

TRAIN applications

The TRAIN (Transient Railway Aerodynamics INvestigation) Rig is a highly versatile moving model rig that can be used for a wide variety of aerodynamic investigations.



The rig has been used in the past for a range of different types of test:

- Tunnel pressure transients for a variety of types of train
- Aerodynamic design of train noses
- Pressure pulses around trains in the open air
- Ventilation flows in cross passages
- Train slipstream behaviour
- Determination of pressure loss coefficients and friction factors for trains

Some of this work is described in the following papers:

T Johnson, J Holding. “Better understanding of high speed train slipstream velocities” (PDF 661K) ([/Documents/college-eps/railway/TRAIN-understanding-slipstream-velocities.pdf](#))

P. Da Costa, A. Willaime, A. Evangelou T. Johnson, N. Parodot “Model rig measurements for SNCF new tunnel portal designs” (PDF 1.26MB) ([/Documents/college-eps/railway/TRAIN-tunnel-portal-designs.pdf](#))

T Johnson, S Dalley “1/25 Scale Moving Model Tests for the TRANSAERO Project” (PDF 484K) ([/Documents/college-eps/railway/TRAIN-TRANSAERO-project.pdf](#))

- T Johnson, G Figura-Hardy (2008)** “Comparison of full-scale and model-scale slipstream velocities”, World Congress on Rail Research Abstract (PDF 41.9K) ([/Documents/college-eps/railway/TRAIN-comparison-slipstream-velocities.pdf](#))
- T Johnson** “Measurements of the effect on pressures of a porous tunnel entrance using a moving model rig” (PDF 184K) ([/Documents/college-eps/railway/TRAIN-porous-tunnel-entrance.pdf](#))
- C J Baker, S J Dalley, T Johnson, A Quinn, N G Wright (2001)** “The slipstream and wake of a high speed train”, Proceedings of the Institution of Mechanical Engineers F Journal of Rail and Rapid Transit, 215, 83-99 (<http://pif.sagepub.com/content/215/2/83.refs>)

Current work on the rig includes:

- AEROTRAIN WP3.4 – the measurement of crosswind forces on moving vehicles
- AEROTRAIN WP4.2 - the measurement of tunnel entrance pressure gradients
- RSSB Project T750 - Review of Euronorm design requirements for trackside and overhead structures subjected to transient aerodynamic loads; Phase 2 - GB design rules: experimental model testing

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.uk (<mailto:c.j.baker@bham.ac.uk>)