MTS Model 855 Multi-axial Wheel Fatigue System
For Testing the Durability of Passenger Car and Light Truck Wheels

System Highlights

- Enables real-world simulation of passenger car and light truck wheel failures
- Meets SAE J2562 recommended practice
- Powerful MTS controls and software offer unmatched simulation management
- Features unique, kinematically independent radial and lateral wheel loading and camber angle control
- Easy wheel access and automatic wheel loading provide streamlined setup
- Interchangeable internal drums accommodate different wheel sizes and types
- Optional spindle assembly facilitates easy upgrade from biaxial to triaxial functionality

The Model 855 Multi-axial Wheel Fatigue System incorporates new patent pending technology to deliver the most accurate, efficient and controllable wheel durability testing available today. Configured for biaxial or triaxial operation, this high-fidelity testing system is designed to subject passenger car and light truck wheels to a sequence of loading events that accurately simulate real-world road conditions, enabling engineers to gain the critical insight needed to optimize wheel designs for performance and weight. Compared to dynamic radial fatigue and dynamic cornering fatigue test systems, the multi-axial Model 855 system offers greater simulation control and a wider range of testing.

Because the Model 855 biaxial and triaxial systems are designed on the same frame and utilize the same kinematics and controls, a biaxial system is easily converted to a triaxial system by installing an optional spindle with drive torque and vehicular brake assembly. This modification expands the system’s functionality, enabling it to evaluate additional inputs that affect wheel design. In addition to real-world simulation of wheel failures, a triaxial system can apply and measure both brake torque and drive torque to the wheel, and simulate lug nut loosening phenomena by incorporating actual components specified by the customer – hub, brake, wheel, etc. – into the durability test.

To simulate the loading of the wheel with high fidelity the Model 855 system uses a tire to transfer forces from the drum to the wheel. Radial wheel loading is achieved by forcing the tire against the inside of the system’s rotating drum. Lateral loading of the wheel occurs when the rotating tire is forced into the drum’s contoured shoulder. Some force/moment relationships created
by loading the tire through the sidewall, however, are different than those that occur at an actual tire-road contact patch. To compensate for this difference the Model 855 system also controls wheel camber (tilt) angle. Adding the camber angle to the tire/wheel during testing recreates the proper force/moment relationships, resulting in an accurate reproduction of wheel stresses and strains that occur during actual driving events. The amount of camber angle required for each radial and lateral load pair is calculated prior to testing during the automatic mapping process. Because the radial and lateral loads and camber angle are controlled by kinematically independent mechanisms, the camber pivot point is always about the tire patch center. The Model 855 system provides lateral, radial and camber control with a frequency response of 0.5 Hz.

The Model 855 system is based on a self-reacting frame assembly that requires no special foundation. Lateral loads are induced through the lateral motion of the rotating drum powered by a hydraulic actuator. Linear slides provide smooth, trouble free, linear drum motion. Radial loads are induced through the rotating drum by a hydraulic actuator and a hydraulic motor controls camber angle. The system’s drum typically rotates at up to 800 RPM with a passenger car drum. Using a rotating internal drum with a contoured shoulder to simulate lateral loads effectively maximizes tire life, resulting in more economical testing when compared to systems that develop loads at the tire contact patch. In the biaxial configuration, an active supply of air is available to the tire/wheel assembly during testing to study the effects of tire inflation changes on wheel performance.

The system is designed to lend easy access to the test wheel and features interchangeable drums to accommodate different wheel sizes and types, such as mini-spare, passenger car and light truck.

The Model 855 system employs a flexible performance control system featuring an MTS digital controller and standard software. This control system provides a user with unmatched control of automated wheel test sequences and powerful data acquisition capabilities. Users can control tests through a computer interface, selecting simple test sequences one-by-one, or easily setting up and running long and complex tests. Prompting messages, option selection menus and dialog screens make test setup and execution straight-forward. Once a test sequence is initiated, the system automatically loads the wheel into the drum and applies the specified radial loads, lateral loads, camber angles, speed and revolutions as defined in the speed files and configuration parameters. The system then runs the test, while monitoring test condition limits, and acquires test data. Following the test, the system analyzes the test data and routes it for storage or presentation. Collected test data can be displayed using your own applications or the spreadsheet software provided with the Model 855 system. Model 855 control system functionality includes:

» Simple, flexible test creation and editing
» Automated Tire mapping
» Matrix and speed file operations
» Durability testing Matrix and speed definition
» Post-test data display/easy data transfer and reporting
» Works with conventional computer spreadsheets

For More Information
Contact your local MTS sales engineer or call MTS at 1-800-328-2255 or 1-952-937-4000.