



Optimization of PT in Cantilever Construction of Prestressed Concrete Bridges

Santiago HERNANDEZ

Civil Engineer
Professor
University of Coruna
A Coruna, Spain
hernandez@udc.es

Santiago Hernandez, born in 1951, received his Ph. D in civil engineering from the University of Cantabria, Spain. He has more than thirty years of experience in structural optimization in mechanical, civil and aircraft engineering.

Pablo OURO

Civil Engineer
University of Coruna
A Coruna, Spain
pablo.ourob@udc.es

Pablo Ouro, born in 1989, received his civil engineering degree from the University of Coruna, Spain. He has been a Research Assistant at the Mechanics of Structures Group of the University of Coruna.

Luis E. ROMERA

Mechanical Engineer
Associate Professor
University of Coruna
A Coruna, Spain
lromera@udc.es

Luis E. Romera, born in 1967, received his Ph. D in mechanical engineering from the University of Coruna, Spain. He has twenty years experience in analysis of mechanical, civil and aircraft structures.

Summary

In this paper an example of application of structural optimization methodologies is presented describing the minimization of the amount of prestressing steel required in a prestressed concrete bridge built by cantilever construction procedure. The numerical results obtained show that this approach reduces the quantity of material needed and does not introduce any additional complexity to bridge construction.

Keywords: Prestressed concrete bridges, structural optimization, cantilever construction, multimodel analysis.

1. Introduction

Cantilever construction is a very common procedure of prestressed concrete bridges [1,2]. The procedure is independent of the length of the span and thus longitudes of even 301 m. for the main span has been reached in the case of the Stolma bridge in Norway [3]. Figure 1.a shows a bridge during the cantilever construction and figure 1.b presents a picture of the aforementioned Stolma bridge.



a) Balanced cantilever construction



b) Stolma bridge, Norway

Figure 1. Examples of cantilever construction in concrete bridges.