

## North Arm Fraser River Crossing

**Location:** Vancouver, British Columbia, Canada

**Submitted by:** VStructural, LLC

**Owner:** In TransitBC

**Engineer(s):** Buckland & Taylor

**Contractor:** RSL Joint Venture

**Stay Cable Supplier:** VSL



### Overview:

The \$1-million North Arm Bridge across the Fraser River in Vancouver, British Columbia, Canada, marks several firsts for bridge design and construction in North America. Most notably, the North Arm Bridge is the first extra-dosed bridge in North America. As such, the North Arm Bridge has stays tensioned up to 60 percent of the strand's capacity, compared to only 45 percent on a traditional cable-stayed bridge. By using a greater percentage of the strand's capacity and anchoring the stays to a shorter, stiffer pylon, the design is more efficient, resulting in both material and labor savings. In addition, the lower pylon in proportion to the span length provides clearance for airplanes flying into and out of the adjacent Vancouver International Airport. The bridge is of precast segmental box girder construction, with two back spans of 456 feet and a main span of 590 feet to allow for marine traffic to pass under it without obstruction.

Early in the project and prior to erection of the bridge, a comprehensive testing program was conducted to qualify the materials and to confirm the performance of the anchorage system at the higher stress levels of an extra-dosed bridge. This testing included fatigue, static strength and leak tightness tests. As an added measure, for each test, an angular deviation was introduced at the end anchorages, resulting in much more rigorous tests than customary. The system chosen also allows for strand-by-strand installation where each strand is stressed using an automatic stressing system consisting of a specialized ram, pump and computerized control box. Each successive strand in a stay cable is stressed to a specifically calculated force that is slightly less than the previous strand so that when the last strand is stressed, all strands have the same force.

Another first for North America is the use of the gensui damper. These specialized dampers, made from a highly engineered rubber, will absorb transverse vibration in the stay cables to protect them from damage. In total, the bridge contains 24 pairs of stay cable anchorages and more than 260,000 feet of stay cable strand.

With final completion expected in winter 2008, the Bridge is set to serve the many visitors coming to the 2010 Winter Olympics and to stand as a testament to innovative bridge design and construction.