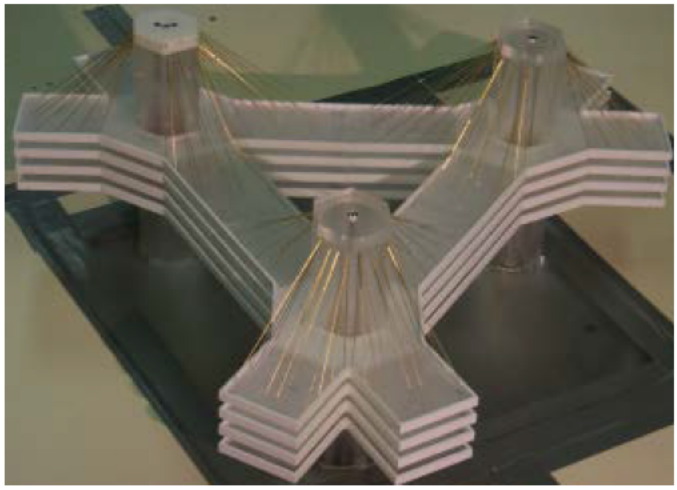
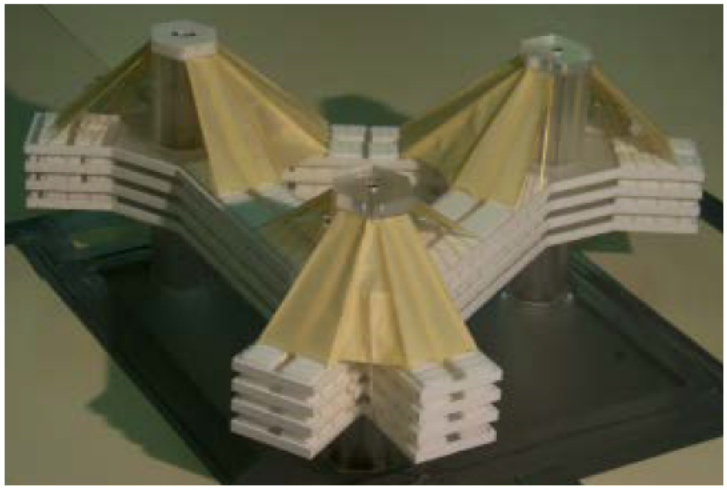
The Triangular Footbridge (Pressure Model) – Middle East

Wind Engineering Study





Client: Canadian Professional Links & Xenel Industries Ltd. of Jeddah, Saudi Arabia	*Year Tested: 2002*	*Length of Span: 230 m*
Tower Height : 110 m	*Deck Width: 32 m*	*Pressure Model Scale: 1:200*

The Project

The proposed Triangular Footbridge is a cable-stayed structure consists of four-level deck linked at three tower locations in a triangular arrangement. The three towers are identical with a basic hexagon shape and a height of 110m. The levels of top and bottom decks are 64m and 40m respectively. The distances between adjacent decks are all 8m. The tower to tower spacing is 150m and the cantilevered portion of the deck is 40m long. The typical deck width is 32m.

The Wind Tunnel Studies

Rigid models of one complete deck unit and tower were designed, constructed and instrumented for pressure measurements. Because of the essentially identical shape and symmetry of the decks and the three towers, the remaining structure of the project was not instrumented. There are 291 pressure taps installed on the deck and tower pressure model. In addition, a pair of representative pressure taps was installed on each side of the tower canopy. The pressure measurements were used in the determination of the local cladding loads as well as the overall structural loads and responses due to wind. The models were tested in turbulent boundary layer flow conditions for 36 wind angles.

The Wind Tunnel Studies (Cont.)

The proposed cable-supported structure consists of a four-level deck structure linked at three tower locations in a triangular arrangement. Two configurations of the project, with and without the deck and tower canopy, were tested.

The main objectives of the wind study of the Triangular Footbridge using a pressure model were to:

1. Provide wind climate and wind speed information at the proposed project site,

2. Determine the overall wind loads suitable for use in the preliminary design of the structural system,

3. Determine the overall structural response,

4. Determine the local peak pressures acting on the external surfaces of the project including both the decks and towers, and

5. Determine the local peak pressure differences suitable for use in the preliminary design of the tower claddings.

The Boundary Layer Wind Tunnel Laboratory

Western

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FSBR/ 83 / April 2020 / LK
Last Printed: April 16, 2020