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Firestone Industrial Products Introduces Multi-Axis Tester for Specialized Studies on High Load Capacity Air Springs

Measures "six degrees of freedom" simulation data for rail, truck and bus applications

INDIANAPOLIS, Ind. (May 18, 2007) — Firestone Industrial Products Company, LLC (FSIP) has expanded its testing capabilities with the introduction of an innovative Multi-Axial Six Degrees of Freedom Test Machine. The device is specifically designed to provide extremely accurate testing of high-load capacity air springs for the rail market. It can also simulate road conditions and perform testing for Class 8 truck and trailer, and bus suspension components. FSIP engineers, who have been utilizing the machine for in-house lateral load testing for more than a year, have also begun use of a Remote Parameter Control function, which allows the Multi-Axis Tester to mimic durability track testing.

The unique FSIP multi-axis tester addresses a need in the market by offering both fatigue testing and quasi-static measurements of air springs. It has the capability to record durability and movement data from equipment-based vertical, longitudinal, and lateral moves, as well as roll, yaw, and pitch. FSIP's new machine can also simulate road conditions and replicate test track runs.

Multi-Axis Tester

"It's one-of-a-kind in this industry," said Steve Street, International Engineering Manager, FSIP. "Testing equipment of this type is usually limited to either fatigue or quasi-static measurement, but ours offers both, which is quite beneficial for product manufacturers requiring data in both areas."

In addition to testing components via six degrees of freedom movements, the new FSIP multi-axis tester is capable of accurately duplicating test track conditions in the laboratory.

"We can perform time history simulations from the data recorded at a test track, replicating in an extremely precise manner the conditions and timing experienced in those trials," said Street. "By mimicking the motion and forces of an industry standard durability test track, our machine makes the suspension component behave exactly as it did on the track, only in a controlled lab environment."

This function provides a time- and cost-savings benefit to manufacturers, who are able to replicate real-world usage conditions without traditional track expenses, which can include vehicle purchase, track rental, personnel fee and fuel.

"It is an economical option for manufacturers that need this kind of data, but lack financial and time resources," said Street. "Especially so for our customers."

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Use of the Multi-Axial Six Degrees of Freedom Test Machine is, like all of BFIP's developmental services, complimentary to Firestone customers.

Another benefit of the device – it allows for reduced conception-to-market development cycles.

"Our investment in this equipment sustains our position as a valuable development partner to both current and potential clients," said Street.

This initiative is also an indication of FSIP's continual commitment to leading the industry with technology, products and services.

"For more than 68 years, Firestone Industrial Products has been on the forefront of technological development, creating products and services capable of meeting extremely demanding specifications," said Street. "This new machine is part of that forward progress."

The multi-axis test machine, manufactured to FSIP's specific design and function requirements, is the result of more than two years of planning, site preparation, construction, equipment analysis and staff training.

"Site preparation was extensive, but essential to ensuring the accuracy of testing," said Street. "We conducted geographic surveys of the proposed site to ensure the physical area could accommodate and was conducive to the 1,800kg [400,000 lb.] concrete seismic mass required for this installation."

This large mass was necessary to isolate the machine, eliminating any unwanted external or environmental feedback as it goes through its movements, which can be extremely fast. Capable of 30 Hz frequency of movement, the Multi-Axial Test Machine can move parts up to 100 inches per second, exacting up to 26 g of acceleration through the action. It accommodates parts up to 660 mm [26 inches] in diameter and with a pitch angle of 27 degrees. The vertical load capability is 195 kN [44,000 lbf]. static and 240 Kn [54,000 lbf]. dynamic, and the machine's lateral load capacity is 50 kN [11,000 lbf].

The FSIP Multi-Axial Six Degrees of Freedom Test Machine is available for a specialized rail car, rail engine, Class 8 truck and trailer and bus suspension component testing services.

"We look forward to working with current and potential customers in-providing the in-depth analysis and testing capabilities this machine can provide," said Street.

About Firestone Industrial Products Company, LLC:

Firestone Industrial Products Company, LLC, a subsidiary of Bridgestone Firestone Diversified Products (BFDP), specializes in air spring manufacturing and technology with a history of more than 60 years of research and development of technologically advanced air springs. With headquarters in Indianapolis, Indiana, and six manufacturing plants located on four different continents, the company produces suspension products enhancing the driving experience for drivers of heavy truck/trailer, buses, rail vehicles, passenger cars, sport utility vehicles, light trucks, minivans, vans, and motor homes.

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