Renovation of a Historic Railway Lift Bridge

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Abstract

This paper describes the history, the design, the structural assessment and the major challenges of the extensive renovation project of a historic railway lift bridge in Rotterdam, The Netherlands. The bridge was completed in 1927 and was the first one of its kind in Western Europe. It is considered as a living example of early 20th century bridge engineering art.

Keywords: renovation, historic bridge, vertical lift bridge, structural assessment.

1 Introduction

The Koningshaven bridge is a vertical lift type movable bridge. The bridge was completed in 1927 and was replaced by a tunnel in 1993. The bridge was designated as a National Monument in 2000 and to preserve the bridge for future generations an extensive renovation project is in preparation.

This paper describes the history, the design, the structural assessment and the major challenges of this extensive renovation project.

2 Brief History

2.1 Swing Bridge

The construction of the Koningshaven bridge was part of a major project extending the connection of the Amsterdam-Rotterdam railway line to the Moerdijk-Antwerpen railway line. This part of the project involved the accomplishment of a double track railway through the densely populated Rotterdam inner city and the crossing of the Nieuwe Maas river. The Koningshaven bridge was completed in 1877 as the southern part of the river and canal crossing between the northern shore of the Nieuwe Maas river through the Noordereiland and the southern shore of the Koningshaven. The Koningshaven bridge consisted of a steel arch with a span of 80 m on both sides of a symmetrical swing bridge with a total length of 54.5 m. Openings of 20 m allowed vessels to pass on either side of the center pivot pier. As time progressed the swing bridge no longer satisfied the requirements of the busy navigation and railway traffic. The width of the bridge openings was too narrow and the bridge opened frequently. Both navigation and railway traffic were seriously obstructed. Several collisions occurred as a result. The collision on 10 May, 1978 with the German steamship “Kandenfels” was decisive in the discussion to replace the swing bridge by a vertical lift bridge.

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