

Bridge over the Railway in Rho (Mi)

General information

- ✓ Years: 2002-2003
- ✓ Customer: Harpaceas S.r.l.
- ✓ Value of work: € 450,000

Structural, executive and construction design of workshop:
Sidercad S.p.A.
Harpaceas S.p.A.

Dimensions: 60x14 m height 25 m

Steel: 240t of metal carpentry and 4t of stays

Characteristics of the project

The town of Rho, in the province of Milan, is characterised by traffic connection difficulties because it is traversed by one of the most important rail links from Milan to Turin and France.

The railway site is very large and has, due to reasons of poor land use in the past, very little space as a buffer zone, which made it essential to design a bridge with a narrow profile to minimize access ramps.

Four ties supported by two arches joined at the end offer a simple and effective structural solution which is a surprising sight for anyone approaching the city from the Milano-Torino motorway as an unexpected monument.

Design innovation enabled the launch night within hours of an arched bridge of 60 m of light which crosses two major railway lines at the station of Rho

Design aspects

The project was carried out in collaboration with Harpaceas and

was designed with X-STEEL, a 3D modelling program specifically for steel structures.

The model created with Xsteel allowed the solution of important design and production problems such as the sheet metal arches with the central statement supporting the ties; it also facilitated assembly by ensuring that the congruence of the parts of the model were then reflected through the automatic drawings on the produced pieces.

Executive project

The project consists of two arch-trusses that, together with the stays, form a sort of fan of straight lines converging at a schematic point located about 5 m above the key. The aesthetic effect is that "the arch pushes up and the stays pull down" and therefore the static of the whole is immediately perceived. The bridge was designed with 5 x 90 cm high steel girders. To eliminate the horizontal forces at the springing point of the arches, it was decided to place two planimetrically diagonal tie rods at the centre of mass of the bridge beams.



Rho - Road bridge with a 60 m span passing over the underlying railway line consisting of a bundle of nine tracks.

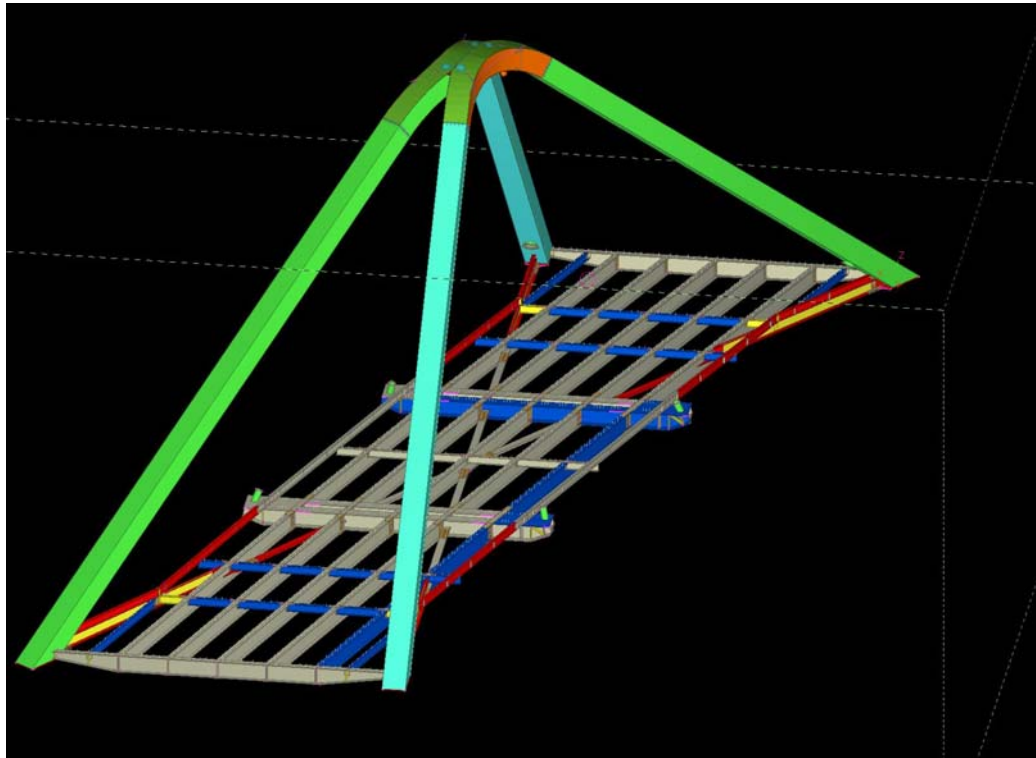
Sidercad S.p.A.
Via B. Bosco 15 – First floor
16121 Genoa - Italy
phone +39 010 54481
fax +39 010 5448865
www.sidercad.it

The bridge is therefore composed as follows:

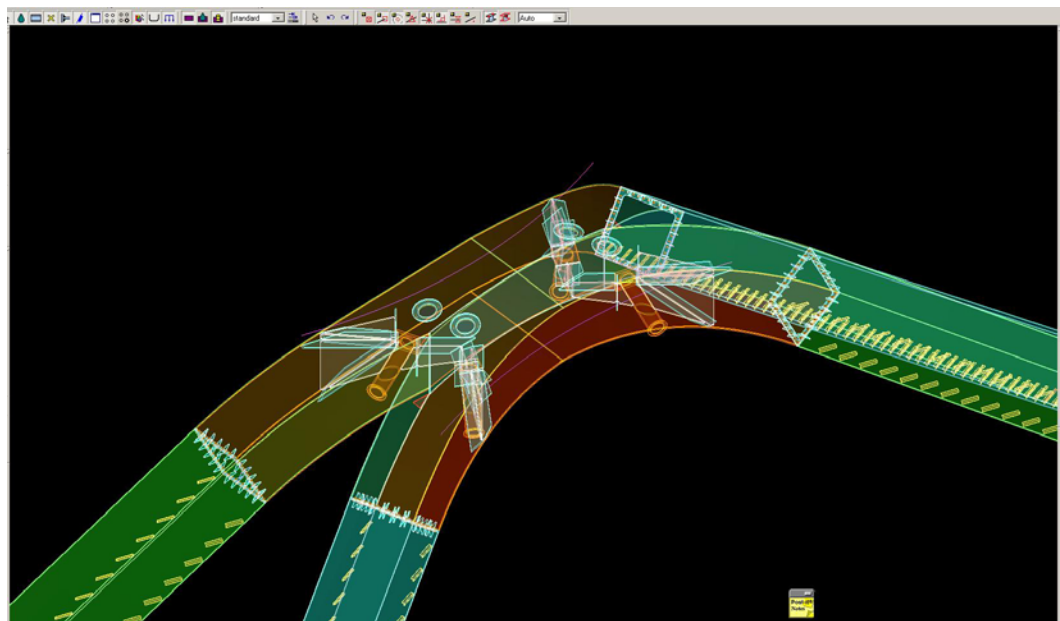
- box section beams for the arches,
- welded composite beams for the deck and diagonal chains
- partially open box section beams for bridge deck beams,
- strips of 3 stranded cable with anchors on ring nuts for the stays.

Assembly

In order to minimise the impact on the operations of the railway lines affecting the launch operation, it was decided to assemble the entire bridge alongside the railway and subsequently carry out the laying of the structure in its final position in a single operation using cranes of suitable capacity.



3D model created
with X-Steel



Xsteel's visualisation
capabilities facilitate
the modelling work