

Personal Involvement in early US Cable-Stayed Bridges

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Holger Svensson, born 1945, received his degree from Stuttgart University in 1969.

He has extensive experience in the design, construction engineering and supervision on site of cable-stayed and other long-span bridges all over the world, especially in the US. Mr. Svensson is a Professional Engineer in 12 States of the US, in Europe, in Asia and in Australia.

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Summary

The personal involvement of the author in the early US cable-stayed bridges is outlined, including the Pasco and Huntington concrete bridges and the Burlington and Fred Hartman composite bridges.

Keywords: Cable-stayed bridges; design alternates; post-tensioning; concrete girders; composite girders; construction engineering; free-cantilevering; aerodynamic stability

1. Introduction

In 1973 my work on cable-stayed bridges in the US started with the Pasco-Kennewick Bridge. For the next 15 years I worked on several other cable-stayed bridges in the US, including the East Huntington Bridge, the Sunshine Skyway Bridge, the Talmadge Memorial Bridge, the Burlington Bridge and the Fred Hartmann Bridge. In addition to many visits I spent most of 1976 with my family in Olympia, Washington, and most of 1982 to 1986 in Tampa, Florida.

2. Examples

2.1 Pasco-Kennewick Intercity Bridge

In 1973 Arvid Grant asked Fritz Leonhardt for assistance in the design of a bridge across the Columbia River. Since the Federal Highway Administration (FHWA) with Bridge Engineer Walter Podolny [1] was very interested in introducing cable-stayed bridges into the US this bridge became actually the first major example of this kind.

The Intercity Bridge crosses the Columbia River between Pasco and Kennewick, Fig. 1, in the State of Washington near Seattle. It was, at its time of completion, the first major cable-stayed bridge in the United States, and the second largest cable-stayed concrete bridge in the World [2]. It consists of a continuous concrete girder, 763 m (2503 ft) long, 24,4 m (80 ft) wide, 2 m (7 ft) deep. The main spans with 124 m - 230 m - 124 m (407 - 981 - 407 ft) are supported by stay cables and two concrete towers.

This bridge introduced state-of-the-art for major cable-stayed concrete bridges to the US. The development of cable-stayed bridges took place in Europe initially with steel girders. Only a few, small concrete cable-stayed bridges had been built before. However, due to the unpredictable steel prices at the West coast and the reduced maintenance requirements a concrete girder was chosen.

Since US contractors were not prepared to build cantilevers up to 150 m (490 ft) in CIP concrete, large precast elements were selected, also a novelty at that time. The special characteristics of the bridge are: