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TREE TOP WALK AT SERRALVES PARK, PORTUGAL

Authors: Paulo FIDALGO[1], Rui ALMEIDA[2], Elsa CAETANO[3], Álvaro CUNHA[4], Paulo CACHIM[5]

Affiliation: [1] CEO, HDP, Lda, Porto, Portugal – paulofidalgo@hdp.pt

[2] Engineer, HDP, Lda, Porto, Portugal – ruialmeida@hdp.pt

[3] Associate Professor with Habilitation , CONSTRUCT & Faculdade de Engenharia da Universidade do Porto, Porto, Portugal – ecaetano@fe.up.pt

[4] Full Professor, CONSTRUCT & Faculdade de Engenharia da Universidade do Porto, Porto, Portugal, acunha@fe.up.pt

[5] Associate Professor with Habilitation, RISCO & Universidade de Aveiro, Aveiro, Portugal – pcachim@ua.pt

Summary

The current paper describes the structure and the dynamic behaviour of a footbridge built in Serralves Park at Porto, Portugal. The footbridge, named Tree Top Walk, is located in a slope in the park at the height of the top of the trees. Because it is in a slope, the footbridge develops with an irregular U-shape at a constant level. The total length of the footbridge is approximately 250 m. At its highest level, the height is 15 m. Approximately at one third of the course there is a passage between the two branches of the U. At this zone, there is a staircase that allows to reach the footbridge at the middle of its course, from the woods and a small amphitheatre at a level of 14 m. The structure of the deck is made with timber while the columns are made with steel covered with timber across their height and the connection between the columns and the deck is performed with timber struts placed in the longitudinal and transversal directions. Three of the columns are made with a circular profile, while the others are 4-foot tubes connected at the top by a circular tube with 2.35 m length. The deck is made with four longitudinal girders with a cross section of 8x52 cm. Spans have different lengths, ranging from 5 to 14,34 m. In total there are 23 spans and 22 columns. In the structural analysis, dead loads, live loads, wind and earthquake actions were considered. To assess the dynamic behaviour of the structure, dynamic tests have been carried out. The performed tests include an ambient vibration test, the determination of the damping level and tests with pedestrians.

Keywords: timber; dynamic testing; lateral vibration; response.

1. Introduction

This article presents the Tree Top Walk footbridge located at Serralves Park, at Porto, Portugal. The footbridge has a total length of 250 m practically at the same level, being the exception the first span with a 0,2 m elevation. Because the footbridge is located on a slope, the highest level is approximately 15 m, and the height changes along the way, with the minimum height being approximately 2,5 m. The footbridge develops across the treetops of Serralves Park with a view to the park and in certain places extending to the sea. The architectural project was authored by architects Carlos Castanheira and Álvaro Siza. Because the footbridge develops at the level of the tops of the trees, experience at different times of the year is also different, because trees may or may not have leaves. With the construction of the Tree Top Walk footbridge, The Fundação de Serralves, that manages the park, intends to valorise its natural and cultural heritage, by innovating in the creation of environmental protection actions and in the promotion of science outreach activities for different publics. The footbridge revitalises a less known part of the park and offers a completely

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