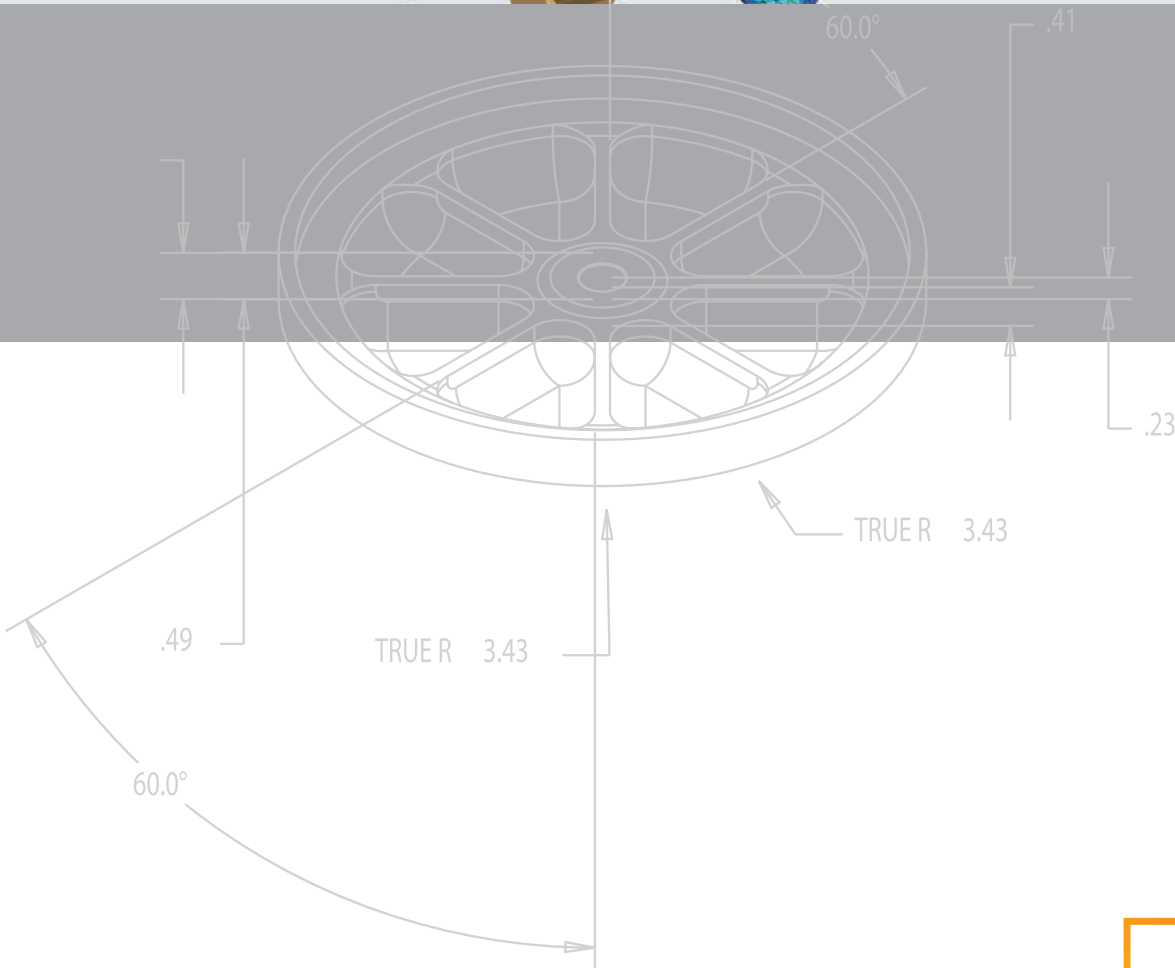
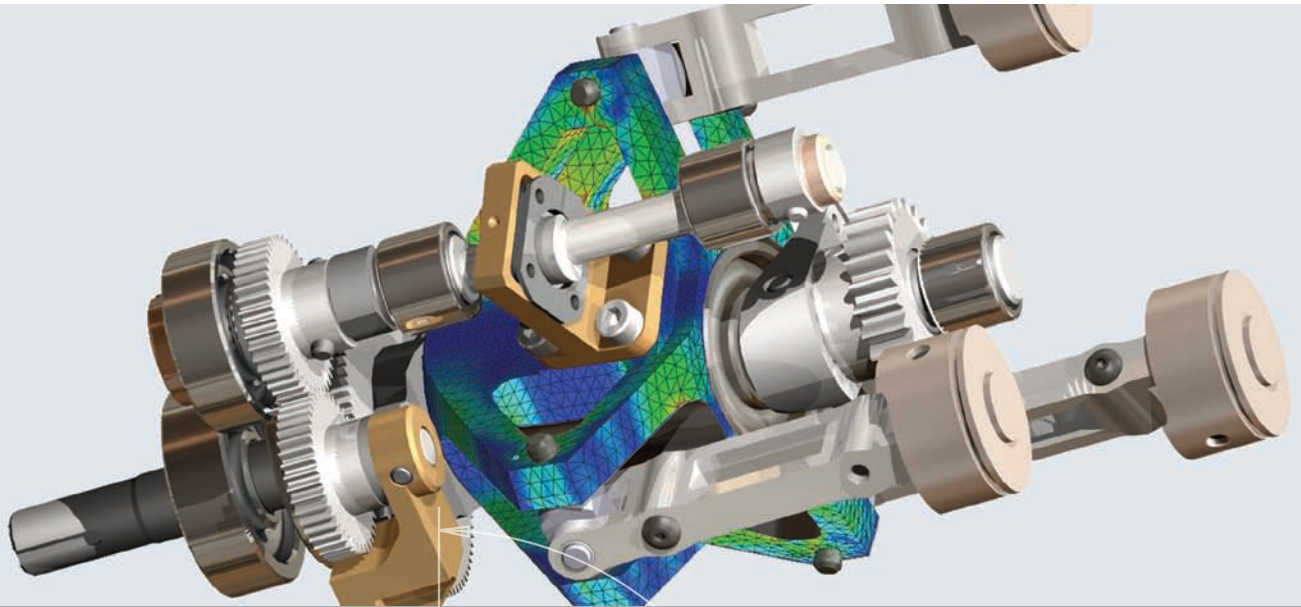


