SOLIDWORKS PRODUCT DEVELOPMENT SOLUTIONS

SOLIDWORKS software provides users with intuitive 3D development environments that help maximize the productivity of your design and engineering resources to create better products faster and more cost-effectively.

SOLIDWORKS Simulation comes in several different packages, depending on whether the user is a designer, an analyst, or both.

DESIGNER TO ANALYST PROCESS SOLUTIONS

SOLIDWORKS Simulation comes in several different packages, depending on whether the user is a designer, an analyst, or both.

<table>
<thead>
<tr>
<th>SIMULATION ENGINEER</th>
<th>SIMULATION STANDARD</th>
<th>SIMULATION PREMIUM</th>
<th>SIMULATION ENTERPRISE</th>
<th>FLOW SIMULATION</th>
<th>SOLIDWORKS PULSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design for Strength</td>
<td><img src="Image" alt="Design for Strength" /></td>
<td><img src="Image" alt="Design for Strength" /></td>
<td><img src="Image" alt="Design for Strength" /></td>
<td><img src="Image" alt="Design for Strength" /></td>
<td><img src="Image" alt="Design for Strength" /></td>
</tr>
<tr>
<td>Thermal Analysis</td>
<td><img src="Image" alt="Thermal Analysis" /></td>
<td><img src="Image" alt="Thermal Analysis" /></td>
<td><img src="Image" alt="Thermal Analysis" /></td>
<td><img src="Image" alt="Thermal Analysis" /></td>
<td><img src="Image" alt="Thermal Analysis" /></td>
</tr>
<tr>
<td>Frequency Analysis</td>
<td><img src="Image" alt="Frequency Analysis" /></td>
<td><img src="Image" alt="Frequency Analysis" /></td>
<td><img src="Image" alt="Frequency Analysis" /></td>
<td><img src="Image" alt="Frequency Analysis" /></td>
<td><img src="Image" alt="Frequency Analysis" /></td>
</tr>
<tr>
<td>Statics for Structures</td>
<td><img src="Image" alt="Statics for Structures" /></td>
<td><img src="Image" alt="Statics for Structures" /></td>
<td><img src="Image" alt="Statics for Structures" /></td>
<td><img src="Image" alt="Statics for Structures" /></td>
<td><img src="Image" alt="Statics for Structures" /></td>
</tr>
<tr>
<td>High Performance</td>
<td><img src="Image" alt="High Performance" /></td>
<td><img src="Image" alt="High Performance" /></td>
<td><img src="Image" alt="High Performance" /></td>
<td><img src="Image" alt="High Performance" /></td>
<td><img src="Image" alt="High Performance" /></td>
</tr>
<tr>
<td>Full Linear Analysis</td>
<td><img src="Image" alt="Full Linear Analysis" /></td>
<td><img src="Image" alt="Full Linear Analysis" /></td>
<td><img src="Image" alt="Full Linear Analysis" /></td>
<td><img src="Image" alt="Full Linear Analysis" /></td>
<td><img src="Image" alt="Full Linear Analysis" /></td>
</tr>
<tr>
<td>Dynamic Analysis</td>
<td><img src="Image" alt="Dynamic Analysis" /></td>
<td><img src="Image" alt="Dynamic Analysis" /></td>
<td><img src="Image" alt="Dynamic Analysis" /></td>
<td><img src="Image" alt="Dynamic Analysis" /></td>
<td><img src="Image" alt="Dynamic Analysis" /></td>
</tr>
<tr>
<td>Multi-Scale Aerothermo</td>
<td><img src="Image" alt="Multi-Scale Aerothermo" /></td>
<td><img src="Image" alt="Multi-Scale Aerothermo" /></td>
<td><img src="Image" alt="Multi-Scale Aerothermo" /></td>
<td><img src="Image" alt="Multi-Scale Aerothermo" /></td>
<td><img src="Image" alt="Multi-Scale Aerothermo" /></td>
</tr>
<tr>
<td>Large displacement contact problems</td>
<td><img src="Image" alt="Large displacement contact problems" /></td>
<td><img src="Image" alt="Large displacement contact problems" /></td>
<td><img src="Image" alt="Large displacement contact problems" /></td>
<td><img src="Image" alt="Large displacement contact problems" /></td>
<td><img src="Image" alt="Large displacement contact problems" /></td>
</tr>
<tr>
<td>Complex material problems</td>
<td><img src="Image" alt="Complex material problems" /></td>
<td><img src="Image" alt="Complex material problems" /></td>
<td><img src="Image" alt="Complex material problems" /></td>
<td><img src="Image" alt="Complex material problems" /></td>
<td><img src="Image" alt="Complex material problems" /></td>
</tr>
<tr>
<td>High and low Speed fluid flows</td>
<td><img src="Image" alt="High and low Speed fluid flows" /></td>
<td><img src="Image" alt="High and low Speed fluid flows" /></td>
<td><img src="Image" alt="High and low Speed fluid flows" /></td>
<td><img src="Image" alt="High and low Speed fluid flows" /></td>
<td><img src="Image" alt="High and low Speed fluid flows" /></td>
</tr>
<tr>
<td>Internal and External fluidflow</td>
<td><img src="Image" alt="Internal and External fluidflow" /></td>
<td><img src="Image" alt="Internal and External fluidflow" /></td>
<td><img src="Image" alt="Internal and External fluidflow" /></td>
<td><img src="Image" alt="Internal and External fluidflow" /></td>
<td><img src="Image" alt="Internal and External fluidflow" /></td>
</tr>
<tr>
<td>Coupled heat transfer</td>
<td><img src="Image" alt="Coupled heat transfer" /></td>
<td><img src="Image" alt="Coupled heat transfer" /></td>
<td><img src="Image" alt="Coupled heat transfer" /></td>
<td><img src="Image" alt="Coupled heat transfer" /></td>
<td><img src="Image" alt="Coupled heat transfer" /></td>
</tr>
<tr>
<td>Spurting/leakage</td>
<td><img src="Image" alt="Spurting/leakage" /></td>
<td><img src="Image" alt="Spurting/leakage" /></td>
<td><img src="Image" alt="Spurting/leakage" /></td>
<td><img src="Image" alt="Spurting/leakage" /></td>
<td><img src="Image" alt="Spurting/leakage" /></td>
</tr>
<tr>
<td>Mixing flows</td>
<td><img src="Image" alt="Mixing flows" /></td>
<td><img src="Image" alt="Mixing flows" /></td>
<td><img src="Image" alt="Mixing flows" /></td>
<td><img src="Image" alt="Mixing flows" /></td>
<td><img src="Image" alt="Mixing flows" /></td>
</tr>
<tr>
<td>Plastic part validation</td>
<td><img src="Image" alt="Plastic part validation" /></td>
<td><img src="Image" alt="Plastic part validation" /></td>
<td><img src="Image" alt="Plastic part validation" /></td>
<td><img src="Image" alt="Plastic part validation" /></td>
<td><img src="Image" alt="Plastic part validation" /></td>
</tr>
<tr>
<td>Multi design evaluation</td>
<td><img src="Image" alt="Multi design evaluation" /></td>
<td><img src="Image" alt="Multi design evaluation" /></td>
<td><img src="Image" alt="Multi design evaluation" /></td>
<td><img src="Image" alt="Multi design evaluation" /></td>
<td><img src="Image" alt="Multi design evaluation" /></td>
</tr>
</tbody>
</table>

