



Puente Mercosur – Truss Grider Bridge across the Orinoco Design, Analysis and Construction

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Summary

With the aim of developing the Southwest of Venezuela and enable its connections with the rest of the country, a third bridge over the Orinoco River is under construction. The combined highway and railroad bridge “Puente Mercosur” has a total length of 11.125 km crossing the Orinoco River and its floodplain. The 2280 m long double deck river crossing carries a 4 lane highway on top and a railway line below. The side spans of the cable-stayed bridge as well as the spans of the double deck approach bridges have regular lengths of 120 m. The deck is assembled in construction yards at river level, before launching each into its final position without any auxiliary pier. The launched segments have weights in the range of 3000 tons and the distance of launching reaches 2000 m. The paper describes the design, fabrication and construction of an extraordinary structure in a remote place accessible just 5 months per year through the river. From the initial steps of design the execution under these special circumstances had been a key issue.

Keywords: Combined highway-railroad bridge, cable-stayed bridge, double deck, extraordinary construction circumstances, launching.

1. Introduction

1.1 General

A general comparison of Venezuela with other countries shows that the most important crude oil exporting nation in South America has, based on a relatively low level, a strong growth in population and as well in the gross national product. This growth combined with a gas price of just 10 cent/litre conducted to a very strong increase in traffic. Supported by steadily high revenues from crude oil exports, the state initiated major flagship projects, in order to improve the road network and as well the railroad connections. In this context the bridges over the Orinoco have a special importance due to the extraordinary size of the structures.

1.2 Relevancy of the 3rd crossing for the infrastructure network

The Orinoco with a total length of 2560 km is the longest river in Venezuela and behind the Amazon and Paraná the 3rd longest in the Latin America (Figure 1). Until now there are just 2 crossings of the river. The first one is a suspension bridge in Ciudad Bolívar inaugurated in 1967 and called Puente Angostura. With a total length of 1272 m and a main span of 712 m it serves for road traffic only [1] (Figure 2).