SolidWorks Simulation Software

DESIGN BETTER PRODUCTS



Axial Piston Engine,
Innovation Engineering, Inc.

SolidWorks Flow Simulation

EASILY SIMULATE LIQUID AND GAS FLOW WITHIN SOLIDWORKS

SolidWorks® Flow Simulation provides unparalleled ease of use for simulating fluid flow and thermal behavior in and around your SolidWorks designs.

SolidWorks Flow Simulation is a powerful computational fluid dynamics (CFD) tool that enables you to quickly and easily simulate fluid flow, heat transfer, and fluid forces when these interactions are critical to the success of your design.

Access a broad range of physical models and capabilities to:

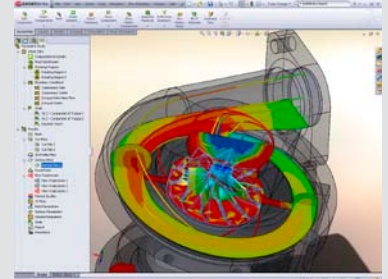
- Examine flow through your components, over your components, or a combination of internal and external flow.
- Couple flow with thermal analysis, simultaneously including natural and forced convection, conduction, and radiation.
- Let SolidWorks Flow Simulation find the best dimensions or inlet and outlet conditions that satisfy goals such as force, pressure drop, or velocity.
- Include sophisticated effects like porosity, cavitation, and humidity.
- Solve flow problems involving non-Newtonian fluids, such as blood and plastic.
- Use a rotating-coordinate frame to simulate the rotation of impellers and to discover how fluid moves through such systems.

Leverage an unlimited combination of real-world operating conditions:

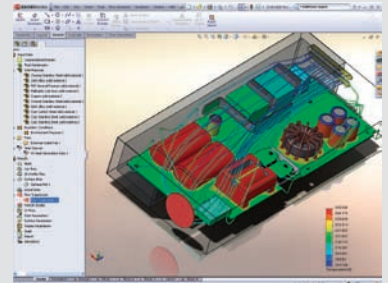
- Apply inlet velocities, pressures, mass- or volume-flow rates, and fans. If multiple fluids are involved, you can apply mass or volume fraction.
- Simulate temperature changes by applying a surface or volume heat source, specifying natural or forced convection, or accounting for solar radiation.
- Use heat sink emulators to study their effects on electronic components.
- Track the behavior of particles suspended in a flow.
- Apply time- and coordinate-dependent boundary conditions and heat sources.

