SOLIDWORKS **SIMULATION**

Drive market-winning innovation, without risk

ENSURE ADEQUATE
EXIT DUCT SIZING WITH
FLOW SIMULATION

CHECK RESONANCE BETWEEN
THE FAN AND THE MOTOR
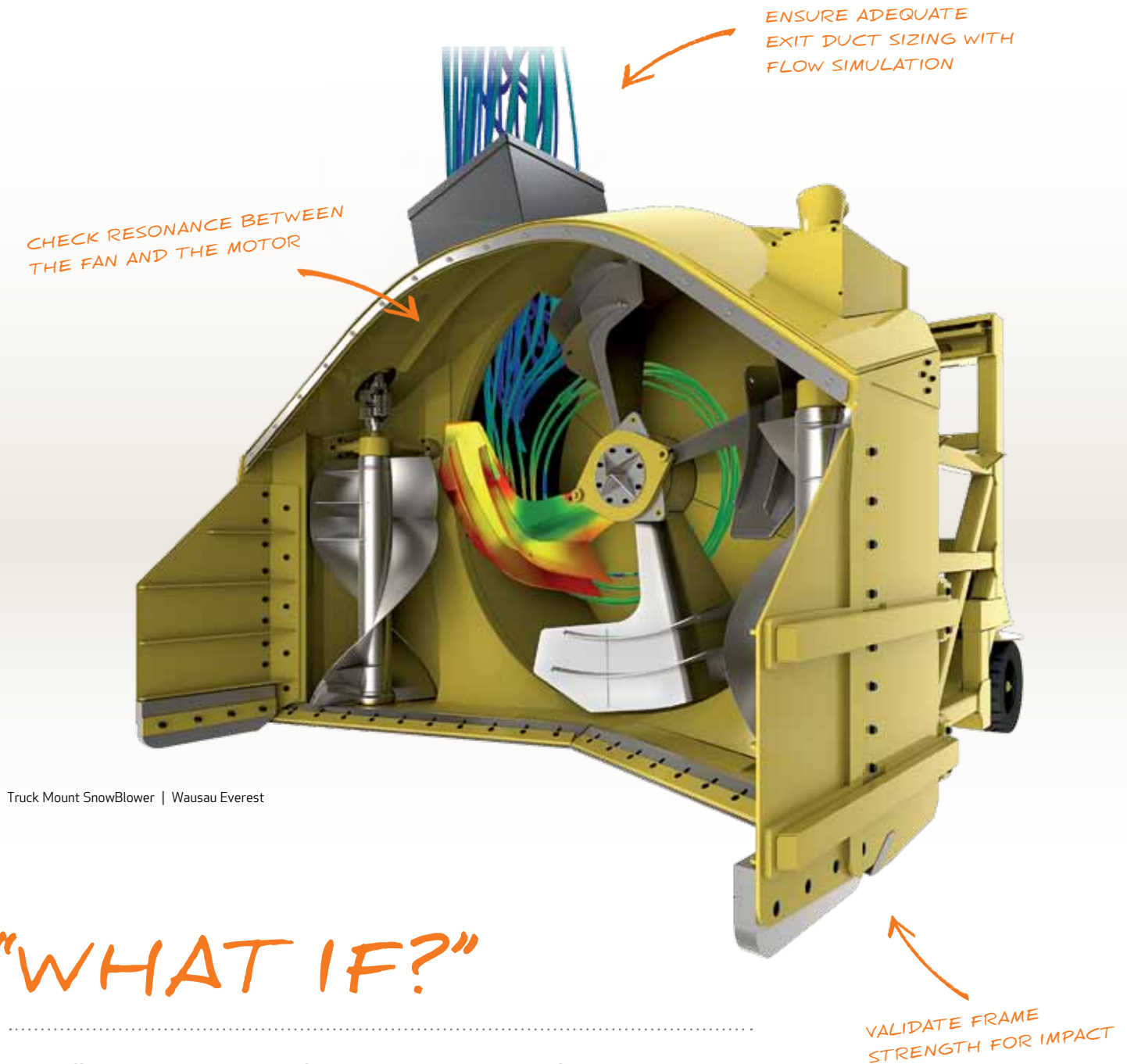
Truck Mount SnowBlower | Wausau Everest

VALIDATE FRAME
STRENGTH FOR IMPACT

"WHAT IF?"

"What if?" It's the question that fuels innovation—and with SolidWorks Simulation software, you can take the risk out of asking "what if" and replace it with an infinite workspace to virtually test your new ideas, develop new designs, and bring your products to market faster.

