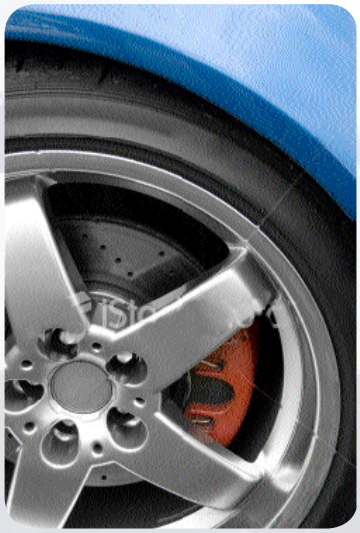
SERVOTEST

Multi Axis Testing

The World of Multi Axis Testing

With many years of experience in the Vibration and Shock testing field, Servotest has been working to develop vibration testing equipment that exceeds other manufacturers in the market place.
We offer an unbeatable range of dynamic test equipment that covers a whole spectrum of testing needs required of a modern manufacturing organisation. By offering our equipment in a number of bespoke ranges and complementary accessories, we can offer the variety of testing forces, sizes and orientations needed.
Modular power units are then configured to the working environment and used to power these machines to the standards needed. International service is reliably supplied through a series of satellite offices and partner organisations. Spare parts are stored and available locally to avoid long lead times for repairs and upgrades.
Turnkey facilities including planning, updating, installation and maintenance are available and can be individually designed to suit specific needs.
New technology is continually introduced into the hardware, instrumentation and software to keep your equipment at the forefront of the industry. At the same time the equipment complies with the various International Standards in place, including; MIL, ASTM, IEC, ISO and BS.



A world of experience…

Servotest is a World Class Test and Motion Simulation Company, with experience of operating around the globe, for multi national corporations, smaller specialist companies and Government Departments. Since the 1950's our engineers and equipment have been at the forefront of our industry. Product and Service quality is maintained by a program of continuous training and development of our people and equipment.
We operate in all of the key industry sectors for our market place, including Automotive, Marine, Civil Engineering, Aviation, Defence, Aerospace and Traction. The company holds both ISO14001 and 9001 Quality accreditation marks and is a member of many national and international trade organisations

