Bru over Otra, a new footbridge in Kristiansand (Norway)

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Abstract

Bru over Otra is a newly constructed pedestrian bridge located in the Norwegian city of Kristiansand. The bridge has an overall length of 180m and provides a 4m clear width route for both pedestrian and cycle traffic over the Otra River.

The bridge is made up of six spans (25m+5x32m+25m) with four piers located within the river and one located in a public park. The bridge is curved in plan and elevation, allowing for the change in level between both embankments.

The deck structure is a multicell continuous steel box girder. The maximum deck depth of 0.9m is constant all long the bridge, although the transversal section is tapered at the edges.

In the case of the substructure, the challenging conditions related to ice loads and the construction of the foundations and columns inside the river flow were crucial to establish their design.

Keywords: Pedestrian bridge, steel box design, ice loads, circular raft foundations

1 Introduction

Bru over Otra is a newly constructed pedestrian bridge located in the Norwegian city of Kristiansand. The bridge spans over the Otra river and improves the connectivity between Kjøita Park and Posebyen boroughs by means of a new pedestrian and cycle route.

2 Description of the structure

The pedestrian bridge is made of six spans (25m+5x32m+25m) with a total of five piers: four of them located within the river and one is supported over the river embankment (Figure 1). The bridge follows a circular alignment in plan and elevation, allowing to overcome the difference in level between both embankments keeping a maximum slope of 4.8%

Talking about the riverbed, its level varies quite importantly between the position of the different piers, with a minimum of 2.50 depth to a maximum of 7.5m both from the Mean Sea level (MSL)

Structurally speaking, the deck is a continuous steel multicellular box girder supported over the piers and abutments by means of elastomeric bearings. The typical section, which remains constant along the bridge, is variable in depth in the transversal direction. The maximum depth is 900mm and is tapered at the edges. A topping concrete slab is provided as a walking surface and with the solely structural function to provide restraint against