

Chacao Bridge Foundations

Bénédicte Pich, Emilie Cousteix, Habib Kata'a, Mathieu Muls, Aymen Cheikh-Mahmed

Systra, Paris, France

Svein Erik Jakobsen

AAS-Jakobsen AS, Oslo, Norway

Contact: bpich@systra.com

Abstract

The 2750m-long Chacao Bridge will connect mainland Chile with island Chiloe. The three-tower suspension bridge will have two main spans over 1km length. Due to exceptionally high seismic forces, the foundations of this megastructure have been a challenge to design.

Central and North Pylons are founded in Chacao channel respectively by four and two groups of nine piles. The piles are made of a reinforced concrete part surrounded by a structural steel casing. The steel casing is embedded into the seabed level by 10m at least and into the pilecap by more than one pile diameter. The casing embedment length ensures the transfer of the steel casing internal forces into the pilecap. This transfer is made by three coexisting mechanisms: a direct transfer at casing top level through the continuity of the reinforced concrete, through a pressure/contra-pressure mechanism and through shear connectors welded on the steel casing.

Keywords: suspension bridge, foundation, pile, pilecap, structural steel casing

1 Introduction

The Suspension Bridge of Chacao with its 2750m long between deflection plates will be the longest suspension bridge in South America. It will link mainland Chile with the country's biggest island, Chiloé (see Figure 1). Chacao bridge includes three pylons and will feature main spans of more than 1km length (1055m and 1155m), see Figure 2. Two of the pylons are offshore structures: the Central and the North pylons.



Figure 1. Chacao Bridge - 3D view