3S SOLIDWORKS

ADVANCED SIMULATION IS
NO LONGER JUST FOR SPECIALISTS

SolidWorks® Simulation makes it easy for every designer to ask—and answer—complex and important "what if" questions. With SolidWorks Simulation you reduce the risk of exploring new and innovative design solutions, and get products to market faster—and with less prototyping. By understanding the product performance early in the design process, costly over-design is avoided and the risk of warranty claims reduced.

This powerful set of simulation tools is fully integrated within SolidWorks software, allowing seamless operation for designers and simulation experts alike at every stage of development.

SolidWorks Simulation provides a complete range of tools for analyzing the structure, motion, and multi-physics of your parts and assemblies, or exploring fluid dynamics and heat flow around and through your design. As part of the SolidWorks suite of product development solutions—covering design, simulation, sustainable design, technical communication, and data management—SolidWorks Simulation is easy to use, yet powerful enough to tackle the most complex design issues. You can predict the performance of your design under real-world operating conditions to detect problems and correct them before prototyping, tooling, and production.

SOLIDWORKS **SIMULATION PROFESSIONAL**

## Perform virtual testing and analysis of parts and assemblies

SolidWorks Simulation Professional gives you a powerful virtual testing environment for advanced simulation, so designers can evaluate difficult issues like the lifespan of their designs, complex load scenarios, and multi-physics problems.
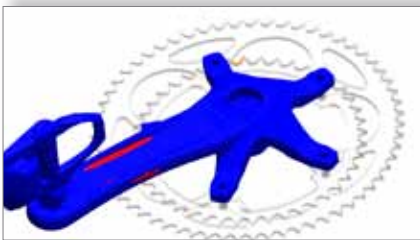

Drive your design with optimization technology to improve product performance.
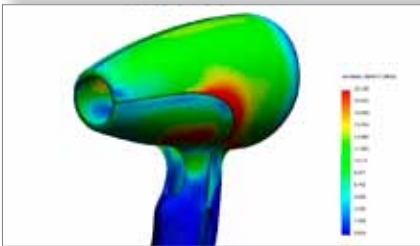
Determine the structural impact of thermal loads on your design.
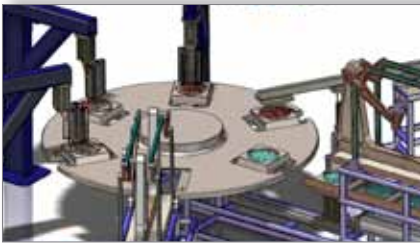
Virtually prototype the most challenging machines with event-based motion simulation.

Estimate component life based on calculated or SolidWorks Motion loads.

Take your design from good to great

- Evaluate forces and stresses between contacting parts, including friction
- Apply bearing loads, forces, pressures, and torques
- Optimize designs based on structure, motion, or geometry
- Use connectors or virtual fasteners to model bolts, pins, springs, and bearings
- Activate the Trend Tracker and Design Insight plots to highlight optimal design changes while you work
- Evaluate complex problems early in the design cycle with plane stress, plane strain, and axisymmetric linear static analysis

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
- Determine thermal stresses due to temperature distributions and varying materials

Analyze assembly motion for process and task workflow with event–based simulation

- Define motion studies based on model event and assembly actions
- Trigger actions through new motion sensors, time, or the completion of a previous task
- Evaluate characteristics like actuator force and joint loads for motion optimization
- Gain greater control of model actuators with servo motors

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

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 load stiffening on frequency and buckling response

SOLIDWORKS **SIMULATION PREMIUM**

See deep into your design with a comprehensive simulation solution

If your design world is truly complex, SolidWorks Simulation Premium is right for you. It includes all of the capabilities of SolidWorks Professional, plus additional features like composite materials and powerful tools for simulating nonlinear and dynamic response.
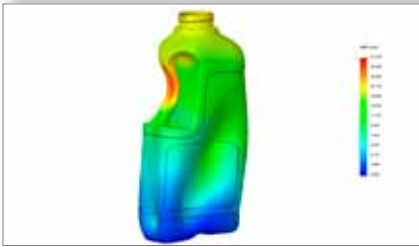
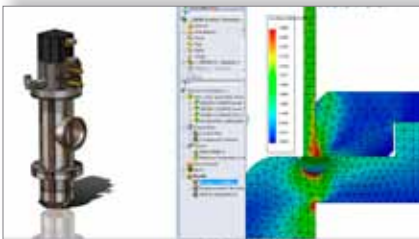Study nonlinear problems that involve large displacement and complex material models.
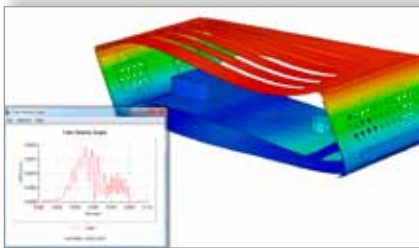
Plot product response versus time for time varying loads.