Gain valuable insights with powerful and intuitive results visualization tools:

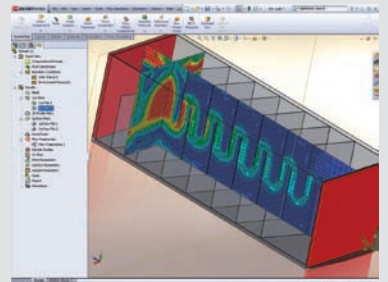
- Utilize section plots to study the distribution of result quantities, including velocity, pressure, vorticity, temperature, and mass fraction.
- Measure results at any location with the Point Parameter tool.
- Graph result variation along any SolidWorks sketch.
- List results and automatically export data to Microsoft® Excel.
- Examine the flow trajectory inside or around the model with animated bands, 3D arrows, pipes, or spheres.



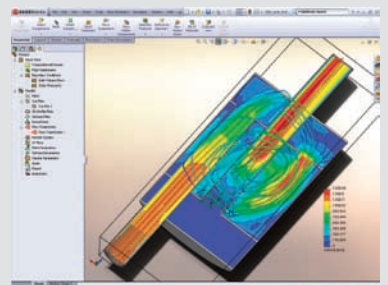
Simulate complex flow problems such as this turbo charger with rotating parts.



Simulate electronic design with multiphysics for fluid flow as well as thermal analysis.



View results for velocities, temperatures, and pressures and probe the section for results at any location.



Visualize complex flow results such as flow trajectories, section plots, and surface plot data.

SolidWorks Simulation Professional

PERFORM VIRTUAL TESTING AND ANALYSIS OF PARTS AND ASSEMBLIES

SolidWorks Simulation Professional provides powerful tools that expand the capabilities of SolidWorks Simulation, so you can investigate more tests and operating environments on both parts and assemblies.

In addition to the design simulation functionality contained in SolidWorks Simulation, SolidWorks Simulation Professional provides tools to complete your virtual testing environment and optimize your validated designs.

Study and optimize assemblies of all sizes:

- Evaluate forces and stresses between contacting parts, including friction.
- Bond components with clearances or gaps, without modification.
- Apply bearing loads, forces, pressures, and torques.
- Use connectors, or virtual fasteners, to model bolts, pins, springs, and bearings.
- Mesh both parts and assemblies with custom meshing diagnostic tools, including mesh transitioning and local mesh controls.
- Converge to accurate solutions by letting SolidWorks automatically refine and/or coarsen the mesh as required.

Understand the effects of temperature changes on parts and assemblies:

- Study conduction, convection, and radiation heat transfer.
- Utilize isotropic, orthotropic, and temperature-dependent material properties.

Simulate vibration or buckling in your designs:

- Examine how vibrating or unstable modes can shorten equipment life and cause unexpected failures.
- Assess the effects of stiffening under external load on frequency or buckling response.

Optimize critical dimensions and conceptual design features:

- Automatically optimize designs for minimum mass or volume as well as buckling and frequency goals.
- Investigate all SolidWorks dimensions in static, thermal, frequency, or buckling analyses.
- Use Trend Tracker and Design Insight plots to drive optimal changes as you work.

Simulate drop tests using your parts or assemblies:

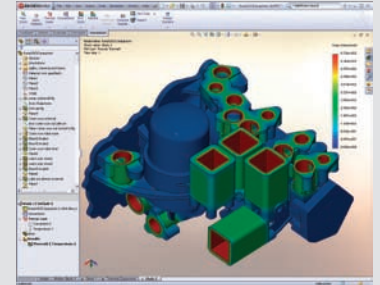
- Isolate the worst-case orientation to support physical testing.
- Observe the interactions between various parts in an assembly after impact.

Study the effects of cyclic loading on product life:

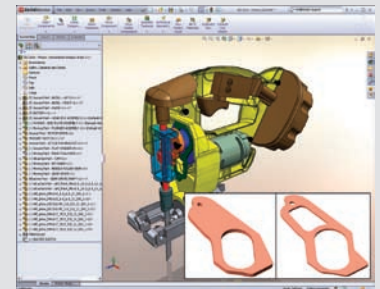
- Check a system's expected life or accumulated damage after a specified number of cycles.
- Import load history data from real physical tests to define loading events.

