



## Bridges

## Reference Details:

**Owner** Highway and Transportation Authority, Puerto Rico  
**+++ Main Contractor** Las Piedras Construction Corp., Las Piedras, Puerto Rico  
**+++ Architect** CSA Architects and Engineers, San Juan, Puerto Rico  
**+++ Consulting Engineers** HNTB, New York, NY, USA

**DSI Unit** DSI USA, Business Unit Post-Tensioning, USA  
**DSI Services** Supply of: 162 t of waxed and sheathed strand for 96 stay cables, ranging from 19 t 37x0.6"; 153 t of 0.6" strand for the pier and tower struts (43 tendons 19-0.6"), floor beams (110 tendons 19x0.6"), edge girders (42 tendons 9x0.6") and longitudinal deck tendons (116 tendons 4x0.6"). 22 tons of Ø 36mm DYWIDAG Threadbars St 835/1030 for 776 bar tendons in the towers. equipment.



## Construction of the First Stay Cable Bridge in Puerto Rico

### Bridge over the La Plata River, Naranjito, Toa Alta, Puerto Rico

Naranjito (Spanish for "small orange"), a city in the middle of the island of Puerto Rico that got its name from the many orange trees in the town center, is pleased with the new bridge over the La Plata river. The bridge is 320 m long, with spans of 80 m + 160 m + 80 m and a deck width of 30.2 m, making it one of the largest bridge construction projects in Puerto Rico.

The construction of this bridge was associated with many challenges. Extreme climatic conditions and heavy rains during the rainy season affected the construction schedule. For the construction of this stay cable bridge a new construction method, new to Puerto Rico, was used for both the towers and the superstructure.

The main bridge consists of two diamond-shaped towers and a bridge deck with two edge girders and transverse floor beams. The bridge deck was built using the free cantilever construction method. For this purpose, two sets of DYWIDAG Form Travellers and DYWIDAG Multistrand Tendons were employed. In addition, DSI USA was responsible for providing the assembly, disassembly and the shifting of the DYWIDAG Form Travellers between the pylons.

The 96 DYNA Bond<sup>®</sup> stay cables were preassembled on the bridge deck. They consist of 19x0.6" and 37x0.6" individually waxed and sheathed strands grouted inside a common PE pipe. For installation into the DYNA Bond<sup>®</sup> Anchorages the strands were cut to the required length and the PE sheathing was removed from their ends. The stay cables were lifted by a crane, fixed at the pylon, temporarily attached to the form traveller and tensioned. After curing of the concrete of the bridge deck, the stay cable force was transferred to the DYNA Bond<sup>®</sup> Anchorage already installed in the deck. After adjustment of the transfer forces, the anchorage was grouted. DSI's extensive services for this project included the rental of DYWIDAG Form Travellers, the supply of DYWIDAG Multistrand Tendons and of the complete DYNA Bond<sup>®</sup> Stay Cable System.