

FOOTBRIDGE - CIRKELBRUG

A playful weathering steel footbridge

Authors: Edwin THIE¹, Oriol CASAS CANCER²

Affiliation: ¹ Sr. Bridge Engineer, Arup, Amsterdam, the Netherlands – edwin.thie@arup.com

² Partner architect, wUrk, Rotterdam, the Netherlands – ocasas@wurck.nl

Summary

In 2018 the Province of Flevoland launched a design competition for a new footbridge over the N305. The new footbridge near Almere in the Netherlands will facilitate a safe crossing over the Waterlandseweg and improve the recreational network in the area. It crosses the canal Hoge Vaart, extending the cycling network by connecting the areas on either side of the canal. By including two viewing platforms on the bridge it also functions as a place to be and enjoy the natural beauty of the area it sits in.

The bridge has a total length of 240m over has eight spans. The longest span is 60m, across the canal Hoge Vaart. The width varies between 4m and 6,5m at the location of the viewing platform above the water. The bridge is completely made of weathering steel and fits nicely into the landscape. It crosses a main road into the city of Almere and hence can also be viewed as a gate into the city for the road users.

The bridge superstructure consists of thin steel plates with stiffeners. This resulted in a playful and slender structure, that is sensitive to vibrations induced by pedestrians and joggers. To control the comfort of the users, the bridge is firstly dynamically analysed to understand its behaviour and the risks. After construction the behaviour is tested and verify with the requirements and dampers are installed for a comfortable crossing.

This paper will describes the architectural experience of the bridge. And explains the design process and the challenges in controlling the human induced vibrations for a comfortable use of the bridge. It will describe the different dynamic analyses that have been performed and the jogger requirements from the Dutch National Annex to the Eurocode. It will go into the difference of the results from a steady state analyses and transient analyses and the comparison with the actual test results.



Fig. 1. Footbridge 'Cirkelbrug'

Keywords: *aesthetics; footbridge; dynamics; human induced vibrations; response; testing; damping; weathering steel.*