Footbridge Nelson Mandela in Béziers: a contemporary slender arch bridge in UHPFRC

Christophe Peigneux, Vincent Servais

Servais Engineering Architectural, Liège, Belgium

Contact: cp@servais.partners

Abstract

This paper presents an innovative footbridge consisting in an arch in UHPFRC with filling in expanded clay grains crushed and spandrel walls in gabion. The analysis of Béziers' architectural heritage leads to propose an innovative design concept: build a bridge without any dilatation joint and bearing, resort to a millenary technology but adapt it to a contemporary material, the Ultra-High-Performance Fibre-Reinforced Concrete (UHPFRC). The repetitive use of similar elements in the arch allows minimising the incidence of formwork complexity and consequently, allows respecting the maximum overall costs. The footbridge has a main span around 36 m and a 3,5 m effective width.

Keywords: aesthetics; structural concepts; UHPFRC; material optimization; durability; footbridge

1 Introduction

Designing footbridges is an engaging act. The provided answers depend on the economic context as well as on the expected functionality. In any case, a good integration of the footbridge in its environment should be considered while satisfying as much as possible all users' needs and requests.

1.1 Location

The new footbridge "Nelson Mandela" is located in Béziers' suburb and more precisely in a residential area (Figure 1 and Figure 2).

Figure 1. Footbridge location

This district receives from the local authorities a complete change and modernisation. A large majority of low-cost housings will be demolished.

Figure 2. Residential area

Currently, an existing footbridge in wood laminated crosses the Boulevard Jean Bouin, links the districts on both sides and provide an access to a park (Figure 3).

This footbridge was often damaged by vandalism and was partially burned (Figure 4) and needs to be replaced.

https://doi.org/10.2749/ghent.2021.1189
Distributed by structurae