

## Professor Clive Roberts

Professor Clive Roberts' work is based around finding solutions for the railway industry that improve the overall efficiency of railway systems. Clive helps to ensure that rail remains an attractive option versus other modes of transport. His work combines simulation, measurement and analysis of problems in order to develop and assess new approaches and technology.

Clive works with many organisations around the world, including: the UK's Department of Transport, Network Rail, Deutsche Bahn, Singapore Land Transit Authority and Japan Central Railways. His research helps railway companies gain a better understanding of their existing systems and the appropriateness of new approaches and technology. This work informs the specification of new train and railway system designs.

The **Railway Research Group (<http://www.railway.bham.ac.uk/>)** (RRG) at Birmingham has developed two important simulators that are used by industry around the world to understand energy consumption and power system requirements for electric trains.

The Single Train Simulator is able to generate a 'power versus time' profile for a train on a particular journey, which can be used to calculate energy consumption, journey time and peak power requirements. This information can then be used to inform strategies for reducing energy consumption, such as advising drivers on how best to drive the trains on particular routes.

For diesel trains, the group is looking at how braking energy can be stored on trains for later reuse. Simulations carried out for the Department for Transport have shown that around 10-20% of energy can be saved through the use of hybrid systems.

The RRG has recently secured funding for a Hybrid Traction Lab that has been built to allow components within railway sized hybrid power-trains to be tested under realistic conditions in conjunction with the group's simulators. Research in this area will inform system design and help to quantify and increase its effectiveness.

