

## SOLIDWORKS SIMULATION SOLUTIONS HELP COMPANIES:

- Grow market share and differentiate through ground-breaking product design
- Empower the engineering team with intuitive, powerful 3D simulation tools to compare design scenarios and new ideas to bring innovative products to market

- Improve product performance, such as lower pressure drop and increased horsepower
- Improve eco-effectiveness of product designs

- Reduce the need for costly prototyping by integrating virtual testing early in product development
- Reduce outsourcing costs by testing performance and functionality internally

- Optimize product development with intuitive, CAD-embedded simulation for structural, fluid flow, motion, plastics injection molding, and sustainable design
- Reduce the need for time-consuming physical prototyping
- Optimize assembly performance by verifying part and mold designs in the earliest stages of development

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graph TD
    PROBLEM[PROBLEM] --> IDEAS[IDEA/SOLUTIONS]
    IDEAS --> A[A]
    IDEAS --> B[B]
    IDEAS --> C[C]
    IDEAS --> D[D]
    A --> SELECTION[SELECTION - DESIGN C]
    B --> SELECTION
    C --> SELECTION
    D --> SELECTION
    SELECTION --> EVALUATE[EVALUATE]
    EVALUATE --> REFINE[REFINE]
    REFINE --> TEST[TEST/SIMULATE]
    TEST --> SELECTION
    TEST --> PROTOTYPE[PROTOTYPE]
    PROTOTYPE --> BUILD[BUILD]
    BUILD --> SHIP[SHIP]
  
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**PROBLEM** Known: product tasks, design limits, and goals

**IDEA/SOLUTIONS** Brainstorming concepts

**A B C D** Measure designs against goals using simulation  
Common UI for design and simulation  
Rapid analysis for simulation: motion, structural strength, flow rates, thermal issues, etc.

**SELECTION - DESIGN C** Select the design with best performance

**REFINE**  
**TEST/SIMULATE**  
**EVALUATE** As design evolves and refines, analysis is 100% associative with enabling simulation-guided design  
Leverage CAD model intelligence in simulation  
Communicate results throughout design team

**PROTOTYPE** Simulation guides which physical tests to run and what to measure

**BUILD**

**SHIP**




Figure 10 shows a 3D visualization of the velocity field in the internal flow of a pump. The flow is depicted in a blue and green color scale, representing velocity magnitude. A color bar on the right indicates the velocity range from 0.0 to 12.716 m/s.

A 3D visualization of a building's thermal environment. The image shows a cross-section of a building with a central corridor and two side rooms. The temperature distribution is indicated by a color scale from blue (cooler) to red (warmer). The central corridor is the coolest, while the side rooms are warmer. Airflow patterns are shown by green arrows, indicating air moving from the warmer side rooms into the cooler central corridor. The building's structure, including walls, floor, and ceiling, is visible.

SOLIDWORKS software provides an intuitive 3D development environment that helps maximize the productivity of your design and engineering resources to create better products faster and more cost-effectively. See the full range of SOLIDWORKS software for design, simulation, technical communication, and data management at [www.solidworks.com/products2017](http://www.solidworks.com/products2017).

To learn more about SOLIDWORKS Simulation solutions, visit [www.solidworks.com/simulation](http://www.solidworks.com/simulation) or contact your local authorized SOLIDWORKS reseller.

SOLIDWORKS systems requirements are posted on the SOLIDWORKS website at [www.solidworks.com/systemrequirements](http://www.solidworks.com/systemrequirements).

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Manufacturing companies across all industries have made 3D virtual simulation a valuable engineering tool to synthesize and define their physical products. Sophisticated simulation is no longer just for specialists. It's the inspiration that fuels innovation. Product engineers can make their technical decisions driven by simulation insights, uncovering significant product and business benefits.

With powerful and intuitive SOLIDWORKS® Simulation solutions, product engineers can virtually test new ideas, quickly and efficiently evaluate performance, improve quality, and get the knowledge for product innovation.



