



9 m wind tunnel

This facility has a proven record of adapting to a variety of unique test requirements and offers great value in the large-scale testing arena. Major renovations were recently carried out on its fan drive, balance weigh-beam controls and data acquisition systems, as well on important mechanical components, such as the cooling system and main drive shaft components.

Testing that offers superior performance gains

The ability to test in a repeatable environment with direct measurement of drag enables significant performance gains through the summation of several small improvements. Custom systems dedicated to truck testing allow the test efficiency required to cost-effectively develop models at full-scale Reynolds number. In addition, the 9 m wind tunnel's size allows the testing of real vehicles, which offers a cost-effective method for benchmarking performance without building dedicated models.

To address automotive OEM needs, the facility now has a ground simulation system. The flow represents on-road conditions more closely, increasing the fidelity of drag and lift measurements and giving confidence in underbody development activities. The availability of a 30 ft trailer on site provides a unique value proposition for commercial truck manufacturers looking for high Reynolds number, low-interference simulation.

Areas of expertise

- › 2-D and 3-D bridge dynamics
- › Aeroacoustics
- › Full and half-model aircraft testing
- › Full-scale automotive and commercial vehicles testing
- › Ground simulation
- › Static and aeroelastic wind tunnel model design and fabrication
- › Turbulence modelling
- › Wind-engineering/bluff-body aerodynamics
- › Wind tunnel testing techniques



Technical specifications

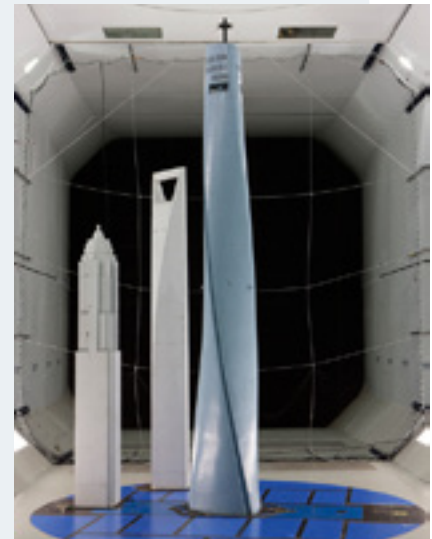
Tunnel characteristics	<ul style="list-style-type: none"> › Air-cooled 6.7 MW (9000 hp) DC motor that drives an 8-bladed fan › Size: 9.1 m high x 9.1 m wide x 24 m long (30 ft x 30 ft x 79 ft) 	<ul style="list-style-type: none"> › Maximum wind speed: 55 m/s (200 km/h) › Turntable: Diameter: 6.1 m (20 ft), Range: $\pm 360^\circ$, Precision: $\pm 0.025^\circ$
Auxiliary services	<ul style="list-style-type: none"> › Compressed air: 1,700 kPa (250 psi) at 4.5 kg/s (10 lb/s) › Boundary Layer Control System (BLCS): distributed floor boundary layer suction 	<ul style="list-style-type: none"> › Ground Effect Simulation System (GESS): 5.6 m x 1 m (18.5 ft x 3.3 ft) centre belt with independent wheel rollers and variable-height chassis supports › Road Turbulence System (RTS): 4% turbulence intensity with road-representative wind spectra
Data system and instrumentation	<ul style="list-style-type: none"> › Load Measurement: 6-component external balance, a selection of internal balances, as well as bespoke solutions for custom needs › Data acquisition system: 320 analog channels, 48 sensor channels with signal conditioning capabilities, 512 pressure channels, 16 thermocouple channels › Supplementary instrumentation: Pressure transducers, laser distance meters, strain gauges, vane anemometers, 5-hole and cobra probes, numerous boundary layer and wake survey rakes, accelerometers 	<ul style="list-style-type: none"> › Data reduction: All calculations, including aerodynamic corrections, are performed in MATLAB®, with results provided in a client-defined data output format › Flow visualization: Smoke, oil, tufts, thermography, wake pressure traverser, particle image velocimetry, pressure sensitive paint, acoustic array › Wind tunnel operation: LabVIEW™-based control of turntable yaw drive, balance weigh-beam system, tunnel speed, BLCS, traverses, and data acquisition

The 9 m wind tunnel is a large, state-of-the-art, high security facility capable of accommodating a variety of surface vehicles, ground-based structures and aerospace models.

Operated by experienced engineers and technicians, it is the facility of choice for several international original equipment manufacturers (OEMs).



Bluff body aerodynamics on surface vehicles



RWDI Shanghai building test

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