Manning Crevice Bridge, Idaho

Wind Engineering Study

Clients: Atkins North America Inc.	*Year Tested: 2015*	*Main Span Length: 300 ft*
Tower Height: 115 ft	*Deck Width: 19 ft*	*Deck Section Model Scale: 1 to 20*

The Project

The Manning Crevice Bridge has a main span of approximately 300 ft across the Salmon River in Nez Perce National Forest, Idaho County, Idaho. The proposed bridge will replace an existing bridge to connect Salmon River Road to the north and south sides of Salmon River. The bridge consists of a single truss tower on the south bank of the river, with suspension cables at 23 ft centers and hanger ropes at a 20 ft spacing supporting the deck. There are two W36 longitudinal stiffening girders at 14 ft centers, with W18 transverse floor beams below the stiffening girders that provide the connection to the suspender ropes. Transverse diaphragms and a system of "X" bracing lateral system complete the structural steel. The roadway is comprised of a 19 foot wide concrete deck slab, with an integral curb and open railing.

The section model of the Manning Crevice Bridge was studied at the Boundary Layer Wind Tunnel Laboratory of the University of Western Ontario.

The Wind Tunnel Studies

A section model of the bridge deck was designed and constructed at a geometric scale of 1:20.

The primary objectives of the section model study were to investigate the aeroelastic stability characteristics of the deck in high wind conditions and to define the wind speeds associated with possible flutter instability and / or vortex shedding induced oscillation. An aim of the investigation was also to define the dynamic response characteristics of the bridge deck to turbulent wind over a full range of wind speed. Analytical estimates of the critical wind speeds for flutter and the responses of the bridge to turbulent buffeting were also a primary focus of the investigation. A 3-D multimode analysis was employed, which integrates the findings of the experimental study with the dynamic modes and frequencies of the structure. Another major output of this analytical study is the equivalent static wind loads, which are used to verify and improve the wind load distributions used for design of the structure.

The Boundary Layer Wind Tunnel Laboratory

The Boundary Layer Wind Tunnel Laboratory
The University of Western Ontario
Faculty of Engineering, London, Ontario
Canada, N6A 5B9 Tel: (519) 661-3338 Fax: (519) 661-3339
Internet: www.blwtl.uwo.ca E-mail: info@blwtl.uwo.ca

FSBR/ 63 / April 2020 / LK
Last Printed: April 7, 2020