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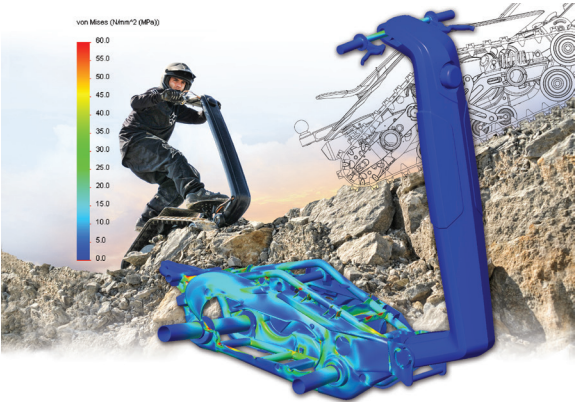
SOLIDWORKS SIMULATION SOLUTIONS

SOLIDWORKS Simulation solutions help product engineers reduce the risk inherent with innovation and get their products to market faster with less physical prototyping to decrease costs. With the consistent, powerful, intuitive set of simulation capabilities, all fully embedded with SOLIDWORKS 3D CAD, designers can understand product performance early in the design process and avoid costly over-engineering.

SOLIDWORKS Simulation

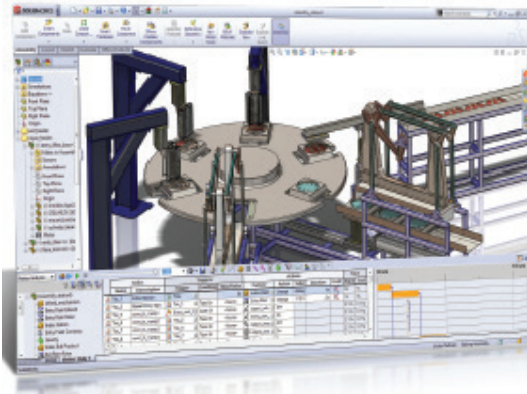
SOLIDWORKS Simulation provides a powerful structural testing environment for sophisticated simulation in an intuitive workflow, so you can answer engineering challenges involving complex load scenarios and multiple physics cases.

You can test products against a broad range of parameters during the design process, such as durability, static and dynamic response, and thermal behavior, and use the technical insight you gain as early as possible for an optimized design.



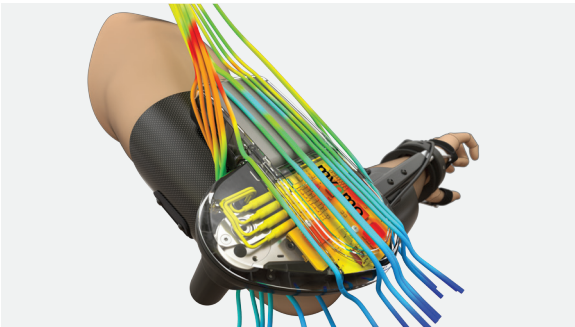
SOLIDWORKS Motion Simulation

SOLIDWORKS Motion Simulation provides engineers with powerful, intuitive assembly motion analysis to accurately determine the physical movements of the assembly under load, as well as the timing (time-based motion) or sequencing (event-based motion). With the assembly motion and forces calculated, you can perform a structural analysis of the components with SOLIDWORKS Simulation to help ensure product performance.



SOLIDWORKS Flow Simulation

SOLIDWORKS Flow Simulation intuitive Computational Fluid Dynamics (CFD) enables designers to simulate liquid and gas flow in real-world conditions, run “what if” scenarios, and efficiently analyze the effects of fluid flow, heat transfer, and related forces on immersed or surrounding components. Early in the design process, designers can easily simulate fluid flow, heat transfer, and fluid forces that are critical to the success of the design.

