Design and Construction Innovations for the Puente Centenario, Panamá

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Summary

The Puente Centenario over the Panama Canal, named to commemorate 100 years of Panamanian independence, includes the longest mainspan for a concrete cable-stayed bridge in the Western Hemisphere. With the completion of the approach routes, the 420m mainspan bridge was opened to traffic in September 2005. The entire crossing measures 1050m between abutments and traverses the canal east-west and forms part of a new bypass highway connecting the northwestern part of Panama City with the Panamerican Highway. The alignment crosses the canal at its narrowest point, north of the Pedro Miguel Locks, near the town of Paraíso. The project required design and construction innovations to satisfy the strict project criteria within the context of the existing geology, seismic hazard, limited material availability, canal security, complex logistics and optimized construction methods.

Keywords: Anchorage, box girder, cable-stayed, cantilever, CIDH piles, composite steel frame, fast-track, pylon, segmental, seismic.

1. INTRODUCTION

The Puente Centenario over the Panama Canal, a 420m mainspan concrete cable-stayed bridge, measures 1052m between abutments and traverses the canal east-west and forms part of a new bypass highway connecting the north-western part of Panama City with the Panamerican Highway. The alignment crosses the canal at its narrowest point through the Gaillard Cut, north of the Pedro Miguel Locks, near the town of Paraíso. This second fixed crossing, named to commemorate 100 years of Panamanian independence, includes the longest mainspan for a concrete cable-stayed bridge in the Western Hemisphere.

The mainspan and viaduct structures were completed in August 2004 within an astonishing 22-month construction period, although opening to traffic was delayed one year due to unfinished roadway works built by other contractors. The new crossing was designed to alleviate traffic on the existing Bridge of the Americas, a four-lane tied-arch truss bridge built in 1962 that has served until now as the only fixed highway link between the Americas.

To expedite the execution of the project, the Ministry of Public Works (MOP) adopted an aggressive program, incorporating traditional, "fast-track", and Design-Build concepts into a framework that brought the builder on-board at the outset of the final design phase. The client selected a symmetrical twin-pylon solution with a central plane of stays supporting a 34.0m wide single-cell concrete box girder deck that carries 6 lanes and a central median walkway. The MOP awarded the construction with an estimated initial construction schedule of 27 months; utilizing effective operating sequences and innovative techniques, the structure was completed within 22 months.

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