



FRP lift bridge over the Oud Rijn: engineering slenderness

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Summary

In a design contest, RHDHV architect Joris Smits entered a challenging asymmetric design for a lift bridge for the Oude Rijn, Katwijk, the Netherlands. Using the lightweight stiffness of Fiber Reinforced Polymers (FRP) for the deck structure, he created an extremely thin structure, for its beauty and to reduce the number of openings of the bridge by increasing the height of the vertical clearance. The client was thrilled by the design but hesitant to believe the concept was feasible: such complex shape and slenderness. Royal HaskoningDHV was asked to further develop the design and demonstrate the technical and economic feasibility of the design. Could such long slender deck really be achieved? How would it respond to its single lifting arm? This paper discusses the challenges of the asymmetric design of the bridge and explains the FRP engineering solution. Dutch Design Recommendation CUR96 [1] has been used for the structural design.

Keywords: analysis, architecture, comfort, feasibility, footbridge, FRP, moveable bridge.

1. Introduction

A design contest was held in 2010 between 4 architects in which RHDHV architect Joris Smits participated with a challenging asymmetric design for a lift bridge for the Oude Rijn, Katwijk, the Netherlands. The single pillar was inspired by a white heron and reflects the social context of the area: suburban development on one side, free space on the other. He created an extremely slender structure, for its beauty and to reduce the number of openings of the bridge by increasing the height of the vertical clearance.



Figure 1 Design of Footbridge over the Oude Rijn, Katwijk, the Netherlands