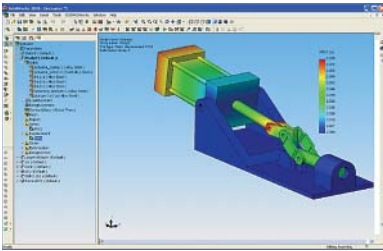# COSMOSWorks OVERVIEW

IMPROVE PRODUCT QUALITY AND PERFORMANCE OF SOLIDWORKS DESIGNS

COSMOSWorks® provides easy-to-use yet powerful design analysis and optimization tools for designers and engineers alike. More than 12,000 companies currently use COSMOS® to improve design quality, avoid field failures, reduce material costs, and shorten time-to-market.

Offering unmatched performance for analyzing assemblies, COSMOSWorks can simulate various assembly connections including bolts, pins, and contacts.
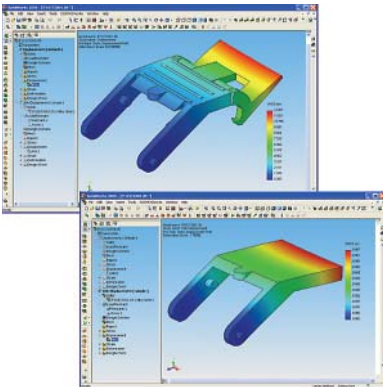
With COSMOSWorks it is easy to study different design configurations created in SolidWorks and choose the optimal design for final production.

COSMOSWorks enables faster, less costly, and more optimized product development, as well as more in-depth examination of product performance than would ever be possible using even the most detailed prototypes.

Fully integrated with SolidWorks® 3D modeling software. COSMOSWorks allows you to test a design and run multiple iterations without ever leaving SolidWorks. COSMOSWorks utilizes the SolidWorks FeatureManager®, PropertyManager dialog boxes, QuickTips, and many of the same mouse and keyboard commands, so anyone who can design a part in SolidWorks can analyze it without having to learn a new interface. It utilizes the power of SolidWorks configurations to test multiple designs. Plus, since COSMOSWorks uses native SolidWorks geometry, design changes made in one program are automatically updated in the other.

Improve product quality. Regardless of industry application, from aerospace to medical, COSMOSWorks provides significant product quality benefits; enabling engineers to go beyond hand calculations and verify proof of concept for their designs. Quick and inexpensive analysis often reveals non intuitive solutions and benefits engineers by providing them with a better understanding of product characteristics.

Avoid field failures. Field failures can lead to costly recalls and liability issues. COSMOSWorks shows how a model will perform under real-world conditions before it is built. This allows engineers to predict the physical behavior of just about any part or assembly under any loading conditions.

Reduce material costs. COSMOSWorks enables designers to meet functional design specifications but not waste materials by overdesigning. Seemingly insignificant amounts of weight cut from dozens of components add up to significant cost reductions in production, shipping, and packaging. You can also test designs with alternate lighter or lower cost materials in COSMOSWorks.

Eliminate the prototyping bottleneck. Nearly 80% of a product's manufacturing costs are locked into the approved design, which is why the ability to perform quick and inexpensive design iterations prior to releasing the design has become a critical competitive advantage. COSMOSWorks makes it possible to perform design iterations quickly and inexpensively on computer models instead of on costly physical prototypes.

SolidWorks

Bundles
Designer
- Linear static, stress and displacement
- Assemblies with gap/contact

Professional
The features of Designer PLUS
- Frequency
- Buckling
- Drop Test
- Thermal

Advanced Professional
The features of Professional PLUS
- Embedded nonlinear
- Embedded fatigue
- Advanced dynamics
- Composites

Add-on Applications
- COSMOSFloWorks - computational fluid dynamics
- COSMOSMotion™ - motion simulation
- COSMOSEMS™ - low-frequency electromagnetics
- Optimization
- Utility Pack
  - FEA translators
  - 30,000-part materials library
    Metals
    Plastics
    MIL-5