Investigate pressure vessel code compliance with required standards:

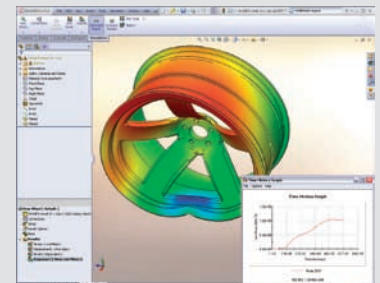
- Combine various structural and thermal loads as required by your application.
- Linearize stresses on any cross-section.



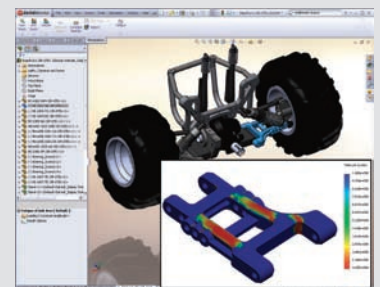
Simulate steady state and transient heat transfer including time-varying inputs.



Minimize material usage or weight of your designs using shape optimization technology.



Study stress, velocity, and acceleration on objects dropped from different heights and orientations.



Use peak loads from testing or SolidWorks Motion to estimate the life of critical components.

SolidWorks Simulation Premium

A COMPREHENSIVE SIMULATION TOOL FOR ALL DESIGN PROFESSIONALS

Simulating the real-world response of your design has never been easier. With the full-featured suite of tools in SolidWorks Simulation Premium, you can reduce the number of assumptions required in a world that is rarely linear or static.

SolidWorks Simulation Premium bolsters the depth and ease of use of SolidWorks Simulation Professional with additional capabilities, including a powerful set of tools for simulating nonlinear and dynamic response as well as composite materials. With SolidWorks Simulation Premium, you can design better products with confidence—in any environment.

Capture the effects of large displacements on your designs:

- Examine the impact of large deformations and changes to loads and restraints.
- Transition easily between linear and nonlinear simulations.
- Study nonlinear buckling and snap-through events.

Simulate products made with nonlinear materials:

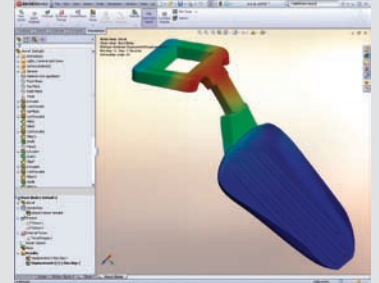
- Optimize designs with hyperelastic materials, such as rubbers, silicones, and other elastomers.
- Conduct an elasto-plastic analysis to study the onset of yield as well as plastic deformation.
- Examine creep effects and material changes with temperature.

Perform dynamic analyses of parts and assemblies:

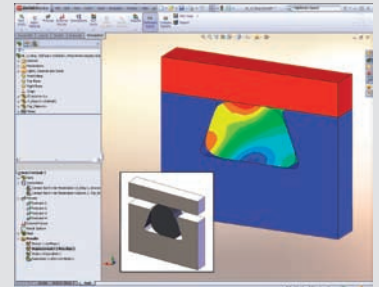
- Simulate time history loading, steady-state harmonic input, and random vibration excitations.
- Use uniform and multibase motion systems to model structures with nonuniform support excitations.
- Input excitation curves of forces in random vibration analysis.
- Study stress, displacement, velocity, and acceleration with time, as well as RMS and PSD values for stress, displacement, velocity, and acceleration.

Simulate composite materials:

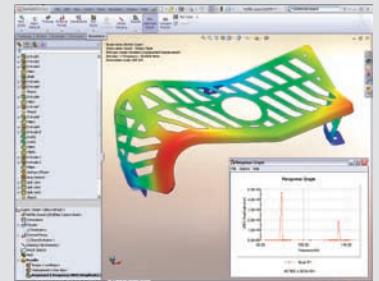
- Utilize simulation to leverage these advanced materials used in an increasing number of products, from consumer goods to advanced aerospace structures.
- Study multilayer shell bodies to examine how each layer has its own isotropic or orthotropic material properties, thickness, and orientation.
- Use the revolutionary interface to dynamically control and display ply orientation directly on your SolidWorks model.
- Use sandwich and graphite or carbon-fiber composites, including honeycomb and cellular foam.



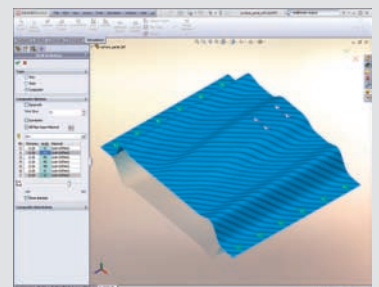
Study nonlinear problems that involve large deformations or changes to load placement or orientation.



