Perform Virtual Ride and Comfort Evaluations Upfront in the Design Process

OVERVIEW
MSC.Software has developed ADAMS/Car Ride 2003 with a consortium of major European automotive manufacturers, with the purpose of allowing virtual ride & comfort engineering up-front in the design process within the preferred automotive virtual prototyping environment, ADAMS/Car. With this product MSC.Software is expanding the scope of the Functional Digital Car solution to include ride and comfort testing.

ADAMS/Car Ride includes the required elements, models, and event definitions for building, testing, and post processing within the ride frequency regime. The same model database, which is used for handling can now be used for ride & comfort engineering. The interface provides the capability of swapping the mathematical description of the components (dampers, bushings, hydromounts, tires), so that the level of fidelity is suitable for the phenomenon the user wants to study.

CAPABILITIES
• Enhances the capabilities of your ADAMS/Car virtual prototype
• Library of detailed components including
  – GSE-based damper UDE
  – Frequency and amplitude dependent hydromount
  – Frequency dependent bushing
• Generic component test rig
• Standard battery of tests for ride and comfort evaluation

BENEFITS
• Perform ride and comfort evaluations upfront in the design process
• Have confidence in and further leverage your chosen solution for vehicle modeling
• Save time and reduce prototype costs
• Achieve more collaboration between dynamics and NVH teams

LIBRARY OF COMPONENTS
ADAMS/Car Ride includes several detailed component models useful for enhancing your virtual prototype in order to perform ride and comfort evaluations.

A general, GSE-based damper UDE (user-defined element) component is provided. This UDE allows you to include any detailed damper model, which has been modeled in MATLAB® Simulink® or MSC.EASY5™. Using automated code generation capabilities of for example the MathWorks Real Time Workshop it is possible to include the models into ADAMS/Car Ride. A simple example model is delivered with this module, which demonstrates how the parameters of the damper can be imported and modified in ADAMS/Car Ride.
A detailed frequency and amplitude dependent hydromount model and a frequency dependent rubber bushing model are provided. The hydromount component model is enhanced with a stand-alone identification tool, which automatically identifies the parameters of the hydromount mathematical model so that its response matches user-specified characteristics of dynamic stiffness and loss angle.

**TEST RIG AND EVENTS**

A generic component test rig is provided in order to allow the user to validate the behavior of the components independently from the complete vehicle assembly. The component test rig allows excitation of one to six input channels (three translations and three rotations), via either prescribed motions or prescribed forces. The test rig supports the automatic evaluation of a component’s dynamic stiffness and loss angle, as function of either frequency or amplitude.

Once the components are specified in detail, a full-vehicle assembly can be run through a battery of ride & comfort predefined simulation scenarios, enabling the user to estimate typical system-level NVH metrics.

The library of full-vehicle events is based on an extended four-post test rig, which supports analytical (e.g., swept sine) as well as measured (e.g., RPC format) excitation inputs. A road-roughness model is also included to generate road profiles in terms of user-specified PSD's.