

I-DEAS® Mechanism Simulation™ offers the same capabilities as I-DEAS Mechanism Design™, with several enhancements to make it more useful for the engineering analyst. In addition to offering kinematic and dynamic solves, you can also:

- Define loads as forces and torques.
- Define bushings and field matrix spring dampers.
- Recover and plot forces and torques
- Interrogate results directly from I-DEAS using ADAMS/Postprocessor (now delivered with I-DEAS Mechanism Simulation).
- Transfer joint and body loads directly to an I-DEAS Simulation finite element model.
- Create an .mnf (modal neutral file) from I-DEAS Model Solution™ (requires only an I-DEAS Model Solution license).

I-DEAS Mechanism Simulation is available only in the I-DEAS Simulation task.

Rigid Body Dynamics

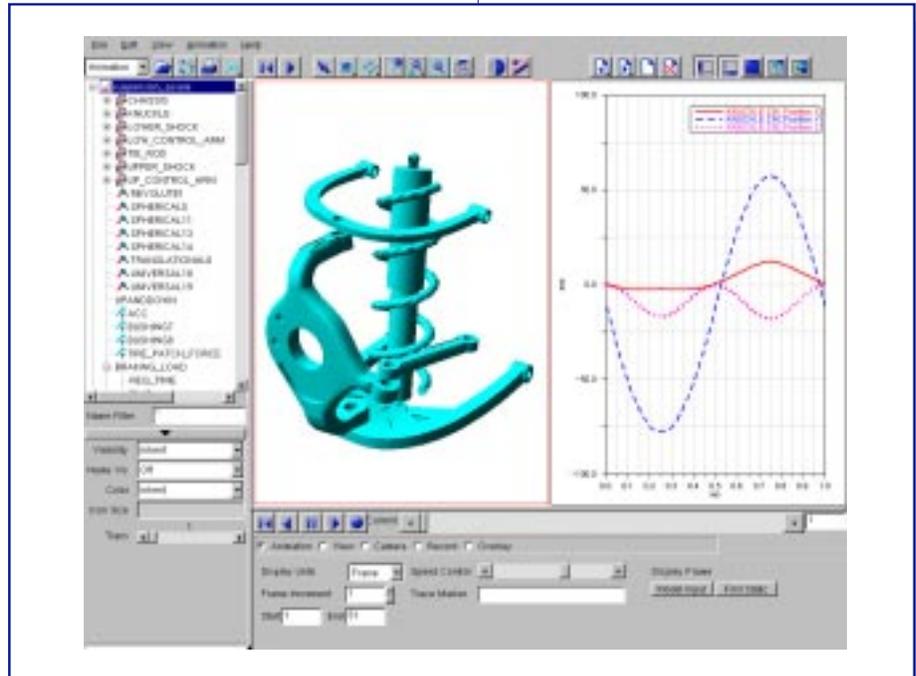
I-DEAS Mechanism Simulation simulates the behavior of under-constrained mechanical systems whose motion is affected by forces (actuators, impacts, gravity loads, etc.). The physical characteristics of your mechanical system that can be simulated with this software include:

- Force-driven, motion-transient behavior. With Mechanism Simulation you can drive your product concept through its work cycle by applying forces and/or torques to a system at rest. During the simulation you will observe the transition to the equilibrium speed.
- Force-driven motion - force balance. I-DEAS Motion Simulation lets you define springs and/or external loads to your mechanical system, then watch the system move during the simulation to achieve a force balance.
- Contact/impact modeling with sphere-sphere and sphere-plane. You can see the effect of part collisions on the behavior of your mechanical system. Collisions can be modeled between related parts in a mechanism or between a part in free fall and the ground (as in a drop test).

