



■ Bridges



Reference Details:

Owner Maine Department of Transportation, USA +++
General Contractor Joint Venture consisting of Cianbro and Reed & Reed, USA +++
Engineer Figg Bridge Engineers, Inc., Tallahassee, Florida, USA

DSI Unit DSI USA, BU Post-Tensioning, USA
DSI Scope Development and technical assistance; supply of 80 total DYNA Grip® Stay Cables with epoxy-coated strands, development of a pedestal support system for the installation of the cradles into the pylons, installation of HDPE ducts, delivery of 4 form travellers



New generation of stay-cable bridges incorporating DSI expertise

"Penobscot Narrows Bridge and Observatory Tower", Bucksport, Maine, USA

Proactive and ground-breaking methods were used for this new staycable bridge opened to traffic in autumn 2006 which will raise the standards for future stay-cable bridges around the world.

The new 646 m long bridge, which has a main span of 354 m and two 128 m high pylons, replaces the previous, very busy 74-year old Waldo Hancock Bridge.

The design and innovative techniques of the new stay-cable bridge were significantly influenced by the owner's particular emphasis on durability (planned service life of the bridge > 100 years) and easy maintenance.

As a result, with the involvement of DSI USA, the following protection systems were combined for the very first time:

- DYNA Grip® Stay Cable anchorages with Epoxy-coated Strands,
- HDPE ducts,
- nitrogen gas protection system,
- DYNA Force Monitoring System.

To enhance the aesthetics of the bridge, the new "cradle system" developed by Figg Bridge Engineers, Inc. was used. The ASCE - American Society of Civil Engineers - gave the Pankow Award to the "cradle system" in April 2007.

In the new "cradle system", a continuous cable stay runs from the bridge deck, through the cradle in the pylon and back down to the bridge deck. Within the curved portion of the stay, each individual strand of the cable is contained in its own protective tube. By eliminating cable stay anchors formerly required in the pylon, the pylon can be given a more slender and aesthetically pleasing shape.

The DYNA Grip® Stay Cables consist of 61 to 73x0.6" epoxy-coated strands encased in a common sheathing. To protect the stay cables on a permanent basis, DSI developed a system which at the same time allows permanent, easy monitoring and is resistant against the extreme temperature fluctuations in that region.

In this system, DYNA Grip® Stay Cables were inserted into a hermetically sealed HDPE duct and dried with warm air. Subsequently, pure nitrogen was pumped into the HDPE duct, which eliminated the presence of potentially corrosive elements such as oxygen, chlorides and humidity. Each stay includes a small nitrogen gas reservoir that will feed pressurized gas into the cable in the event of a small leak. Gauges which record fluctuations in pressure and provide the owner with a monitoring system are connected to each stay. The sealing cap covering the strand tail at each anchorage fully encapsulates all anchorage

hardware and also incorporates a unique feature: a clear end plate which allows direct visual inspection of the anchor area.

Unique, permanently installed gauges provide data for the DYNA Force System developed by DSI with which the forces in the stay cables can be monitored continuously and cost-efficiently. The DYNA Force System is robust, requires no maintenance, has an accuracy of + 1% and is designed to have a similar service life as the bridge. The result of the successful cooperation between developers, planners and designers and the Maine Department of Transportation's enthusiasm for innovation is an elegant bridge that will continue to be a landmark well into the 22nd century.

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