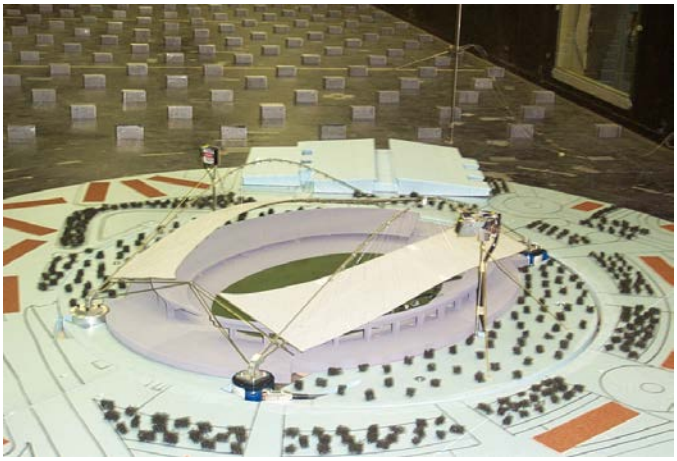
Olympic Stadium Roof, Athens, Greece

Wind Engineering Study

Site Photo



Wind Tunnel Model

Client	*Engineer*	*Architect*
Athens Olympic Committee (ATHOC)	Santiago Calatrava	Santiago Calatrava
Height	*Year Tested*	*Model Scale*
200 m	2003	1:300

The Project

The Olympic Stadium Roof is the centre piece of the infrastructure built for the 2004 Summer Olympic Games in Athens, Greece. In addition to athletic competition, it was the location of the opening and closing ceremonies of the games.

Stadium roofs of this type are susceptible to wind excitation, particularly the downstream roof which is buffeted by the turbulent wake of the upstream roof. The wing-like form of this roof reduces the buffeting action but raises concern in regard to possible aeroelastic instability.

The two portions of the roof are supported by cables suspended from two main arches rising 70m above the infield. Rotational stiffness of each roof section is achieved through a torsion tube running the length of the stadium connected to girders. The girders at either end of the stadium span the entire width and are connected directly to the foundations giving overall stability.

The Wind Tunnel Studies

A 1:300 scale pressure model of the stadium was constructed and instrumented with 400 pressure taps. The pressure measurements were integrated over the surface of the roof to determine the overall forces as well as some 30 structural responses including deflections, forces in individual members etc. The local pressures were also used in the design of the glass which made up the roof panels.

An aeroelastic model was constructed to evaluate the effect of the motion of the roof on its response. It also served as a comparison with the pressure model.

The Boundary Layer Wind Tunnel Laboratory

Western

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