- Gravity effects. You can simulate the behavior of your mechanical system as it moves from its initial position to a static equilibrium based upon gravity loads.
- Flexible connections modeling using bushings. With I-DEAS Mechanism Design you can only connect parts with rigid connectors or spring dampers. I-DEAS Mechanism Simulation lets you use bushings. You can vary the bushing stiffness in various directions to mimic certain joint types. You can connect two parts with several bushings and get an accurate distribution of loads between the bushings. Your mechanism will align itself as needed to reach a force balance.
- Rigid body forces, torques, velocities, and accelerations can be recovered and applied as a load in a finite element analysis.

Load Transfer

Once an I-DEAS Motion Simulation solve is completed, the resulting forces, torques, gravity, velocities and accelerations can be automatically transferred to an I-DEAS Simulation finite element model. A user simply picks a rigid body in the mechanism, then selects a time step. Nodes are created at marker locations and joint loads are transformed into finite element loads applied at the nodes. Gravity, velocities and accelerations are transferred to the finite element load set. Optionally, the joint loads can be saved in a time history ADF (Associated Data File) for use in I-DEAS Durability or I-DEAS Response Analysis.



I-DEAS Mechanism Simulation offers advanced mechanical system simulation capabilities.

Reduce Dependence on Physical Testing

With ADAMS capabilities, an engineering team can quickly perform virtual tests of a variety of design variations before a physical prototype exists. What used to take weeks or months to physically model and test can now be done in just hours with ADAMS technology in the I-DEAS environment. The benefits of physical testing, including performance determination, interference checking, and load history determination, are available to I-DEAS Mechanism Design and I-DEAS Simulation users.

Performance Tuning

I-DEAS Response Analysis and use of ADAMS requests provide post-solution methods for calculating relative position, velocity, forces, and acceleration between any two arbitrary rigid bodies, based on results of your solution.

The ADAMS/Postprocessor is delivered with I-DEAS Mechanism Simulation, allowing you investigate model results in greater depth. I-DEAS Mechanism Simulation results and geometry are automatically transferred to ADAMS/Postprocessor. Simultaneous display of assembly configurations and function plots are possible using the ADAMS/Postprocessor tool.

Manufacturers who use this technology have not only reduced the time and cost of new product development, they have also accelerated innovation and improved the quality of their mechanical designs.

Scalability

Both I-DEAS Mechanism Design and I-DEAS Motion Simulation are based upon ADAMS simulation technology, used to build and test virtual prototypes. When you need to raise the sophistication of your system models even further, you can transfer your mechanism to the ADAMS Full Simulation Package. Some of the additional capabilities of the ADAMS suite of software include:

- Flexible components. You can include flexible bodies in your mechanical system simulation and assess the effect of flexibility upon system behavior. Flexible bodies for use in ADAMS may be derived from I-DEAS FEM models.
- Control systems. Control system models can be combined with the mechanical system model to simulate the combined, nonlinear, closed-loop behavior of the product.
- Custom model elements. Sophisticated model elements can be defined in special software modules and linked into the core simulation package.
- Design of experiments. Special techniques guide you in running a set of simulations that help you understand the design sensitivities of your model.
- Optimization. You can optimize a set of mechanical system parameters to obtain the best performance within specified constraints.
- Industry-specific modules. Special modules such as ADAMS/Car, ADAMS/Rail, and ADAMS/Engine simplify the process of developing and testing virtual prototypes.

Mechanism Simulation Solution

To achieve the full benefits of I-DEAS Mechanism Simulation, your organization should adopt a motion simulation strategy where designers, engineers, and analysts take specific roles and use specific software tools. The implementation services groups of SDRC and Mechanical Dynamics, Inc. can help your organization develop a motion simulation strategy that will maximize the value of these capabilities in the I-DEAS CAD/CAM/CAE environment.

Prerequisites

Master FEM
-or-
I-DEAS Artisan™ Package
-or-
I-DEAS Product Design Package
-or-
Core Master Modeler
-and-
Assembly Set

For More Information

For more information, contact your local SDRC representative or call 1-800-848-7372.