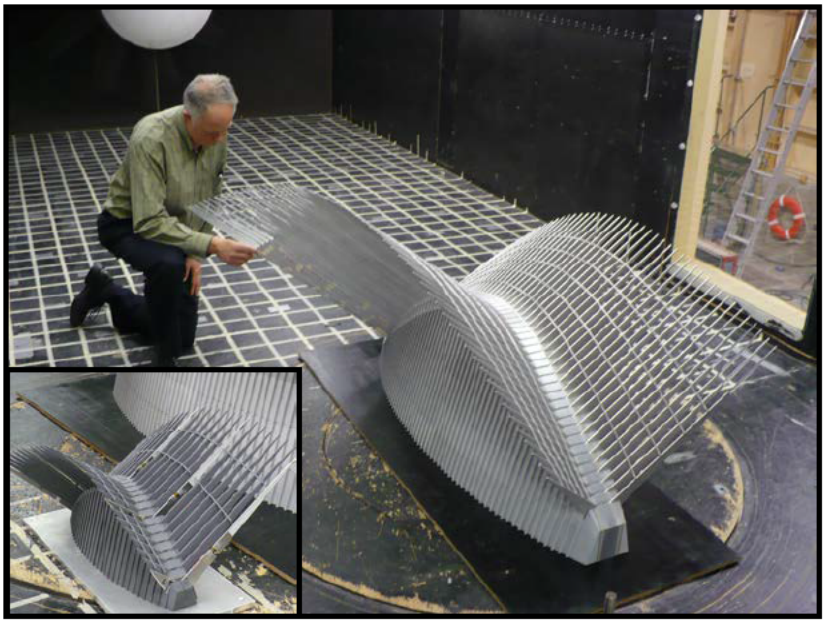
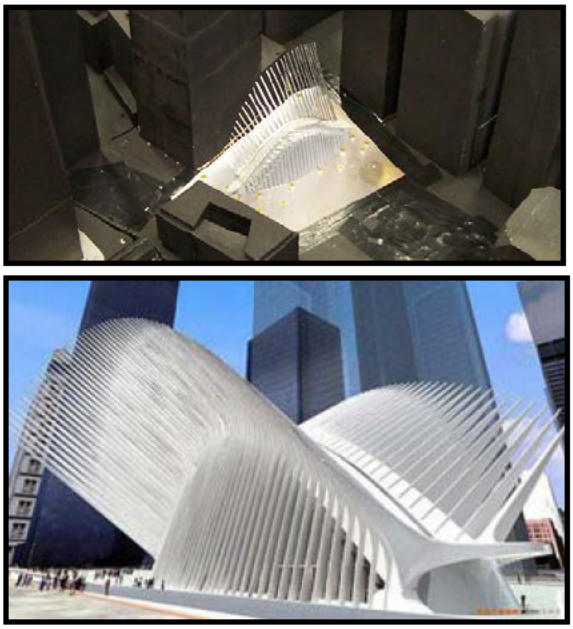
PATH Terminal, New York, NY, USA

Wind Engineering Study



1:200 (Inset) and 1:68 scale Aeroelastic Wind Tunnel Models



1:400 Pressure/Plaza Model (Top); Rendering (Below)

Client	*Architect*	*Owner*
Downtown Design Partnership	Santiago Calatrava	The Port Authority of NY & NJ
Overall Height (above ground)	*Years Tested*	*Model Scale*
Hall ~110 ft; Wings ~200 ft	2004 - 2008	1:400; 1:200; 1:68

The Project

The Permanent Port Authority Trans-Hudson (PATH) Terminal at the World Trade Center (WTC) site in Lower Manhattan will serve as a major regional transportation hub as well as a significant cultural and retail centre. An integral component of the master plan for the World Trade Center site, it will be an entryway for commuters, workers, residents and visitors - in many ways it is the heart of the trade center redevelopment project.

The aboveground curving wing-like canopies will run the length of the oblong glass-and-steel shell that is to serve as a large skylight over the terminal concourse. These wings extend over the plazas created to the northeast and southwest of the terminal building. At the highest point of its arc, one wing will reach about 200 feet into the air. The wings can pivot aside to create an opening to the sky along the main axis of the terminal.

The Wind Tunnel Studies

The wind engineering program for the PATH Terminal included the study of the wind-induced pressures on the hall structure, pedestrian level wind speeds around the site, and structural loads on the portal legs and wing-like structures. Through the progression of the wind studies, geometry updates required re-evaluation of pressures and plaza level wind speeds. Several configurations of the trade center redevelopment were considered.

A study of wind-induced cladding pressures was carried out for locations distributed over the PATH Terminal hall. Pressure results were also used to develop loads on the portals using a pressure integration technique.

Aeroelastic studies at 1:200 and 1:68 model scales were carried out on specific elements of the wing-like structure. The aeroelastic models provide direct information on the mean and dynamic wind-induced loads, as well as allowing an evaluation of the aerodynamic stability of the elements.

The Boundary Layer Wind Tunnel Laboratory

Western

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