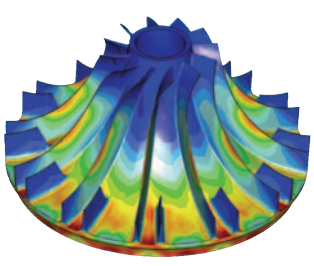
Pro/ENGINEER® Mechanica®

GAIN EARLY INSIGHT INTO DESIGN PERFORMANCE

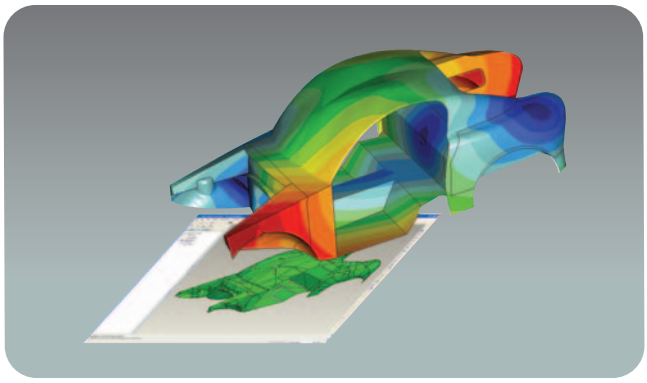
Pro/ENGINEER Mechanica gives designers the power to understand structural and thermal product performance 'on the desk-top', before resorting to costly, time-consuming physical prototyping. By gaining early insight into product behavior, you can vastly improve product quality while saving time, effort and money.

Today's competitive marketplace is forcing design teams to 'get it right the first time'; the earlier in the development cycle that designers can understand product performance, the faster a quality product gets to market. When teams must rely on costly, time-consuming physical prototyping to test product behavior, schedules and budgets are quickly compromised. True, CAE tools offer a solution, but they're usually disconnected from the CAD solution. Thus, engineers must spend valuable time translating data and preparing the model for analysis. Then, each time there's a design change, designers have to repeat the translation process. Moreover, typical CAE tools require users to have an extensive specialized skill set. There's a faster, smarter way to evaluate product performance with a powerful, yet easy to use solution – Pro/ENGINEER Mechanica.

With Pro/ENGINEER Mechanica, design engineers can better understand product performance and then optimize the digital design – early on in the design cycle, without needing a background in simulation. As an integral part of Pro/ENGINEER, Pro/ENGINEER Mechanica has the same user interface, workflow and productivity tools that are prevalent throughout Pro/ENGINEER. Thus, product designers can enjoy the same industry leading power, performance and associativity of Pro/ENGINEER for their analysis needs, without needing to learn a new program. In addition, Pro/ENGINEER Mechanica analyzes native Pro/ENGINEER models and stores the analyses in the model files. This means no data translation and data management is streamlined.



In Pro/ENGINEER Mechanica, we can easily determine where the higher stress areas are on this turbine and make adjustments to the model as needed.



Pro/ENGINEER Mechanica allows you to analyze displacement and identify problem areas. Once we update the design, we can easily re-run the analysis, without recreating it.

With the ability to evaluate product performance on-screen, Pro/ENGINEER Mechanica gives engineers the freedom to explore new ideas and design variants, then optimize their designs. Meanwhile, they will have confidence that new designs will satisfy performance requirements, require fewer changes during physical prototyping and deliver superior value.

Key Benefits

- Gain early insight into product performance and discover design flaws early as you increase first-time build success
- Improve user efficiency with an intuitive, familiar user interface
- Obtain realistic performance data and improve product quality by directly applying real-world conditions to design geometry
- Evaluate more scenarios than with physical prototypes
- Save time and reduce errors by working in a seamlessly integrated design and simulation environment – with no data translation
- Increase innovation by simultaneously designing and simulating design variations
- Decrease development costs by reducing or even eliminating physical prototyping
- Capture the knowledge of your simulation experts and make it accessible to others using the Process Wizard, a structured, customizable wizard that guides engineers through the simulation process