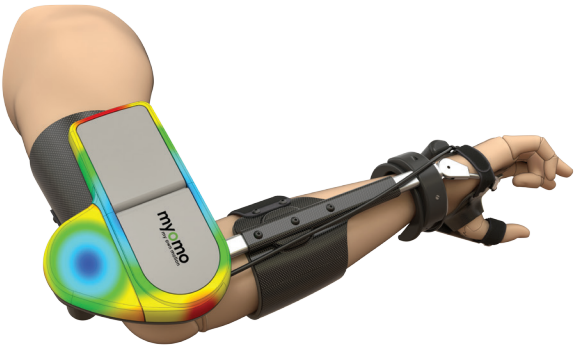


“With SOLIDWORKS Simulation, I can identify and resolve potential issues during design, so that when we mold those initial pieces, they are right the first time. It’s an incredible tool that has let us save 30 to 60 percent in capital costs in the development of new products.”

— Todd Turner, Senior Product Development Engineer, Macro Plastics

SOLIDWORKS Plastics

SOLIDWORKS Plastics injection molding simulation predicts how melted plastic flows during the injection molding process—the manufacturing method used to produce over 80 percent of all plastics products. The ability to predict how the plastic will flow enables prediction of manufacturing-related defects. Additionally, SOLIDWORKS Plastics enables the prediction of part warpage and mold cooling optimization. Users can change part or mold geometry, processing conditions, or the plastic material to eliminate or minimize potential defects, saving energy, natural resources, time, and money.



SOLIDWORKS Sustainability

SOLIDWORKS Sustainability performs real-time environmental assessments as part of your product design process. Fully integrated with your SOLIDWORKS design environment and using industry-standard lifecycle assessment criteria, SOLIDWORKS Sustainability provides instant feedback, so you can quickly make adjustments to your design, and turn your sustainability goals into results.



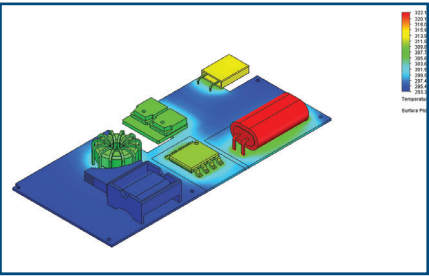
“SOLIDWORKS Flow Simulation not only improves our productivity and efficiency, but also lets us tackle heat transfer challenges that we would not be able to resolve without it.”

—Bernd Knab, Development Manager, POLYRACK Tech-Group

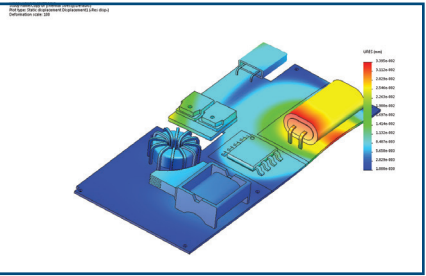
ENGINEERING CHALLENGES TACKLED WITH SOLIDWORKS SIMULATION SOLUTIONS

SOLIDWORKS Simulation Solutions enable product engineers to perform a complete performance test in a single user interface with the smoothest and most efficient engineering workflow.

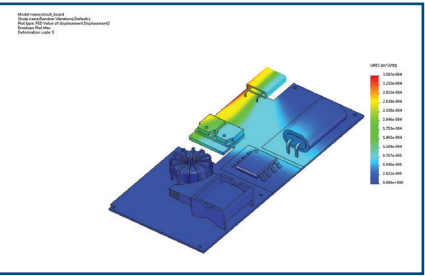
For products subjected to fluid flow and heat transfer, you can simulate the fluid flow around your product for velocity, pressure, and thermal insights with CFD simulation, use the thermal results in a thermal stress simulation to assess dilatation risk, and measure the response of your product to random vibration in structural dynamic analysis. All this in one environment enables a unique and productive workflow.



Temperature distribution from a CFD analysis in SOLIDWORKS Flow Simulation

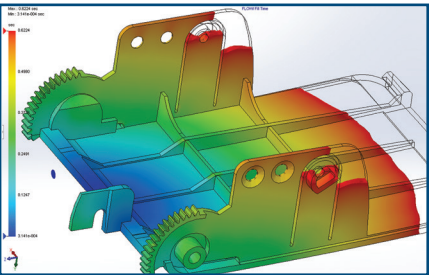


Displacement distribution from a coupled thermal-stress analysis in SOLIDWORKS Simulation