Supported Languages
- Chinese
- Czech
- English
- French
- German
- Italian
- Japanese
- Korean
- Polish
- Russian
- Spanish

System Requirements
- SolidWorks 2004 or higher*
- Pentium®- or AMD Athlon™-class processor
- Microsoft® Windows XP Professional or Windows 2000
- 256 MB RAM or greater
- 200 MB disk space or greater
- CD-ROM drive
- Pointing device
- OpenGL hardware graphic support recommended

* COSMOSWorks 2005 requires SolidWorks 2005

Automated analysis tools
- Parameters to define analysis inputs such as material, loads, etc. as well as geometric dimensions
- Design scenarios for quick "what if" studies
- Built-in library of nearly 200 materials, including many with nonlinear properties
- Transitional mesher with user-defined controls
- Mesh failure diagnostics tool
- p-method adaptive technology for automatic convergence to correct results
- Shell analysis using SolidWorks surfaces and extracting mid-surfaces of thin walled structures
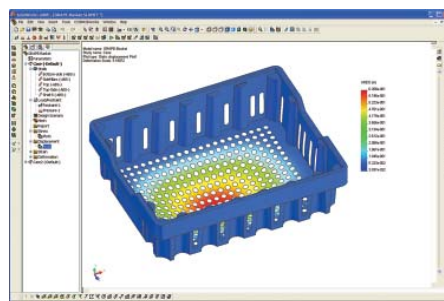
Assembly analysis tools
- Solid meshing of complex multiple part assemblies
- Contact/gap analysis with friction
- Nonlinear large displacement surface contact and friction
- Simulate assembly conditions such as pin, spring, bolt+ & rigid connections, shrink fit (interference fit)

Results visualization tools
- Stress, strain, deformed shape, displacement, energy, error, strain energy density, reaction force, and lists
- Frequency lists, mode shape plots and lists*
- Temperature, temperature gradient, heat flux plots, and lists*
- Design Check Wizard to verify design integrity, factor of safety plots
- Superimpose original model on the deformed shape
- Dynamic viewing of section and iso plots
- Query results (probing of results)

Engineering collaboration tools
- HTML reports
- AVI, VRML, XGL, BMP, JPEG
- eDrawings™ analysis files

COSMOSWorks Designer
Linear static, stress and displacement
- Assemblies with gap/contact
- Prescribed displacements
- Elastic support
- Torque
- Uniform and variable force, pressure
- Bearing loads
- Remote loads / restraints
- Body forces (gravity, centrifugal)
- Pins, spring, bolt+ and rigid connectors

COSMOSWorks Professional
Includes all of the features from COSMOSWorks Designer, PLUS:
- Frequency and buckling
- Drop Test simulation+
  - Specify drop height and orientation
  - Flat or inclined floor
- Thermal analysis
  - Conduction, convection, radiation
  - Steady state and transient with time-dependent loads+
  - Temperature-dependent materials and loads+
  - Temperature, heat flux, heat power
 - Thermostat
  - Thermal contact resistance

COSMOSWorks Advanced Professional
Includes all of the features from COSMOSWorks Professional, PLUS:
- Embedded+ nonlinear analysis tools
  - Plasticity, hyperelasticity, visco-elasticity, including creep
- Embedded+ fatigue analysis tools
  - Design life, partial/cumulative damage
- Advanced dynamics analysis tools
  - Time history, harmonic, random vibration, response spectrum
- Composites

* Professional or greater
+ COSMOSWorks 2005

Using shell element technology, solve thin walled parts quickly and easily.
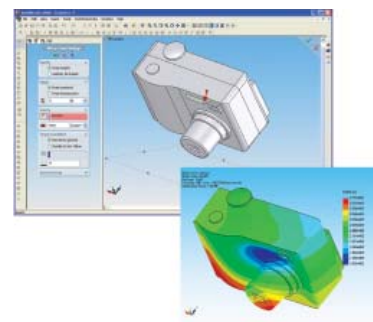
Drop Test simulation studies the effect of impact on a model when dropped from various heights.

COSMOS®