



Replacement of the Woodrow Wilson Memorial Bridge Bascule Span

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Summary

A mile-long signature replacement structure has been designed to replace the Woodrow Wilson Memorial Bridge on the I-95 Interstate System. With eight independent bascule leaves and a movable mass of 19000 metric tons, the bascule span is the largest movable bridge in the U.S. and possibly the world. To meet extraordinary public demands, the new bascule bridge has been constructed with many unique features including aesthetic V-shaped concrete piers, fully-composite concrete decks, moment-transferring span locking system, details to accommodate a future transit system, and a fully-redundant electrical control system. These components are amongst the innovative, interdisciplinary features described in this paper.

Keywords: Bascule bridge; movable bridge; v-shaped piers; post-tensioning; segmental concrete; trunnion; moment locks; tail locks; bridge control system.

1. Introduction

The Woodrow Wilson Memorial Bridge is the only Potomac River crossing in the southern half of the Washington, D.C. metropolitan area, USA. It connects the states of Virginia and Maryland, and carries the Capital Beltway (I-495) and I-95, the main north-south interstate route on the East Coast. The existing bridge was an aging steel structure with numerous short spans and a moveable span built in the early 1950's. This bridge was rapidly deteriorating under the daily traffic volume of 175,000 vehicles. Thus, in 1987 it was decided to replace the bridge with a new 1840 m long low level structure that can accommodate the anticipated traffic growth to 300,000 vehicles and reduce the frequent bascule span openings to approximately one per week.

2. The new bridge

2.1 Description

The culmination of the review process was a bridge of twelve-lanes, wide shoulders and a sidewalk including a movable span and increased navigational clearance (22,86 m). The new bridge has incorporated the following basic design requirements: 1) Be an arch structure in the tradition of other Potomac River bridges; 2) Integrate the moveable span with the fixed spans; 3) Provide open lines of vision between the shores of the river.