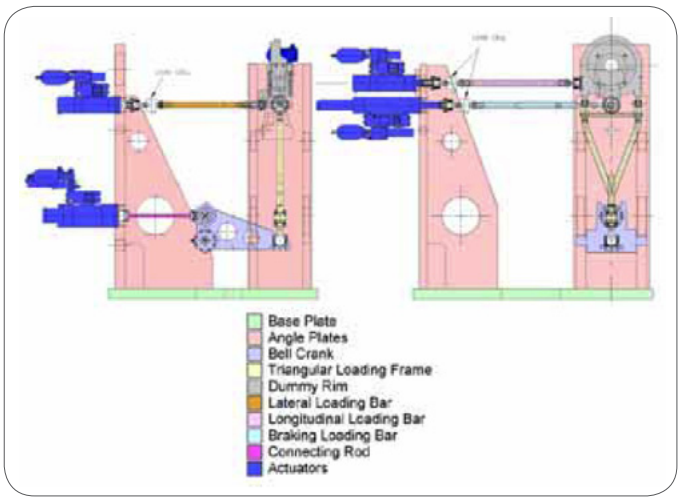
Corner Car Triaxial Test Machine

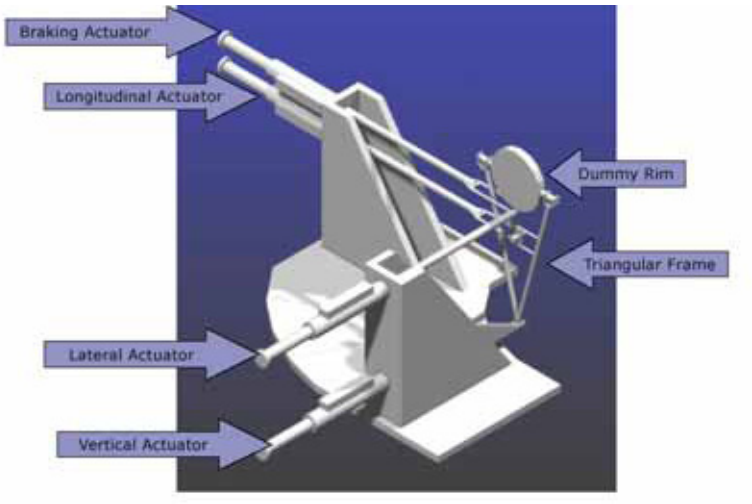
The illustration shows the layout of a corner car rig, which comprises of four actuators, as shown. The description below is best read with reference to the diagram, which shows the rig in more detail.

Each ‘corner’ rig is built on an arced base plate, housing the actuators for each plane (two for the lateral and two for the longitudinal). Each pair of actuators is retained in an angle plate to hold them in a horizontal plane, parallel to the floor.

For the lateral pair, the bottom actuator is for the vertical inputs. This device provides the vertical force by virtue of a bell crank system, transferring the horizontal force to a vertical force with a ratio of approximately 2.5:1. Thus the required 300mm stroke is given by 120mm displacement of the actuator.

The vertical force is transmitted to the dummy rim through a vertical triangular frame, with the point end of the triangle at the end of the bell crank, and the thick end attached to the dummy rim. This triangular frame provides that attachment points for the other actuators, be they at the tyre contact patch or lower, for the longitudinal inputs. The top actuator is for the lateral forces. This attaches to the dummy rim at the tyre contact patch to provide the requisite inputs. The force is transmitted through a pin-jointed arm, allowing scope for the vertical movement caused by the above actuator.





Forces simulated by corner car rig

For the longitudinal pair, the bottom actuator is that used to recreate the longitudinal forces and acts on the triangular frame that holds the vehicle in the air, through contact with the dummy rim. The actuator attaches 60% of the distance up this frame, and the frame pivots about the bell crank device described above. Again, the ratio caused by attaching the actuator below the point of required contact succeeds in reducing the requisite stroke, but increasing the requisite force. The 6:4 ratio means that only 200mm stroke is required at the actuator to produce 330mm at the spindle level. This arm is also pin jointed to allow for the vertical movement of the triangular frame. The top actuator is that used to recreate the braking forces. This attaches to the dummy rim at the tyre contact patch, as with the lateral force actuator. Again, the arm is pin jointed to allow for the vertical motion. For both this actuator and the above longitudinal force actuator, the arms are forked at one end to reduce interference with the triangular frame.

The dummy rim itself is split into two parts. This is designed to allow it to rotate about its centre when simulating the braking forces and also attach directly to the triangular frame to transmit the longitudinal force. This is achieved using a roller bearing allowing the outer section to rotate relative to the inner section.

Applications

System Usage

The Four Channel Vehicle Test Rig has a number of different uses. It can be used for durability testing of one corner of the vehicle or substructures thereof, such as the suspension. It can also be used for characterisation tests of the vehicle or substructures thereof. The Most popular use is with two corners forming an axle test rig with the axle supported on a rigid support frame or a section of the vehicle. These are fixed body tests to endurance test the suspension mounting points and suspension components.

The high performance specification of the system allows it to accurately reproduce many of the expected inputs to the vehicle under normal service conditions and thus greatly extends its usefulness in the testing environment.

Control and Monitoring

The system is controlled and monitored by the Servotest state of the art PULSAR digital control system. This controls in force or displacement the actuator channels and monitors the specimen transducers (accelerations, strains, loads etc) to provide the system response for iteration of drive files from desired response files prepared by the Customer from track test data using the powerful Servotest ICS software. The test can be sequenced using the EzFlow software to sequence drive files and data logging. The trend monitor software will ensure changes in the specimen or rig are detected and can be checked and corrected by the operator.

Details of this controller are available on separate product brochures.

PULSAR
THE SERVOTEST CONTROL SYSTEM
INCORPORATING OPTOSTAR TECHNOLOGY

Triaxial test machines as used by various racing teams

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