



Viaduct of Archidona: a 3150 m long continuous composite deck on a High Speed Railway bridge

Francisco MILLANES MATO

Ph. D. Civil Engineer
President IDEAM S.A.,
Madrid, Spain.
Prof. University "Politécnica
de Madrid"
general@ideam.es

Enrique BORDÓ BUJALANCE

M. Sc. Civil Engineer
Project Manager
IDEAM, S.A.
enrique.bordo@ideam.es

Juan Luis MANSILLA DOMÍNGUEZ

M. Sc. Civil Engineer
International Welding
Engineer
IDEAM S.A.
juanluis.mansilla@ideam.es

Jesús MARTÍN SUÁREZ

M. Sc. Civil Engineer
Project Manager
IDEAM, S.A.
jesus.martin@ideam.es

Summary

The Viaduct of Archidona is included in the High Speed Railway Line between Antequera and Granada, in the province of Málaga (South of Spain). This Railway Bridge [1] [2] has a deck with a total length of 3.150 m, having expansion joints just at the abutments. It's, as far as we know, the continuous deck with the highest length between joints built up to this moment. It's also placed in an area of relevant seismic actions and difficult geotechnical conditions.

The deck has been designed with a composite cross section (twin-girder solution), with constant depth and typical span length of 50 m, with a similar typology to "Arroyo de las Piedras" Viaduct, the first composite High Speed Railway Bridge in Spain. This typology has been chosen to reduce longitudinal movements of the structure due to thermal-rheological actions, and to minimize seismic support forces, as the composite deck has less mass than a concrete one.

The design of the substructure has been conditioned by the seismic resistant strategy and the need of allowing the important relative longitudinal displacements of the deck due to thermal and rheological actions on piers and at abutments. During design and construction, special care was taken to ease and speed up construction of repetitive elements, which is a key factor in a very long structure. It was made full use of precast construction and high quality steel fabrication.

Some interesting issues regarding construction (control of geometry for the placing of bearings; follow-up control measures during assembling of the steel segments; not very usual precast solutions; etc.) are also explained in the presentation.

Keywords: High Speed Railway bridge; composite deck; twin-girder; seismic action; precast construction; track dilatation joints.

1. Introduction

The Viaduct of Archidona (Málaga, Spain) is located on the High Speed Railway Line (H.S.R.L.) Antequera-Granada. The design of this structure (figure 1), with a solution that is not very common in Spain [3], had to face many restrictive conditions:

- The location was on an area of moderate to high seismicity (basic ground acceleration: 0,11 g; design ground acceleration: 0,18 g);
- Alignment led to typical pier heights around 25 m;
- Placing of track dilatation devices on the structure had to be avoided, according to ADIF requirements, leading to an allowed total maximum relative displacement in track joints of 1200 mm.