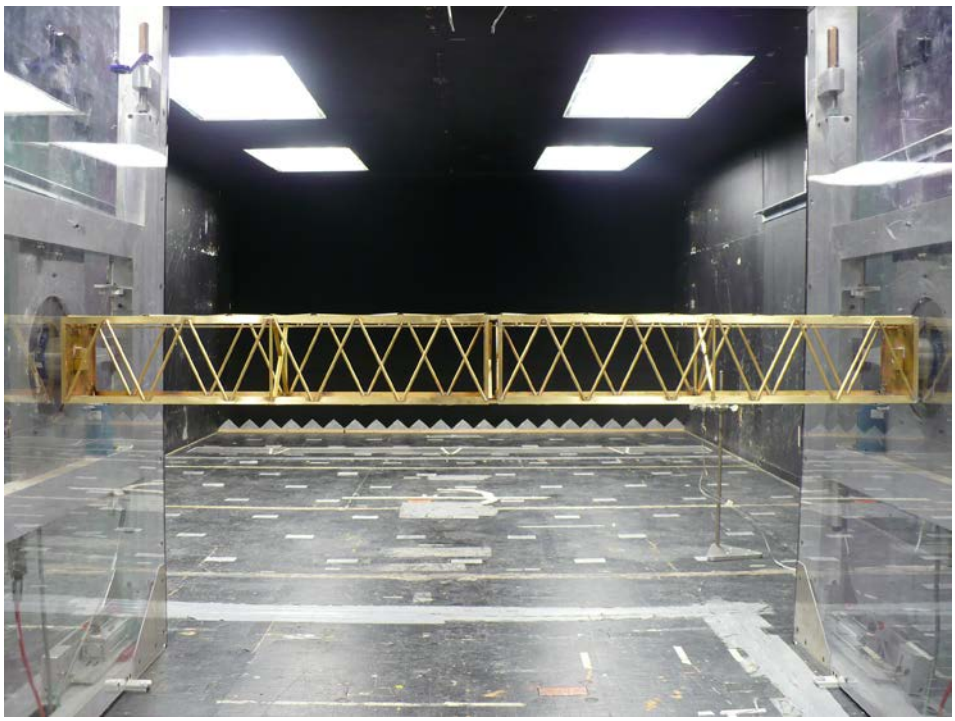
The Hoover Dam Bypass Project, Nevada, USA

Wind Engineering Study



Client	Structural Engineer	Model Scales
American Bridge, Inc.	Teng & Associates, Inc, Chicago	Section Models: 1:16 & 1:46.4
Height	**Year Tested**	
335 ft	2009	

The Project

The Hoover Dam Bypass links Nevada and Arizona over the Colorado River on US Route 93 about 1500ft downstream of the Hoover Dam. On September 15, 2006, a collapse occurred of the High-Line cableway system used for the construction of the bridge, during a moderate wind event.

The High-line cableway towers damaged in the event are about 335ft tall with open truss forms. The Nevada South Tower has a mix of circular tube and Tee sections for the diagonal members in the structure, while the other three towers utilize only Tee section members. The main truss chords are comprised of angle sections. Each tower is independently stayed using a series of wind guys at the 255 foot elevation as well as two luffing cables, a backstay and a main track cable over the gorge.

The Wind Tunnel Studies

A comprehensive wind effects study was performed, based on a static and dynamic section model investigation and a subsequent development of equivalent static loads. In order to envelope the dynamic characteristics of the tower structures used in the project, three section models were designed and fabricated: 1) with tubular diagonal members; 2) with Tees for the diagonal members, and 3) with a mix of tee and tubes appropriate for the Nevada South Tower.

Tests of the section models were performed to examine the wind-induced forces on the sections as well as to examine the likelihood of aerodynamic instability in both smooth and turbulent flow conditions. Aerodynamic derivatives of the tower section were also obtained. These results were used in the subsequent stability and buffeting analysis of the 3-dimensional tower structure.

The Boundary Layer Wind Tunnel Laboratory

Western

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