



Tappan Zee Hudson River Crossing: The New NY Bridge Project

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In 32 years, Marco Rosignoli has assisted bridge designers, contractors and owners in 21 countries and 4 continents. Designer or peer-reviewer of 5 cable-stayed bridges, 9 incrementally-launched bridges, multiple balanced-cantilever bridges, 50 kilometers of LRT and HSR bridges, and numerous bridge erection machines, he has written 3 books published worldwide and 90 papers and lectures on bridge design and construction technology. He owns 32 patents on bridge construction methods.

Summary

The Tappan Zee Hudson River Crossing – the New NY Bridge Project – is a great example of how the design-build method of project delivery can lead to innovative and cost-effective design solutions. The design-build team worked together during the bid phase to develop the design of an iconic bridge for the New York area that is cost-effective to build, operate and maintain. The bridge has been designed to provide a 100-year service life prior to major maintenance.

Keywords: Design-build; large-scale projects; composite construction; cable-stayed bridges; prefabricated pile-caps, prefabricated pier-caps, full-depth precast deck panels, incremental launching.

1. Introduction

The Tappan Zee Bridge is a 5,0km bridge crossing the Hudson River between Rockland and Westchester Counties, approximately 40 kilometres north of New York City, Figure 1. The existing bridge begins from the west shore as a low causeway bridge with 169 short spans above the river, and transitions to longer deck trusses approaching the main truss over the navigation channel. The navigation unit is a 3-span cantilever truss with a 365,8m main span and two 182,9m anchor spans. The east approaches consist primarily of high-level deck trusses, with a few spans of shorter steel girders entering the Westchester landing.

The existing bridge carries 7 lanes of traffic, with a movable barrier in the middle of the deck to provide 4 lanes in the predominant rush-hour direction. The bridge carries nearly 140.000 vehicles per day, with a toll for cars of \$5. The New York State Thruway Authority (NYSTA) is the owner of the bridge, and approximately 20% of the entire toll revenue of the NYSTA is collected on this bridge.

The bridge was opened to traffic in 1955 and was designed to be as light as possible, taking into account the scarcity of steel following WWII and the Korean War and the relatively low strength foundation material over much of the site. In the western half of the bridge (on the right-hand side



in Figure 1), bedrock is 200m below the river surface, and this drove the choice of multiple short spans founded on 15m timber friction piles. In the eastern half of the bridge, bedrock is 90m or less below the river surface, and long truss spans were founded on piles driven to rock.

Main span and several approach trusses are founded

Fig. 1: The Tappan Zee Bridge