Viaduct in the Highway Siervo de la Nación

Carlos Santos, José Matos

University of Minho, Guimarães, Portugal

José Luís Barbosa, Ricardo Leite

GEG- Engineering Structures for Life, Porto, Portugal

Contact: carlos_miranda06@hotmail.com

jmatos@civil.uminho.pt jbarbosa@geg.pt ricleite@geg.pt

Abstract

The aim of this paper is to present a real case study regarding the long multi-span viaducts. Briefly, the authors show the global structural concept used in Mexico City's long viaduct to ensure a good behavior to accommodate differential settlements that can occur. It is important to highlight that the design was developed by GEG.

Keywords: long multi-span viaduct, precast, design, structural concept

1 Introduction

The Government of Mexico has initiated the construction of Highway *Siervo de la Nación* located in Mexico City and connecting *Tepexpan* to *Río de Los Remedios* in order to improve the vehicular traffic and to communicate more directly and efficiently, generating significant savings in the operating costs for road transportation of people and goods. The integration of this highway into a metropolitan area, developed largely along the *Gran Canal* river, the local sensibilities like the presence of oil, electrical, water and railway infrastructures, were decisive for an important part of the structure (with ~7 Km and 4 lanes) to be built lifted from the soil.

2 Design aspects

The fundamental objectives, efficiency, economy, and elegance constitute the leading ideas to achieve a successful viaduct design.

2.1 Efficiency

Efficiency begins by satisfying the functional needs of the bridge (new connections). Aspects like the safety of the users, strength, and serviceability are attended in the design's phase.

The structural logic was meant to follow a global structural concept of flexibility and accommodation, giving greater comfort to the viaduct to support differential settlements that can occur along his length due to inadequate subsoil conditions.

To avoid excessive forces that could arise from the settlements if the structure were continuous, the GEG's design team choose a solution that includes the "turn off" of all spans. There are expansion joints and cork at all supports allowing the discontinuity of the superstructure. (see figure 2)

Following the structural logic, to get a coherent flow of forces and a good balance of loads and effects "born" a longitudinal structural system