Our 3D EXPERIENCE® platform powers our brand applications, serving 12 industries, and provides a rich portfolio of industry solution experiences.

- **DESIGN**
  - Design for Strength
  - Thermal Analysis
  - Frequency Analysis
  - Statics for Structures
  - High Performance
  - Full Linear Analysis
  - Dynamic Analysis
  - Multi-Scale Aerothermo
  - Large displacement contact problems
  - Complex material problems
  - High and low Speed fluid flows
  - Internal and External fluidflow
  - Coupled heat transfer
  - Spurting/leakage
  - Mixing flows
  - Plastic part validation
  - Multi design evaluation

- **ANALYST**
  - Design for Strength
  - Thermal Analysis
  - Frequency Analysis
  - Statics for Structures
  - High Performance
  - Full Linear Analysis
  - Dynamic Analysis
  - Multi-Scale Aerothermo
  - Large displacement contact problems
  - Complex material problems
  - High and low Speed fluid flows
  - Internal and External fluidflow
  - Coupled heat transfer
  - Spurting/leakage
  - Mixing flows
  - Plastic part validation
  - Multi design evaluation

- **ENGINEER**
  - Design for Strength
  - Thermal Analysis
  - Frequency Analysis
  - Statics for Structures
  - High Performance
  - Full Linear Analysis
  - Dynamic Analysis
  - Multi-Scale Aerothermo
  - Large displacement contact problems
  - Complex material problems
  - High and low Speed fluid flows
  - Internal and External fluidflow
  - Coupled heat transfer
  - Spurting/leakage
  - Mixing flows
  - Plastic part validation
  - Multi design evaluation

SOLIDWORKS Simulation tools deliver actionable results for both the casual designer or engineer as well as the dedicated analyst. They provide a completely integrated design and analysis strategy, without ever having to leave the familiar SOLIDWORKS environment. Other benefits include:

**CONCEPT DESIGN SELECTION**
- Ensure assembly layout movement range and capability with Sketch Motion.
- Test early (incomplete) assemblies using connectors to motion hardware.
- Enable rapid design iteration with fast solvers that can guide design direction.

