Railway aerodynamic tests

The TRAIN rig is one method of carrying out aerodynamic investigations on trains.

The specific advantages of the TRAIN rig are:

- Its use avoids the uncontrolled ambient conditions and expense associated with full scale tests, and model test geometry can be varied relatively quickly and cheaply
- Unlike conventional wind tunnels and CFD, it can be used to investigate transient phenomena, such as train passing, slipstreams etc
- It can be used to calibrate/validate computational models of train tunnel pressure transients
- The use of full scale train speeds ensure Mach number similarity when undertaking tests of pressure wave phenomena in tunnels

Typical examples of studies that can be performed include:

- Investigations into the effects of cross-winds on train stability
- Slipstream studies (at the trackside and on station platforms with and without cross-winds)
- Trains passing
- Effect of train shape (development of the aerodynamic design of new trains and improvement of existing trains
- Determination of train empirical factors for unsteady flow predictions in tunnels
- Exploration of methods for the alleviation of transient pressures in tunnels
- Investigation of primary wave steepening in tunnels and the development and alleviation of micro-pressure waves

Links and contact

- **Overview of the rig (/research/activity/railway/research/train-rig.aspx)**
- **For technical specifications of the rig (/research/activity/railway/research/train-specification.aspx)**
- **Details of railway aerodynamic testing (/research/activity/railway/research/train-aerodynamic.aspx)**
- **Details of other possible aerodynamics tests (/research/activity/railway/research/train-testing.aspx)**
- **Details of some previous applications (/research/activity/railway/research/train-applications.aspx)**

For further information please contact Professor Chris Baker on **c.j.baker@bham.ac.u (mailto:c.j.baker@bham.ac.uk)**

© University of Birmingham 2015