Lola Wind Tunnel and Vehicle Dynamics R&D facility

Wind Tunnel Specifications

- Maximum model scale: Typically, 50% for open wheel F1 sized race car
- Maximum model elevation: Nominal 600mm above rolling road surface
- Maximum wind speed: 65 m/sec (145 mph)
- Maximum road speed: 80 m/s (180 mph)
- Turbulence intensity: Less than 0.08%
- Average wind temperature: 20º (68ºF)
- Wind temperature stability: 1ºC during test
- Test section dimensions: 2.7m wide x 2.47m high
- Diffuser configuration: 7:1 contraction ratio
- Main fan motor power: 650KW (872hp)
- Overhead balance: 6 component with accuracy greater than 0.04% of range
- Model attitude control: Pitch, heave, roll, yaw, wheel steering
- Pressure scanning system: 128 channels
- Rolling road dimensions: 2.0m wide x 4.0m long
- Rolling road yaw angle: ± 10º

7-Post Chassis Rig Specifications

Technical Data:

- Maximum/minimum wheelbase: 4000mm/1250mm
- Maximum/minimum track: 2500mm/1000mm
- Minimum spacing of front aerodynamic loaders: 790mm
- Optimum spacing of front aerodynamic loaders: 1000mm
- Minimum spacing of aerodynamic loader and transducer: 120mm
- Minimum spacing of aerodynamic loader and wheel-pan: 120mm
- Aerodynamic loader spherical joint size: M20 x 16mm wide

Applications:

- Dynamic torsional load testing of complete car
- Evaluation of component stiffness and lifting
- Waveform sweeps for spring/damper/tyre frequency interactions
- Measurement of dynamic and static weight transfer effects
- Evaluation of pitch and heave ride height sensitivity
- Circuit data simulation of mechanical and tyre/damper set-up changes
- Circuit data simulation of aerodynamic set-up changes (in conjunction with wind tunnel)
- Development of ‘roll-out’ chassis set-ups without historical circuit data
- Replay of recorded circuit runs with enhanced data analysis

Actuator System:
The rig's seven hydraulic actuators include one for each wheel plus three additional units (two front and one rear) simulating aerodynamic loads. The maximum acceleration of each wheel actuator is 2 metres/second2 over 150 millimetres of travel. All actuators are equipped with sensors for acceleration, travel, and load.

Structural Testing:

- Car wheels positioned on individual pans with chassis restrained to surface table
- Wheel pans raised to stress suspension up to maximum expected loading
- Simple load-versus-deflection plots used to show structural integrity and performance of suspension arms plus springs, dampers, torsion bars, anti-roll bars, and bump rubbers
- Influence on corner weights throughout load range also recorded

Dynamic Testing:

- 4-post mode aerodynamic simulation via constant-rate force application using tensators
- Full 7-post mode offers fixed or variable aerodynamic load testing with aero mapping
- Track replay requires access to profession team engineers and budget