

SMALL FOOTBRIDGES: 2 CONTEXTS, 2 RESPONSES

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Summary

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.

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 reappropriation of ancestral methods imposes to revise the arch filling weight composition. The middle age typologies are transposed to the 21 century's techniques and materials. This results in an innovative footbridge consisting of an arch in UHPFRC with filling in expanded clay grains crushed and spandrel walls in gabion.

The repetitive use of similar elements in the arch, i.e. 4 shells, allows minimising the incidence of formwork complexity and consequently, allows respecting the maximum overall costs.



Fig. 1. Footbridge in UHPFRC upon Boulevard Jean Bouin in Béziers (FR)

As part of a design and build project, pertinent and coherent integration of the footbridge in a remarkable natural site should be combined with structural simplicity. This leads to the conception of a minimal structure using weathering steel as material without any superfluous artifice. The structure consists of a guardrail and a floor, without recourse to any secondary element.

This minimalist conception leads to a “low-cost” structure. The overall cost is 2 times cheaper than the cost of a usual footbridge.

The footbridge has a double structural behaviour: a tie-arch structure which is adequate for symmetrical loads and a truss structure for non-symmetrical loads. Both structures are directly integrated in the guardrail and constitute this guardrail. A simple steel sheet 12 mm thick is cut in successive triangle shapes. The geometry of these cuttings creates a symmetrical graphic design without any material waste.

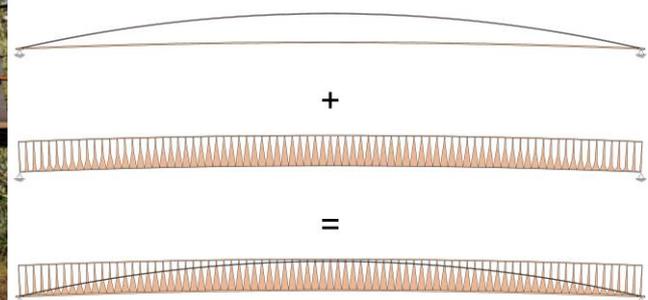


Fig. 2. Footbridge in weathering steel upon the Kalkenvaart (BE)

Keywords: aesthetics; structural concepts; UHPFRC; weathering steel; material optimisation; minimal design; durability; footbridge