Pro/ENGINEER Mechanica

Features and Specifications

Advanced Adaptive Solution Ensures Results Accuracy
- Powerful technology drives solution result accuracy
- Automatic convergence gives designers confidence in results
- Capture actual model geometry as designed, not as an approximation as in traditional analysis packages

Broad Range of Analysis Capabilities
- Analyze static stress and displacement
- Evaluate natural frequency
- Solve for buckling factors of safety
- Perform steady state thermal analyses for temperatures and fluxes

Thermal Analysis Capabilities
- Apply heat loads, prescribed temperatures and convection coefficients for thermal models
- Import thermal boundary conditions from Computational Fluid Dynamic (CFD) analyses
- Solve coupled structural thermal analyses

Querying, Interpreting and Communicating Results
- Query results values directly on the model using simple mouse clicks and get results in fringe, iso-plot, vector plot or graph
- Output MPEG, VRML, JPEG, EXCEL, TIFF and HTML reports
- Automate results-creation using templates
- Compare model iterations side-by-side

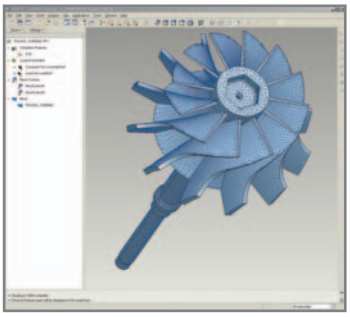
Scalability to Address Your Needs
- Output, solve and post-process the model in either NASTRAN or ANSYS

Robust Set of Tools for Modeling Assemblies
- Model spot, end and perimeter welds
- Define contact between components as free, bonded, or nonlinear
- Simulate bolt or screw connections with fasteners
- Automated midsurfaced assembly modeling

Meshing Tools for Tackling Tough Jobs
- Mixed meshing options (solids, shells and beams)
- Flexibile meshing options offer both automatic meshing or with user control
- Automated geometry cleanup and diagnostics

Multiple Modeling Entities to Simulate Complex Designs
- Springs, masses, beams and shells
- Specify the degrees of freedom at beam ends
- Library of standard sections for common beams

Leverage All that Pro/ENGINEER Offers
- No separate data files; one file stores all simulation and design data
- Model units and material properties are shared with the design model
- Integrated with Pro/ENGINEER Behavioral Modeling Extension, for more advanced design exploration such as design of experiments
- Apply loads from Pro/ENGINEER Mechanism Dynamics Option to a structural analysis
- Compatible with advanced Pro/ENGINEER modeling tools such as simplified reps, inheritance features and assembly merges
- Automated mid-surface extraction for sheetmetal and thin solid parts



Pro/ENGINEER Mechanica gives you the option of uniformly meshing a model, as we see here, or customizing the mesh for tailored results.

Design Improvement and Optimization Tools
- Track results at specific locations
- Conduct optimization and feasibility studies to improve initial designs
- Answer "what if" scenarios using sensitivity studies
- Parametrically vary properties in your simulation model

Structural Boundary Conditions including...
- Enforced displacement, mirror and cyclic symmetry constraints
- Force and moment, bearing and pressure loads
- Gravity, angular acceleration/velocity body loads
- Inertial relief
- Temperature loads
- Vary loads as a function of coordinates or table data

Language Support
- English, German, French and Japanese

Platform Requirements
- Microsoft Windows (XP, 2000)
- UNIX platforms (Solaris, HP-UX)

For specific operating system levels, visit:
www.ptc.com/partners/hardware/current/support.htm

The Pro/ENGINEER Advantage
Every Pro/ENGINEER module delivers an advantage over other CAD/CAM/CAE products due to the power of associativity; any change in the design is automatically reflected in the analysis, without any translation of model information between applications. By eliminating the data translation step, you not only save time, but you also avoid the chance of introducing translation errors in your design. This application integration is especially powerful in simulation modules, where addressing design flaws can be an iterative process. With full associativity across CAD, CAM and CAE functions, Pro/ENGINEER gives you an advantage that no other application offers.

1725-MECH-0406