



Project design and construction of the Trapagaran Viaduct in Bilbao (Spain)

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Abstract

The Trapagaran viaduct was divided into 3: main viaduct, access viaduct and transition area. The main viaduct is 670 m long with 125 m spans. It is formed by a 35.60 m wide, 5.90 m deep prestressed concrete box cross section. The access viaduct is formed by four separate structures with spans reaching 86 m. Each of the decks is made up of a mixed 3.50 m deep box girder. The four branches converge in the transition area displaying complex geometry. The transition area is a prestressed concrete structure of approximately 60 m in span executed on falsework.

Keywords: Cantilever method, Evolutive cross section. Mixed Construction, Complex geometry.

1. Introduction

The Trapagaran Viaduct is integrated into the Bilbao South Metropolitan By-pass works (VSM) and is a connection between the A-8 junction and the section commencing the VSM stretch. In view of the viaduct's dimensions and characteristics as well as the obstacles underneath over which it crosses, this is a unique construction for which a solution suited to its structural and aesthetic importance and its integration into its surroundings was proposed.

2. Main Viaduct. Deck

2.1 General description

The main viaduct's deck is a continuous 670 m long girder divided into 4 central spans measuring 125 m and two end spans measuring 90 and 80 m. (Figure 1)

The deck is 35.60 m wide and is occupied by 3 different carriageways, 2 two-lane ascending with 9.50 m shoulders and one 3-lane descending 13.50 m wide. Rigid barriers 0.6 m wide are arranged between them whilst 0.50 m wide top safety parapets are arranged at the ends.

The deck's cross section has a single resistant prestressed concrete core which, with a constant thickness of 5.90 m, perfectly adapts to variations in curvature and camber. The cross section is formed by a central box more than 14.00 m wide, completed by side cantilevers supported on cross braces. The box webs are 60 cm thick in most of the spans and increase to 90 cm close to the support area on piers.