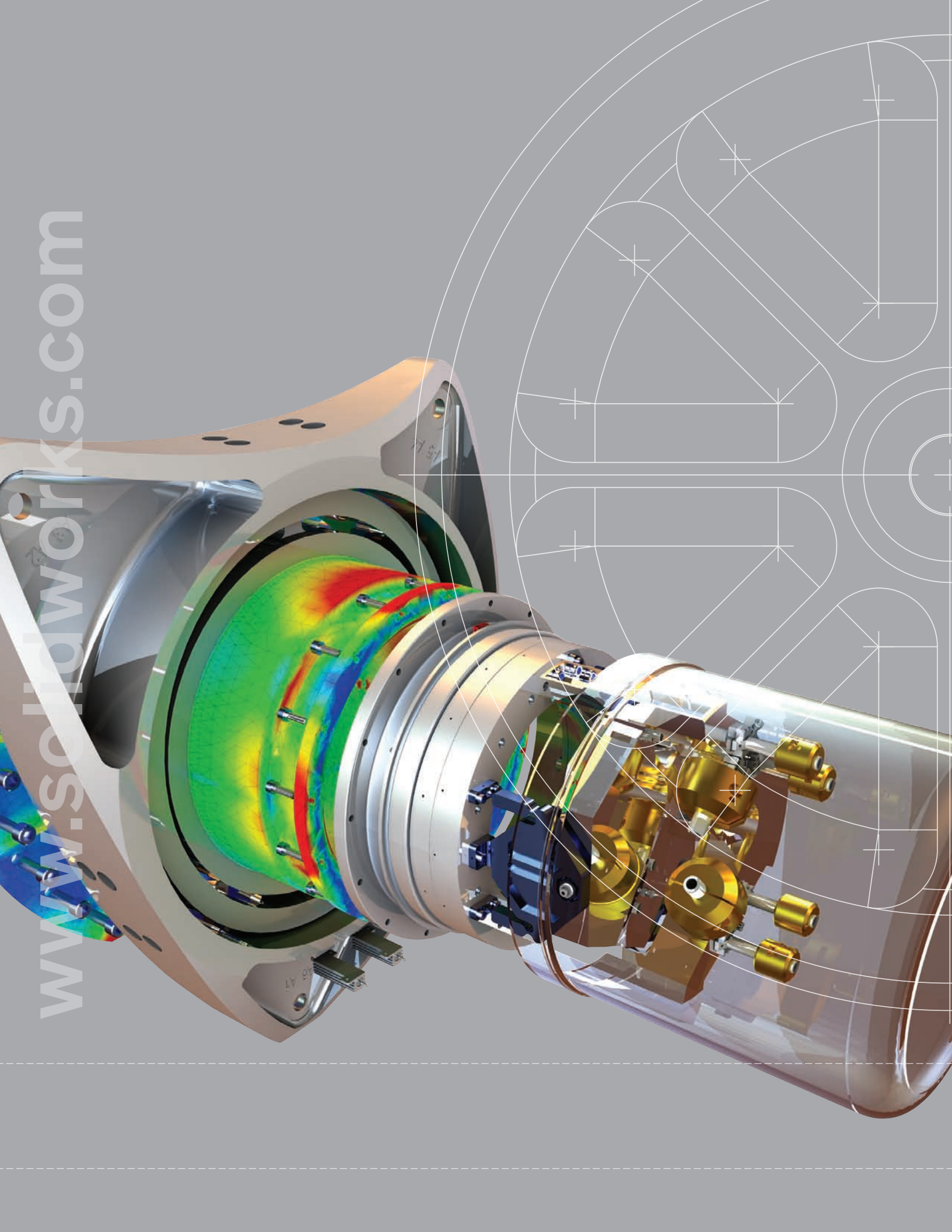
Simulate the response of elastomers such as O-rings and seals.



Plot translations versus time (dynamic response) at specified locations due to time-varying loads.



Validate the performance of composite materials including stiffness and ply failure results.



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Image courtesy of National Optical Astronomy Observatory,
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National Science Foundation



Dassault Systèmes SolidWorks Corp.
300 Baker Avenue
Concord, MA 01742 USA
Phone: 1 800 693 9000
Outside the US: +1 978 371 5011
Email: info@solidworks.com
www.solidworks.com