KINGDOM CENTRE TOWER, RIYADH, KSA

Wind Engineering Study

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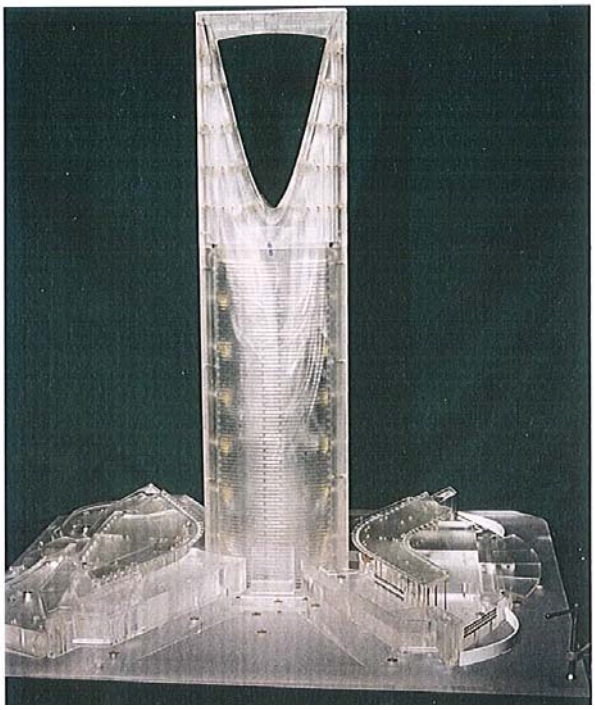

Pressure Model

Client	*Structural Engineer*	*Architect*
Kingdom Holding Company Riyadh, Saudi Arabia	Ove Arup & Partners London, England	Ellerbe Becket Minneapolis, Minnesota
Height	*Year Tested*	*Model Scale*
299 m	1997	Pressure Model 1:400

The Project

The Kingdom Tower Project consists of a 299 m tall central tower with extensive low-rise buildings to the east and west. The top 124 m of the tower consists of a sculpture that appears as a parabolic opening. The tower is approximately lens-shaped in plan.

The project is located in a block bordered by the King Fahad Expressway, Al Uroubah and Olaya Road in Riyadh.

The Wind Tunnel Studies

The wind engineering studies for the Kingdom Tower Project included studies of the wind-induced structural loads and responses of the tower, local cladding pressure loads on the project as well as pedestrian level wind conditions.

The study of overall structural loads and responses were determined for the central tower using the force balance technique.

A study of wind-induced cladding pressures was carried out for two sessions. A simplified model of the low-rise was used in the first session. Since this test indicated large local suction loads on specific areas of the low-rise, a second test was performed with a detailed model of the low-rise. The detailed pressure study had 666 pressure measurement locations distributed over the tower and the low-rise.

Pedestrian level wind speeds were determined at 28 locations on the podium and around the project site. A flow visualization study was also conducted to investigate the overall airflow characteristics and locate regions of flow separation, re-attachment and vortex formation.

The Boundary Layer Wind Tunnel Laboratory

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