

Facilities

Vehicle Dynamics Facilities

Tri-axial Tyre Dynamics rig

The tri-axial tyre dynamics rig is capable of measuring modal parameters of the rolling and non-rolling tyres such as tyre stiffness and damping in the radial, longitudinal and lateral directions. Using a SOMAT Field Computer, mode shapes of rolling tyres can also be measured. The addition of a steer facility enables the measurement of tyre cornering forces and aligning moments.

- Ongoing research includes:
- Characterisation of tyre dynamic performance using empirical models
- Finite element modelling of rolling tyre dynamics aimed specifically at:
 - investigating heat build-up in the tyre carcass during aircraft take-off and landing
 - modelling lateral forces and moments generated in vehicle manoeuvres such as cornering, traction and braking
 - developing a tyre design system for rapid design and analysis of new tyre designs



Four-post Vehicle Dynamics rig



The four-post rig provides the platform for carrying out various dynamic tests on complete vehicles in the laboratory. This facility enables the simulation of road-going conditions in the laboratory under controlled conditions by the use of remote parameter control (RPC©).

This provides both convenience and repeatability of tests. Such tests include investigation of noise and vibration problems, determination of primary bending and torsion modes and durability testing.

Vehicle Structure Dynamics Analysis

The concept of using vehicle structural dynamics performance standards for assessing the performance of vehicle body structures was developed at Birmingham University in the late 1970s. Many vehicle manufacturers now routinely apply these standards in developing prototype vehicle body structures. The Vehicle Dynamics Laboratory provides a custom-built facility for the measurement of vehicle body structural dynamic performance characteristics with provision for diagnosis of structural weaknesses where they exist. Research on the application of vehicle structural dynamics standards continues with the emphasis shifting to the diagnosis of structural problems and effective procedures for modification of structures to solve such problems.

- Characterisation of the performance of structurally damped panels and structures
- Development of diagnostic tools for identification and solution of structural problems in vehicle body structures.

