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Design and Implementation of Installation Works on the New Neuenkamp Highway Bridge over the Rhine in Duisburg

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ABSTRACT

The existing six-lane highway bridge, which crosses the Rhine River between Duisburg-Neuenkamp and Homberg, was originally opened to traffic in 1970. Due to increased traffic loads and severe fatigue damage it now needs to be replaced. The new design consists of two similar cable-stayed steel superstructures, each carrying four lanes. It has an overall length of 802 m, an overall width of almost 70 m, pylons of 90 m in height, and a central span of 380 m. The installation of the superstructure comprises incremental launching of the approaches, crane assembly of the pylons, and the cantilevered assembly method of the central span. Additionally, the requirement to maintain vehicular traffic on the A40 highway during the construction phase demands transversal launching of the southern bridge structure by 14.4 m after completion. This paper covers the design and implementation of the installation works of the steel structures on site.

Keywords: construction practices of long-span bridges, cable-stayed bridge, incremental launching, crane assembly, large scale cantilevered assembly.

1 INTRODUCTION

The Neuenkamp Highway Bridge is an important crossing over the Rhine River in the heart of the German Ruhr region. Over time, the existing bridge structure has developed severe fatigue damages, resulting in several rehabilitation and reconstruction works during the last decades [1]. Since 2014, the bridge has been under constant monitoring in combination with ongoing maintenance measures and a traffic weight limit, making a full replacement inevitable.

With a central span of 380 m, the new structure will be the largest symmetric cable-stayed bridge in Germany (cf. Fig. 1). Both the 802 m long and almost 70 m wide bridge deck (cf. Fig. 2) and the 75 m high pylons are made of steel. In the central span, the bridge deck consists of two steel box girders with orthotropic deck, while the approach spans are mainly constructed as identically shaped steel box girders with composite bridge deck. The stay cables are arranged in pairs, resulting

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