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

Study a whole class of problems quickly and easily with the 2D planar simplification tool.

Analyze your design in the nonlinear world

- Easily transition between linear and nonlinear simulations
- Examine the large deformations caused by overloads, contact, and flexible materials
- Determine residual stresses and permanent deformations in metals after material yield
- Study nonlinear buckling and snap-through events
- Investigate designs with hyperelastic materials, such as rubbers, silicones, and other elastomers
- Conduct an elasto-plastic analysis to study plastic deformation and the onset of yield
- Examine creep effects and material changes with temperature

Perform dynamic analyses of parts and assemblies

- Simulate time history loading, steady-state harmonic input, response spectrum, and random vibration 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
- Carry out impact analysis using the nonlinear dynamic capabilities

Simulate composite materials

- Study multilayer shell bodies to examine the effect of each layer with its own material properties, thickness, and orientation
- Use the revolutionary user interface to dynamically control and display ply orientation directly on your SolidWorks model
- Determine the correct composite lay up and orientation for the operational loads
- Utilize sandwich and graphite or carbon-fiber composites, including honeycomb and cellular foam

Easily tackle complex problems with the 2D planar simplification tool

- Create plane stress, plane strain, and axisymmetric nonlinear analysis
- Solve complex contact problems in a fraction of the time with no loss of accuracy
- Use 3D CAD models without modification to generate 2D sections for analysis

SOLIDWORKS **FLOW SIMULATION**

Thorough liquid and gas analysis made easy

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

Examine complex flow in and around components to detect turbulence and recirculation issues and determine flow conditions.
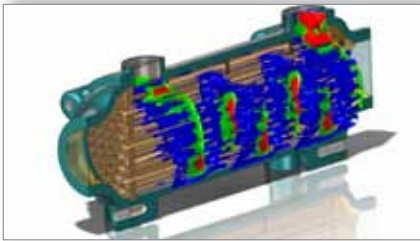
Prevent heating problems by inspecting temperature distribution and heat fluxes.
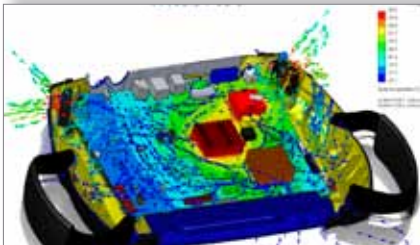
Use the Electronic Cooling Module to optimize thermal performance of PCBs.

Improve air and temperature flows in living and working environments with the HVAC module.

Inspect and optimize complex flows

- Examine complex flows through and/or over your components via a combination of internal and external flows
- Find the best dimensions or flow conditions, such as pressure drop, that satisfy design goals
- Detect turbulences and recirculation issues with animated bands, 3D arrows, pipes, or spheres using flow trajectories visualization
- Understand the flow of non-Newtonian fluids, such as blood and liquid plastic
- Compare and assess the impact of impeller and fan motion, using rotating coordinate frames
- Include sophisticated effects like porosity, cavitation, and humidity

Reduce the risk of overheating phenomena in your designs

- Visualize and understand temperature distribution in and around your products
- Couple flow with thermal analysis, simulating convection, conduction, and radiation effects
- Apply time-and-coordinate-dependent boundary conditions and heat sources
- Find the best dimensions that satisfy your design goals, such as heat exchange efficiency

Optimize the thermal performance of your PCBs and electronic components

The Electronic Cooling Module includes Joule heating simulation, a two-resistor component compact module, a heat pipe compact module, and a PCB generator to evaluate thermal properties and cooling requirements for electronic components.

Predict and optimize airflow and comfort parameters in working and living environments

The HVAC Design Module includes advanced radiation modeling, comfort parameters, and a large database of building materials to evaluate gas movement and temperature in working and living environments.

Gain valuable insights with powerful and intuitive results visualization tools

- Utilize Section or Surface plots to study the distribution of resultant values, including velocity, pressure, vorticity, temperature, and mass fraction
- Measure results at any location with the Point, Surface, and Volume Parameter tool
- Graph results variation along any SolidWorks sketch
- List results and automatically export data to Microsoft® Excel®

DS SOLIDWORKS

LET'S GO DESIGN

SOLIDWORKS PRODUCT DEVELOPMENT SOLUTIONS

SolidWorks lets you maximize the productivity of your design and engineering resources to create products better, faster, and more cost-effectively. See the full range of SolidWorks solutions for design, simulation, sustainable design, technical communication, and data management at **www.solidworks.com/products2012**.

▶ **LEARN MORE**

To learn more about SolidWorks Simulation, visit **www.solidworks.com/simulation** or contact your local authorized SolidWorks reseller.

www.solidworks.com

DS SOLIDWORKS

LET'S GO DESIGN