**PRODUCT DESIGN REFINEMENT**
- Determine operational loads and timing with Motion Analysis.
- Discover new design shapes with Topology study.
- Calculate Factor of Safety (FoS) and product performance.
- Measure the impact of fluid flow on your designs with Flow Simulation.
- Evaluate the impact of complex materials and extreme loads definition with Simulation Engineer.

**FINISH VALIDATION**
- Test structural performance under extreme and dynamic loading.
- Perform a multi-physics test that links fluid, thermal and motion analysis to a structural test to determine their impact on structural performance.
- Run an endurance test to ensure product longevity.
- Determine operational loads and timing with Motion Analysis.
- Discover new design shapes with Topology study.
- Calculate Factor of Safety (FoS) and product performance.
- Measure the impact of fluid flow on your designs with Flow Simulation.
- Evaluate the impact of complex materials and extreme loads definition with Simulation Engineer.

Innovation starts with someone asking, “What if?” or “Why not?” Answering these questions with any great certainty typically requires the time and expense of physical prototyping and testing. But this can stifle innovation under the weight of an organization’s cost constraints.

So, we asked, “What if many of the questions that arise from the painstaking process of designing, testing, refining and testing again, could be answered before any metal was cut or wiring installed?” The result is SOLIDWORKS® Simulation, a dramatic transformation of the design process, where easy-to-use, yet powerful analysis tools can be employed every step of the way. SOLIDWORKS Simulation provides testing and analysis of parts and products in real-world environments in advance of any manufacturing work. Teams can work concurrently to develop the design while validating any changes, thus speeding up the overall design cycle. SOLIDWORKS Simulation also contains previous analysts and data so that any design changes throughout a product’s life can be quickly and easily recalculated, ensuring product performance and reliability.

In SOLIDWORKS, engineers have all the information necessary throughout the design process, the model with complete analyzable setup and results, meaning that any changes along the design turf that could be quickly and easily recalculated, ensuring product performance and reliability. Thousands of companies have taken advantage of these tools, helping many to become leaders in their markets.

![Innovate. Evaluate. Validate.](Image)

Innovate. Evaluate. Validate.
STREAMLINE DESIGN FOR STRUCTURAL STRENGTH, STIFFNESS AND ENDURANCE
Ensuring the required structural strength, rigidity and endurance of a design has traditionally been in the realm of either physical testing or of specialist analysis tools. SOLIDWORKS Simulation delivers powerful analysis capabilities together with the SOLIDWORKS ease of use, resulting in a suite of structural analysis tools that can be used by both the designer and analyst.

SOLIDWORKS Simulation can assist in determining a product's capacity in the face of several factors:

- Motion
- Linear
- Frequency
- Fatigue
- Thermal Structural
- Topology and Optimization
- Non-Linear
- Dynamic

STRUCTURAL SIMULATION ENGINEER
Understanding product performance under extreme loading and deformation requires a robust, non-linear solution. Structural Simulation Engineer from SIMULIA enables analysts to tackle the most challenging of static non-linear problems using:

- The world-class ABAQUS Solver
- Advanced meshing tools
- Comprehensive material models
- Robust component contact formulation

"The power of the Simulation Engineer product is the ability to come up with solutions rapidly and reliably to complex problems that become part of the design process."
— Laurence Marks, Director Strategic Simulation & Analysis

SOLIDWORKS FLOW SIMULATION
Advanced fluid flow simulation made easy
Understanding the impact of fluid flow in and around your design can be key to evaluating its performance. Consider these design elements:

- Internal external liquid and gas flow
- Free surface flow
- Non-Newtonian fluids
- Low speed to supersonic flows
- Fans and rotating components
- Conjugate heat transfer
- Electronics cooling module
- Pressure and temperature transfer to SOLIDWORKS Simulation for structural analysis

SOLIDWORKS PLASTICS
The design of plastic components cannot be complete without an analysis of their manufacturing process and the level of performance that can be achieved. SOLIDWORKS Plastics Simulation enables designers and analysts to simulate the plastic injection molding process, including:

- Confidence of component fill
- Component wall thickness and rib placement evaluation
- Mold flow visualization
- Optimize injection gate location
- Visualize the plastic flow front and check if the part will fill the mold completely
- Determine maximum injection pressure needed to fill the mold
- Optimize gate locations to avoid or at least minimize weld lines

See the full range of SOLIDWORKS software for design, simulation, technical communication and data management visit www.solidworks.com.