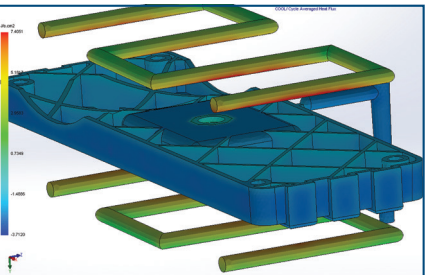


Power Spectral Density (PSD) values from a random vibration analysis in SOLIDWORKS Simulation

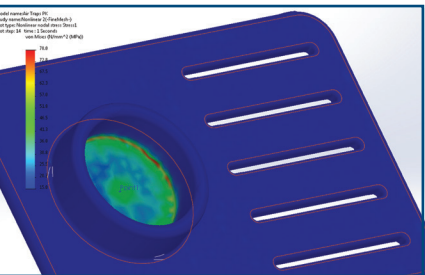
For plastic parts, you can simulate the filling, packing, and cooling phases of the injection molding process, and then perform warpage analysis to determine if your part will deform due to molded-in stresses. You can then perform a structural analysis that takes into account both molded-in and external stresses for product response assessment.



Fill time and melt front location from fill analysis in SOLIDWORKS Plastics

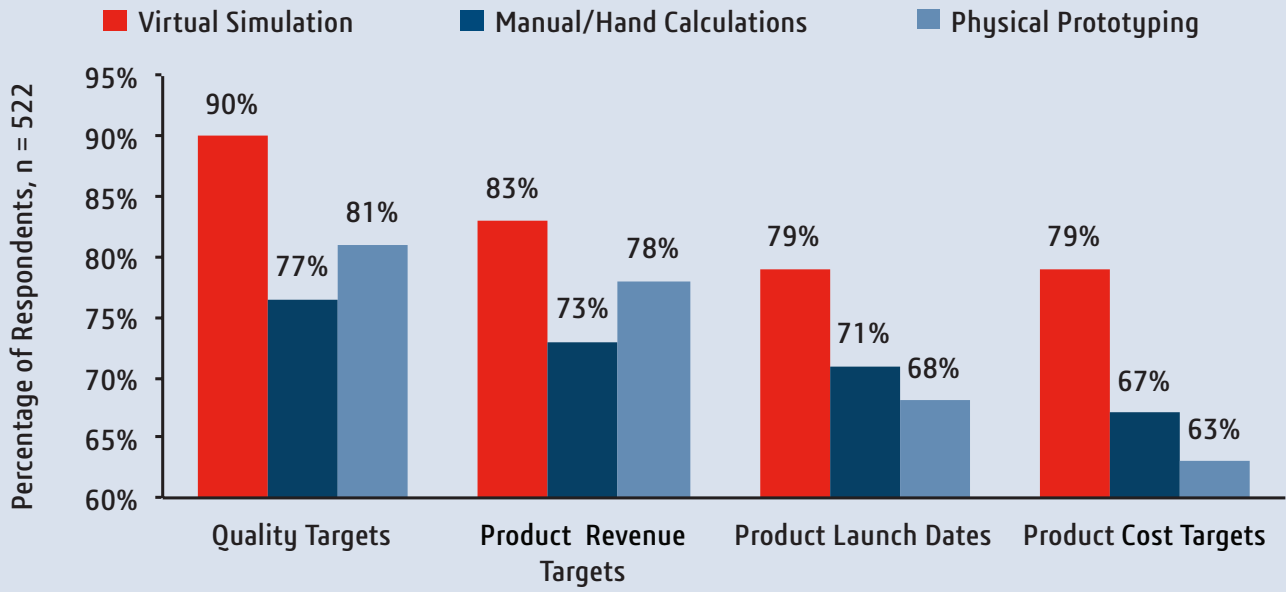


Heat flux from SOLIDWORKS Plastics cooling simulation of the cavity, cooling channels, and mold



Stress distribution on a plastic part submitted to external loading coupled with residual molded stresses

THE USE OF SIMULATION RESULTS IN HIGHER ACHIEVEMENT OF PRODUCTS TARGETS



Adopt a concurrent engineering approach for premium product quality.