

Lessons learned from construction of several extradosed bridges

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Abstract

The creation of the concept and denomination of the extradosed bridge is attributed to the French engineer Jacques Mathivat, who, in 1988, coined this term for the first time referring to the solution he proposed for the Àrret Darré Viaduct. In that proposal, prestressing cables extended out from the upper part of the deck were anchored to a low tower in order to gain eccentricity. Even though this option implied material savings with regard to other more conventional solutions, it was rejected. Nevertheless, Mathivat's proposal inspired the Japanese who, in 1994, built Odawara Blueway Bridge in Japan. Since then, approximately one hundred extradosed bridges have been built all over the world.

Keywords: extradosed, pylon, cable stays, saddle, cantilever, prestressing

1 Introduction

In the latest years, Ferrovial Agroman and its partner in Poland, Budimex have built and even designed several extradosed bridges. This experience facing design and construction issues has grown during building stages. Saddles, limit tension stresses, different sort of links between pylon and deck have led to several issues solved to achieve the final stage of the bridges. In addition to that, all the bridges have an iconil approach in design which design has not been possible to be changed due to structural issues. In this sense, some troubles have been faced due to this kind of structural misconception. Three different extradosed bridge are to be presented in this paper.

2 Vistula River Bridge

The extradosed bridge above Vístula river is part of national route 90 near the city of Kwidzyn. The viaduct has a total length of 1690 m and is divided into two approach viaducts on both banks of the river covering the flood plain with lengths of 474 and 409 meters respectively and a central section of 807 metres in length with three pylons tensioned with an extradorsal system.

2.1 Introduction and general description of the structure.

The main section of the structure, with 807 meters between expansion joints, features a layout of span lengths of 69.3-130.0-204.0-204.0-130.0-70.0 meters. The three central supports are pylons protruding 17 meters above the deck, with