

The New Storstrøm Bridge - Pylon and Stay Cable Design

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Abstract

The New Storstrøm Bridge in Denmark includes a signature main bridge located centrally at the bridge crossing, spanning over two ship navigation channels as a cable-stayed bridge. It spans over 2 x 160 m with a single, architecturally shaped pylon with an integral, monolithic connection centrally between the deck and the pylon. The central pylon provides vertical support to the deck through the stay cables and lower pylon, but also acts structurally as the point of longitudinal fixity for one of the three frames of the bridge. The paper will describe the key design challenges for the structural design of the cable-stayed bridge of the New Storstrøm Bridge, including a discussion on the pylon design, stay cables, stay anchorage concepts and the bridge structural system.

Keywords: Cable-stayed bridge, railway bridge, landmark structure, advanced bridge design.

1 Introduction

The New Storstrøm Bridge is a 4 km long marine crossing in Denmark. Located centrally at the crossing, the bridge features a Cable Stayed Bridge (CSB) 2 x 160 m to span over the ship navigation channels in the Storstrømmen waters. The location of the CSB can be seen in Figure 2.

The cable stayed bridge concept was carefully chosen by the employer the Danish Road Directorate (the DRD) after studying several options [1]. General information about the project may be found on DRD's project specific web page [2].

At completion, the bridge will be the 3rd largest in Denmark. Although the actual cable stayed part of the crossing is limited compared to the full length of the bridge, the CSB spans and pylon will provide a significant visual identification of the bridge. Therefore, the DRD – together with their consultants including architects Dissing+Weitling – gave significant geometrical constraints and

architectural requirements as a part of the design basis. An early rendering can be seen in Figure 1.

This paper intends to describe the challenges and innovations that were deployed in the design of the CSB, especially considering the many structural constraints provided as a part of the tender documents.



Figure 1. Rendering showing the proposed cable-stayed bridge (courtesy of the DRD)