



Viaduct over river Ulla: A Composite truss in the Spanish Atlantic High Speed Railway Line

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Summary

The Viaduct over River Ulla is located in the Atlantic High Speed Railway Line between A Coruña and Pontevedra, in the north west of Spain. Its location, close to the firth of Ulla, in a landscape of outstanding natural beauty and strong environmental constraints, was the object of a tender among the most renowned Spanish structural specialists.

The solution that was finally chosen is a viaduct 1620 m long, with three main spans of 225+240+225 m and several approaching spans 120 m long each, which mean a main span about 20% longer than the Nantenbach bridge in Germany, current world record in H.S.R. composite steel and concrete truss girder beam bridges.

The main spans are designed with a double composite steel and concrete truss deck, with double composite action in hogging zones, and a total depth ranging from 9,15 m at the midspan section to 17,90 m at the section over the piers. The adjacent spans that give access to the depth-varying main ones, have been designed with constant depth.

The article describes the structural conception of the bridge and the three different constructive process, that had to be used due to the access and the environmental restrictions.

Keywords: High Speed Railway Bridge, double composite action (steel-concrete), truss, launching, lifting, self-equilibrated cantilevers.

1. Introduction

"Arroyo las Piedras" Viaduct [1], finished in 2005, was the first composite steel and concrete bridge of the Spanish High Speed Railway Lines (H.S.R.L.). Its typical span, of 63,50 m, is slightly longer than the typical span of the Orgon Viaduct (63 m), located at the TGV Mediterranean Line (France), that was the longest composite steel and concrete span for this typology until that moment.

Several composite steel and concrete solutions have been constructed in the Spanish HSRL ever since. Reference [2] shows some of the most remarkable projects designed by the authors with composite steel and concrete solutions.

This article will focus on Viaduct over river Ulla, an outstanding composite steel and concrete solution for a bridge located on an unique landscape.

2. A unique solution for a unique undertaking

Viaduct over the river Ulla, constitutes the most important intervention in the High Speed Atlantic Railway Line between A Coruña and Pontevedra, in Galicia, the northwest of Spain.

Its location, close to the firth of Ulla, near the Atlantic Ocean shore and in a landscape of outstanding natural beauty and strong environmental limitations, was the object of a tender among the most renowned Spanish structural specialists. The alternative finally chosen was the one described on this paper, and it will be finished before the end of 2014.