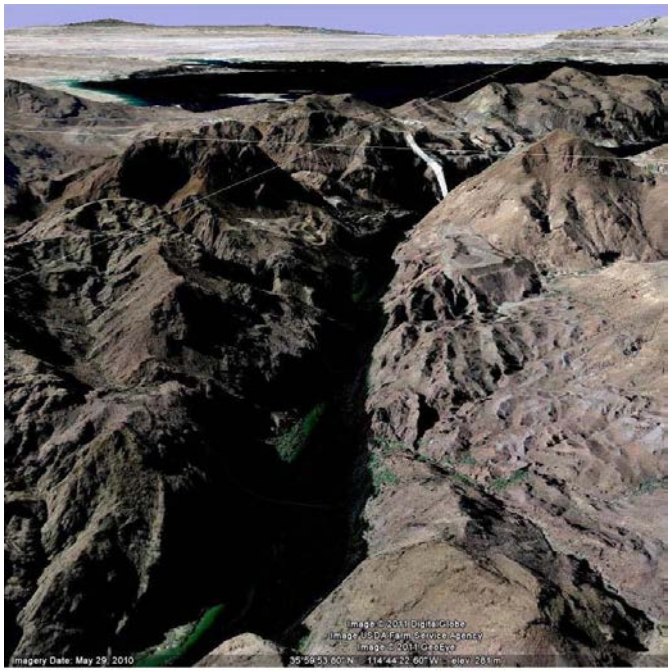
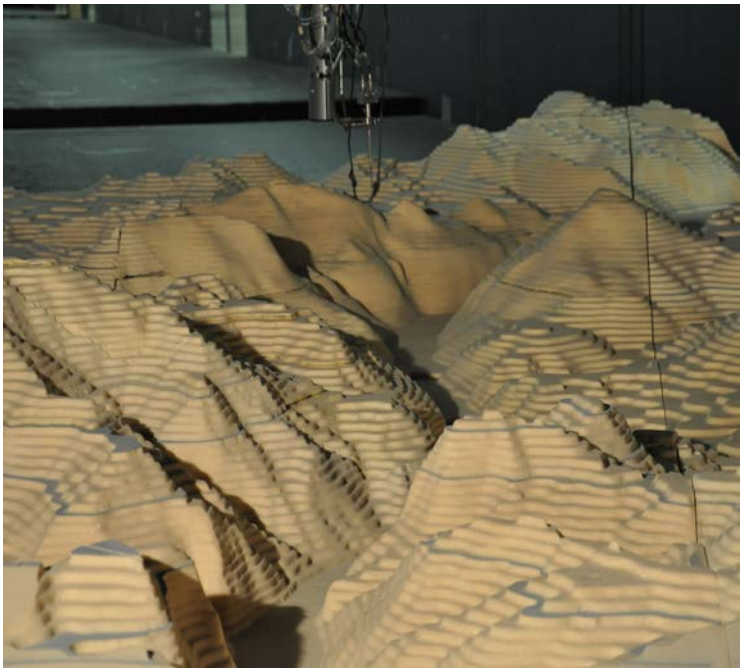
The Hoover Dam Bypass Project, Nevada, USA

Wind Engineering Study





Client	Structural Engineer	Model Scales
American Bridge, Inc.	Teng & Associates, Inc, Chicago	Topographic Model 1:1200
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 Wind Tunnel Studies

A comprehensive wind effects study was performed, including: 1) a static and dynamic section model study and a subsequent analysis of the equivalent static loads; 2) a topographic study of the wind speed and direction; 3) a Computational Fluid Dynamics study of the local wind flow characteristics; and 4) a Full Aeroelastic Model Study.

The topographic model study was performed to determine the wind characteristics at the project site. The model constructed for the project incorporates all major topographic features including the main 800ft deep gorge downstream of the Hoover Dam within an area of 2.7 by 3.6 miles. The topographic model included a greater extent of topography to the south of the dam, considered full scale observations of the main direction of the approach winds during the time of tower collapse. The model also included part of Lake Mead, the Hoover Dam and major temporary structures on the construction site.

Both a multi-component “hot-wire” anemometry and a special purpose, small 12-port pressure probe were used in measuring mean wind speed, wind direction and turbulence intensity. The probes were installed on a device ensuring the accurate positioning of the probes relative to the tower sites. Measurements were performed up to an equivalent maximum full scale height of 4500ft.

The Boundary Layer Wind Tunnel Laboratory

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