

Dynamic interaction between rails and structure in a composite bridge of 120 m length

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ABSTRACT

The new steel composite bridge over Verdugo river for the line of high-speed trains in Galicia (Spain) is placed between the localities of Arcade and Pontesampaio.

The total length of the viaduct is 120.00 m with a central pillar arranged in the middle of the river, dividing the total length of the bridge in two spans with 60.00 m each one.

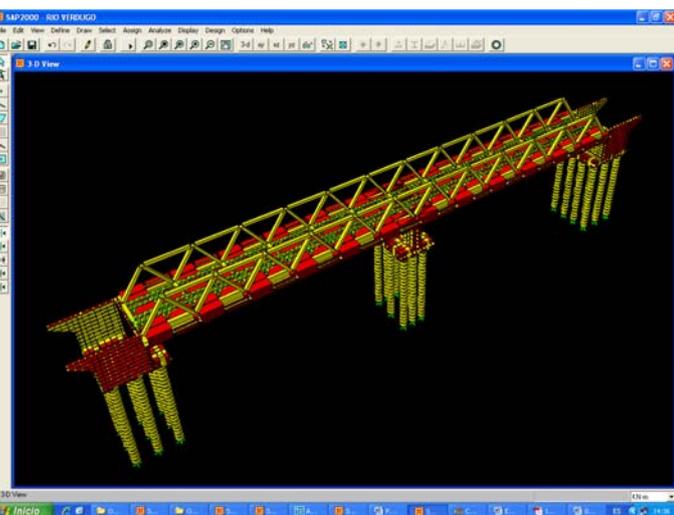


Figure nº 1 Model of finite elements of the Bridge over Verdugo river

The structure consists of a composite deck with two metallic main trusses of 1.80 m of height, on both sides of the platform. The composite slab deck has metallic transverse girders of 0.90 m of height arranged every 5.0 m, where are disposed the pre-slabs, that support the pouring concrete of the deck.

The foundation has 6 reinforced concrete piles of 1.75 m of diameter and 21 m of length under the central pillar and 9 of 22 m of length under each abutment.

The project velocity of the line is 200 km/h. Under the rails and over the deck there is ballast and according with the owner, it was needed to study, if it was necessary to dispose expansion devices for the rails.

A 3D finite element model with 7265 nodes, 6569 elements type FRAME and 2003 elements type SHELL has been made, which comprises all the elements of the struc-

ture: deck, trusses, girders, central pillar, abutments, mat foundations and concrete piles.

According with the European and Spanish Regulations it is needed to make an extensive model in order to verify three aspects:

- Maximum tensions in rails.
- Maximum displacements.
- Maximum rotations at the ends of spans.

The paper presents all the aspects of the study, compare the different Rules and finally exposes the conclusions.