

Novel wind tunnels at the University of Birmingham: Get Blown Away in a wind tunnel at Birmingham!

The wind engineering team of the School of Civil Engineering has a reputation for not only undertaking high quality work but also for investigating challenging issues which cross a number of boundaries.

The (thunderstorm) downburst simulator

This device aims to model the winds which can arise during a thunderstorm downburst. Under these situations, a column of air descends rapidly on the ground and spreads outwards. As a result, a large ring vortex is formed which impinges on the ground. The simulator consists of nine axial flow fans which generate a circulator jet of 1m diameter. This device is the largest one in the world and as such enables the flow to be investigated at relatively fine scales.



Formation of a ring vortex

Moving model facilities

As a train moves through the air it generates a slipstream which in general induces a highly turbulent non-stationary change in the local air velocity which can have an adverse effect on the stability of passengers waiting on platforms, platform furniture and trackside workers. In order to investigate such issues fast moving models are required and the team at Birmingham have access to two such facilities:

- The rotating rail rig consists of a 3.61m diameter railway track on a frame that can be rotated at up to 118 r.p.m., which corresponds to a rail speed of 50mph. The rig was originally designed so that standard rail sections could be mounted on the frame to enable investigations into the removal of accreted organic matter using novel laser based techniques. However, it has also been successfully used to investigate the slipstream characteristics of a passing train. A 1/50th train model has been fixed to the rotating rail and allows experiments can be undertaken in a short period of time.
- The moving model rig is a similar facility and it fires model trains (and road vehicles) along a 150m straight track at speeds of up to 190mph. Firing the models along a straight track enables the effect of cross winds on slipstreams and overall forces/moments on the trains to be simulated.



The atmospheric wind tunnel

The latest edition to the wind tunnel facilities is the construction of an atmospheric wind tunnel. Once completed, this wind tunnel will have the ability to rotate the individual at different speeds, thus enabling a variety of different wind conditions to be established, for measuring, research and analysis.



The atmospheric wind tunnel

For more information on wind engineering at Birmingham, please contact [Dr Andrew Quinn](#) or [Dr Mark Sterling](#).