

SolidWorks Simulation

	Feature	Standard	Professional	Premium
1	Fully integrated in SOLIDWORKS® 3D CAD			
	<ul style="list-style-type: none"> Fully embedded in SOLIDWORKS for ease of use and data integrity. Same user interface as SOLIDWORKS (toolbars, menus and context-sensitive right-click menus). SOLIDWORKS users can get up to speed rapidly with SOLIDWORKS Simulation. Associativity with SOLIDWORKS design changes. Support for SOLIDWORKS materials and configurations for easy analysis setup. Overlay of simulation results onto SOLIDWORKS CAD graphics. 	✓	✓	✓
2	FEA Modeling			
	<ul style="list-style-type: none"> SOLIDWORKS Simulation includes solid, shell and beam element formulation. SOLIDWORKS Simulation Professional and SOLIDWORKS Simulation Premium offer 2D simplification, plane stress, plane strain, axisymmetric and sub-modelling. 	✓	✓	✓
3	Interactions and Connectors			
	<ul style="list-style-type: none"> Bonded, Contact, Shrink Fit, Free and Virtual Wall conditions. Node-to-surface and surface-to-surface contact. Self-contact. Connectors: bolt, spring, pin, elastic support and bearing Connector safety check 	✓	✓	✓
4	Loads and Constraints			
	<ul style="list-style-type: none"> Fixtures to prescribe degrees of freedom. Force, pressure and remote structural loads. Temperature loading. 	✓	✓	✓

	<ul style="list-style-type: none"> • Import Pressure and Thermal Loads from SOLIDWORKS Flow Simulation. • SOLIDWORKS Simulation Professional and SOLIDWORKS Simulation Premium include Load Case Manager to evaluate the effects of various load combinations on your model. 			
5	Stress Hot Spot Diagnostics			
	<ul style="list-style-type: none"> • Regions of model with irregular stress gradients can be detected between adjacent elements. • The cause of the irregular stress gradients could be stress singularities. Patent awarded in 2020. 	✓	✓	✓
6	Communication with Reports and eDrawings®			
	<ul style="list-style-type: none"> • Customizable simulation report. • eDrawings of simulation results. 	✓	✓	✓
7	Linear Static Simulation for Assemblies			
	<ul style="list-style-type: none"> • Part and assembly structural analysis problems solved for stress, strain, displacements and Factors of Safety (FOS). • Typical analysis assumes static loading, elastic linear materials and small displacements. 	✓	✓	✓
8	Time-Based Motion			
	<ul style="list-style-type: none"> • Rigid body kinematic and dynamic motion tool used to calculate velocities, accelerations and movements of assembly under operational loads. • With motion analysis complete, component body and connection loads can be included in linear analysis for a complete structural investigation. 	✓	✓	✓
9	Design Comparison Studies			
	<ul style="list-style-type: none"> • "What if" scenarios based on defined variables (dimensions, mass properties, simulation data). 	✓	✓	✓
10	Fatigue Simulation	✓	✓	✓

	<ul style="list-style-type: none"> • Estimation of high cycle fatigue life of components subjected to multiple varying loads where peak stress is below material yield stress. • Cumulative damage theory used to predict locations and cycles to failure. 			
11	Trend Tracker <ul style="list-style-type: none"> • Detection of trends in results from different iterations of a static study 	✓	✓	✓
12	Automatic Conversion of Toolbox Fasteners to Bolts <ul style="list-style-type: none"> • Automatic conversion of Toolbox fasteners from SOLIDWORKS CAD models to simulation bolt connectors. Patent awarded in 2018. 		✓	✓
13	Design Optimization <ul style="list-style-type: none"> • Based on a Design of Experiments (DoE) method, Design Optimization finds the optimum design according to design variables and user-defined goals such as minimize mass, stress, deflections. • Design variables can be CAD dimensions, material properties or load values 		✓	✓
14	Load Case Manager <ul style="list-style-type: none"> • Effects of various load combinations on your model can be evaluated. 		✓	✓
15	Advanced Interactions and Connectors <ul style="list-style-type: none"> • Thermal contact resistance condition • Insulated condition • Edge weld connector • Link Rod connector 		✓	✓
16	Topology Optimization Studies <ul style="list-style-type: none"> • Ability to discover new minimal material design alternatives under linear elastic static loading while still meeting component stress, stiffness and vibrational requirements. 		✓	✓
17	Event-Based Motion Simulation <ul style="list-style-type: none"> • Motion analysis generated by event-triggered motion control using any combination of sensors or events or time schedule. 		✓	✓

18	Frequency Simulation			
	<ul style="list-style-type: none"> Product's natural modes of vibration can be determined—important for products that experience vibration in their working environment. 		✓	✓
19	Buckling or Collapse Simulation			
	<ul style="list-style-type: none"> Buckling failure mode for long and slender components is by collapse at load below material yield stress. Buckling study predicts components' buckling load factor. 		✓	✓
20	Thermal Simulation			
	<ul style="list-style-type: none"> Solution of steady-state and transient thermal problems for temperature, temperature gradient and heat flux. Thermal analysis results can be imported as loads into Static Studies. 		✓	✓
21	Drop Test Simulation			
	<ul style="list-style-type: none"> Ability to analyze effect of impact of part or assembly on target surface. 		✓	✓
22	Pressure Vessel Design			
	<ul style="list-style-type: none"> Pressure Vessel Study calculates linearized stress, key for safe pressure design. 		✓	✓
23	Submodeling Simulation			
	<ul style="list-style-type: none"> Ability to analyze structural response of subset of main assembly. 		✓	✓
24	2D Simplification			
	<ul style="list-style-type: none"> Dramatic reduction in amount of time needed to solve problem by simplifying 3D models to 2D in plane stress, plane strain or axi-symmetric models. 		✓	✓

25	Linear Dynamic Simulation			
	<ul style="list-style-type: none"> • Calculation of effects of dynamic loads, forcing vibrations, impact or shock loading for linear elastic materials. • Study types are *Modal Time History Analysis *Harmonic Analysis *Random Vibration Analysis *Response Spectrum Analysis. 			✓
26	Nonlinear Simulation			
	<ul style="list-style-type: none"> • Calculation of effects of dynamic loads, forcing vibrations, impact or shock loading for linear elastic materials. • Study types are *Modal Time History Analysis *Harmonic Analysis *Random Vibration Analysis *Response Spectrum Analysis. • Nonlinear Analysis enables users to analyze complex material behavior, such as post-yield metals, rubbers and plastics, as well as account for large deflections and sliding contact. • Complex material models in Nonlinear Static Studies can be used to calculate permanent deformation and residual stresses due to excessive loads, as well as predict performance for components, such as springs and clip fasteners. • Nonlinear Dynamic Study accounts for effect of real-time varying loads. In addition to solving nonlinear static problems, Nonlinear Dynamic Studies can solve impact problems. 			✓
27	Composites Simulation			
	<ul style="list-style-type: none"> • Analysis of structural response of composite, which is mixture of two or more materials. 			✓