

A new landmark arch bridge in Milan

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Summary

The new De Gasperi Bridge, located at Milan Portello, is made of two steel arches, having a 80m span. The arches thrust is held by the deck, which works like a tie. The platform is a composite steel-concrete deck. In order to reduce the intensity of the tensile stresses in the concrete slab, the whole deck is prestressed by nine external tendons. A peculiarity of this bridge consist in the two arches diverging towards the lateral sides of the deck, with an inclination of $22,5^\circ$ with respect to the corresponding vertical planes. The deck longitudinal beams are supported by nine transverse box beams, slightly tapered at the end, stretching outside the deck width. The ends of these transversal beams are connected to nine couples of hangers, having tubular section. The hangers lie onto the same inclined planes of the arches and are normal to the arches axes. In order to avoid flexural stresses, the connection between hangers and arches was made by means of Cardan joints.

Keywords: diverging arches; Cardan joints; landmark bridges.

1. Introduction

There are no particular reasons for designing a bridge with arches lying onto planes diverging towards the lateral sides. On the contrary, there are many good reasons to maintain the arches onto vertical planes or to have them converging in correspondence with their crown, and to connect them by means of transverse elements. This latter choice, in particular, makes the arches less sensitive to lateral instability phenomena, while the whole structure becomes more robust and stiffer.



Fig. 1: The Gasperi Bridge during load tests.

In the new De Gasperi Bridge, located at Milan Portello, the two bearing arches diverge toward the lateral sides of the deck: such a characteristic derives from an architectural choice, coherent with the recent urban requalification project, which led to the introduction of wide green areas and to the erection of few, refined and innovative tall buildings. A new wide underground car park will collect the town bound traffic and channel people to the downtown through a subway station.

The image of the new Portello district has to be caught in its entirety. In this context, the bridge was conceived mainly from an architectural viewpoint, as an object which is part of the surrounding landscape but, at the same time, has a character of its own.