DATASHEET

MD Adams/Car

Real Dynamics for Vehicle Design and Testing

MD Adams/Car

With MD Adams/Car, engineering teams can quickly build and test functional virtual prototypes of complete vehicles and vehicle subsystems. This helps cut time, cost, and risk in vehicle development and improves the quality of the new vehicle designs. Working in the MD Adams/Car simulation environment, automotive engineering teams can exercise their vehicle designs under various road conditions, performing the same tests they normally run in a test lab or on a test track, but in a fraction of the time.

Business Value

- **Improve Engineering Productivity:** Enable efficient communication between various groups of expertise, reduce your dependency on disconnected point solutions, and improve analyst efficiency.
- **Accelerate Time-To-Market:** Gain faster, better insight into overall system design performance.
- **Reduce Manufacturing Costs:** Accurately predict and correct the design behavior much earlier in the design cycle. Achieve an optimal design by analyzing multiple design variations faster.
- **Achieve Lower Warranty Costs:** Predict system-level functional performance, and accurately assess lifecycle service (safety, fatigue, durability). Reduce risk by having better information at every state of vehicle design and development.
- **Drive Innovation:** Explore several design concepts quickly and efficiently.

MD Adams/Car Package Modules

MD Adams/Car has been packaged with a suite of modules as described below.

MD Adams/3D Road

MD Adams/3D Road lets you simulate many types of three-dimensional smooth roads such as highways, race tracks, test tracks, and parking structures. MD Adams/3D Road helps you study various effects of smooth roads, such as bank angle and slope, on vehicle dynamics. You can simulate particular roads including your company's own closed-circuit test track.

MD Adams/Car Ride

MD Adams/Car Ride is an extension of the MD Adams/Car capabilities to allow virtual ride and comfort engineering up-front in the vehicle design process. MD 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 used for handling can now be user for ride and comfort engineering.

MD Adams/Car Vehicle Dynamics

With MD Adams/Car, you can perform various analyses on the vehicle to test the design of the different subsystems and see how they influence the overall vehicle dynamics. You can also examine the influence of component modifications, including changes in spring rates, damper rates, bushing rates, and anti-roll bar rates, on the vehicle dynamics. This module includes standard testing procedures for cornering, courses, steering, quasi-static, and straight-line analyses.

MD Adams/Car Suspension Design

With MD Adams/Car, you can learn how a suspension controls the wheel motion and transmits load from the wheels to the chassis. Build into the Suspension Template are standard suspension analyses to predict roll and vertical forces, static loads, steering characteristics, and wheel travel.

Capabilities

- Analysis of suspension, steering and full-vehicle maneuvers
- Shareable Test Rig templates
- Driving Machine to set proper gains for closed-loop controllers
- General actuation analysis
- Analytical description for roads – create internally or import data
- Closed course path optimization
- Easy integration of control systems into vehicle models
- Test data fitting tools to easily generate model parameters from test data for isolators and tires
- Creation or import of component geometry in wireframe or 3D solids
- Extensive library of joints and constraints to define part connectivity
- Model refinement with part flexibility, automatic control systems, joint friction and slip, hydraulic and pneumatic actuators, and parametric design relationships
- Comprehensive linear and nonlinear results for complex, large-motion designs
- Comprehensive and easy to use contact capabilities supporting 2D and 3D contact between any combination of modal flexible bodies and rigid body geometry

High Performance Computing (HPC)

- 64-bit support on Windows and Linux platforms
- Parallel processing support for MD Adams/Tire results
- Shared Memory Parallel solver

MSC Software

MD Adams/SmartDriver

The MD Adams/SmartDriver is an advanced driver simulator that can bring a vehicle design to its dynamics limits or user specified targets, such as a percentage of maximum longitudinal acceleration. Using MD Adams/SmartDriver, vehicle handling, durability, and ride performance can be improved with minimal set-up.

MD Adams/Driveline

MD Adams/Driveline provides engineers and analysts with specialized tools for modeling and simulating driveline components and studying the dynamic behavior of the entire driveline during different operating conditions. It can also be used to explore the interaction between the driveline and chassis components, such as suspensions, steering system, brakes, and the vehicle body.

MD Adams/Car Truck

MD Adams/Car Truck provides component, suspension and full-vehicle templates specifically for heavy truck and bus engineers. Elements like a steerable solid-axle suspension, dual wheels and airbags are included in the database. MD Adams/Car Truck models can be run through the complete battery of MD Adams/Car suspension tests as well as full-vehicle maneuvers bolstered by special tuning of the MD Adams SmartDriver for heavy vehicles.

MD Adams/Chassis

MD Adams/Chassis enables simulation of full vehicle events (such as steady state drift, throttle off in turn, and constant radius) and half vehicle events including dynamic load case and static vehicle characteristics. The power of MD Adams/Chassis is further enhanced when used with MD Adams/Insight to perform systematic experiments on the vehicle model. The effect of multiple design variations can be studies, the design can be optimized, and robustness issues can be addressed effectively.

MD Adams/Tire FTire

MD Adams/Tire FTire software is an optional module that can be used to add tires to your mechanical model and to simulate maneuvers such as braking, steering, acceleration, free-rolling, or skidding. It lets you model the forces and torques that act on a tire as it moves over roadways or irregular terrain. You can use MD Adams/Tire to model tires for either vehicle-handling, ride and comfort, and vehicle durability analyses.

MD Adams/Car Package Includes:

- MD Adams/Car 3D Road
- MD Adams/Car Ride
- MD Adams/Car Vehicle Dynamics
- MD Adams/Car Suspension Design
- MD Adams/SmartDriver
- MD Adams/Driveline
- MD Adams/Car Truck
- MD Adams/Chassis

Optional Module:

- MD Adams/Tire FTire

Prerequisites:

- MD Adams Basic Package

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