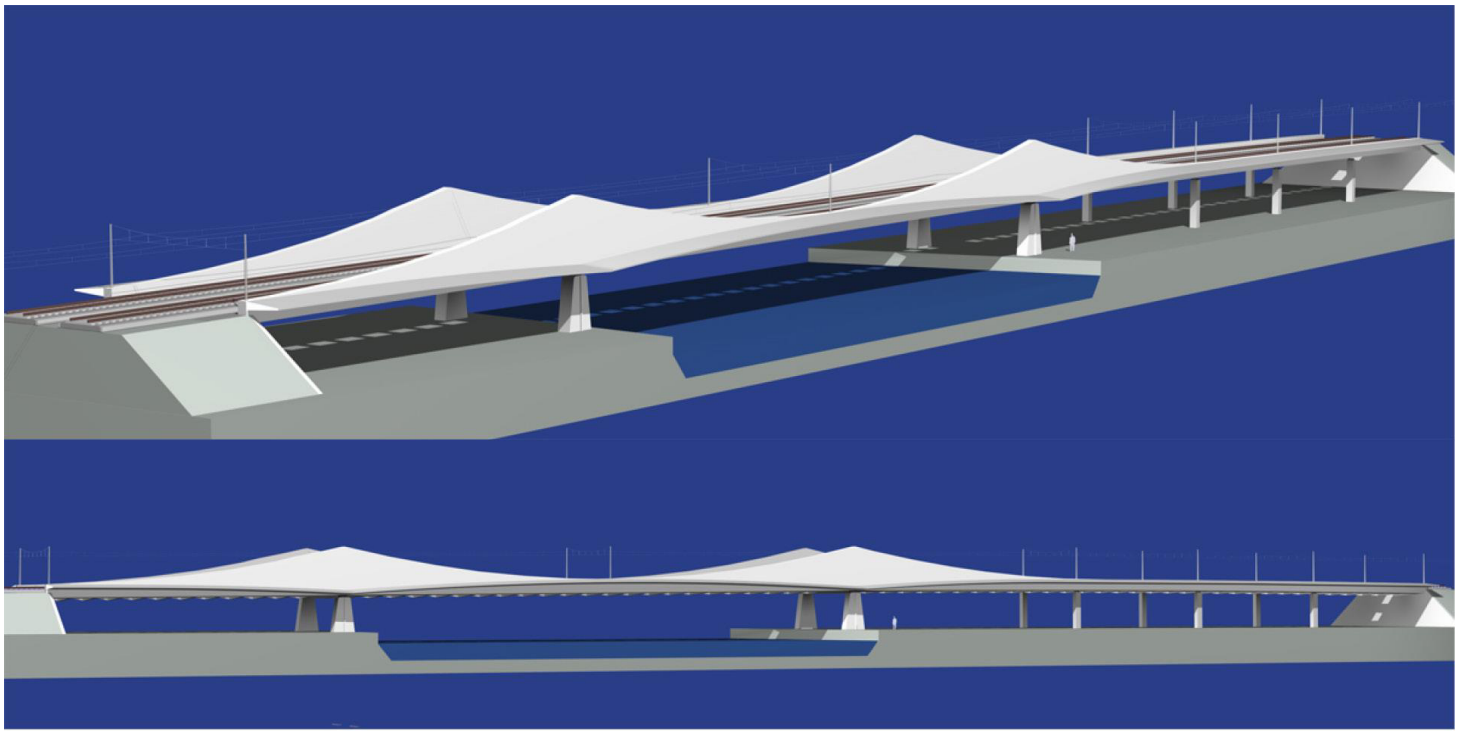
Marina de Badalona Railway Bridge

Badalona, Barcelona, Spain / 2003

Structural type	concrete slab with two prestressed concrete inverted beams
Characteristics	207m in length, 6 spans of 39 + 78 + 39 + 30 + 21m
Client	Marina de Badalona
Scope	detailed design



The design of structures in metropolitan areas is always a challenge due to the large amount of conditioning factors. This is especially true regarding railway or road design, where infrastructural and human demands have to be met, as in the case of the railway bridge in the city of Badalona.

Nowadays, the area of the city next to the sea is occupied by contaminating industrial plants. The Badalona Town Council is trying to open up the city towards the Mediterranean area by pulling down obsolete buildings of slight commercial value and updating the serviceability of those buildings with architectonic or technical interest. The project includes the rehabilitation of a beach area and the construction of a new marina and fishing port.

A railway line runs parallel to the coast separating the urban centre from the sea. Due to the current lack of resources to tunnel this railway line, the construction of a bridge is essential to connect the city centre of the city with the new facilities. Therefore, the company Marina de Badalona S.A. invited several companies to take part in a tender for this railway bridge which will cross a new pedestrian area, a part of the new seaport and two traffic routes.
FHECOR Consulting Engineers was awarded the Construction Project and Works Management, on the basis of the proposed pre-design.

The idea for this structure lies in the combination of functionality, structural rationality, aesthetic criteria and reduced construction and maintenance costs. Furthermore, the client would like this bridge to become a symbol for the city´s new development.

The structure of the bridge consists of concrete bridge divided into five spans of 39.00, 78.00, 39.00, 30.00 and 21.00m. Its transversal section is composed of two variable depth girders (the total depth varies from 1.90 m at mid-span and on the approach spans to 6.50m over the piers at the main span). The depth of the deck therefore adapts itself to the variation in bending moments.

The girders are connected by means of pre-cast, pre-stressed concrete beams. The rib-shaped arrangement of these beams allows the penetration of natural light. This is an important aspect of the design, conceived to 'illuminate' the lower passage and to compensate the elevated width-height ratio of the deck. At the same time, this penetration of discontinued light symbolizes, somewhat, the image of the railway.

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