



new!

PTC Product Focus: A) [What's New in Mechanica for Wildfire 3.0](#)

B) [Arbortext Editor and DITA](#)

new!

Tips of the Month: A) [How to use Behavioral Modeling with Mechanica](#)

B) [ArborText/Windchill Integration Allows True Content Reuse](#)

Announcements: [Most Recent Announcements](#)

Upcoming Events & Training Schedule: [Events & Training Schedule](#)

PTC Product Focus

What's New in Mechanica for Wildfire 3.0

Costly and laborious prototyping hinders a design team, resulting in compromised schedules and budgets. However, with Mechanica, designer engineers can better understand product performance, and accommodate the digital design accordingly -- all without needing a specialist's FEA-background. The result: engineering gains early product insight and delivers higher quality products at lower cost.

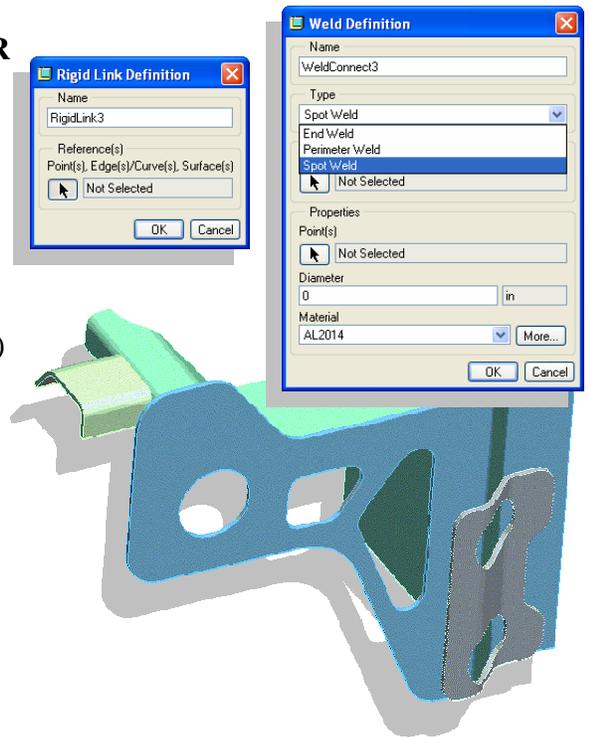
Competitive conditions force design teams to "get it right the first time," making it critical to understand product performance early in the development cycle. With a complete range of advanced capabilities, Mechanica enables engineers to fully evaluate and optimize their designs, improving product quality while reducing prototyping expense.

With the introduction of Wildfire 3.0, PTC continues to expand on the already powerful capabilities found in Mechanica. Read on to learn what's new in Mechanica for Wildfire 3.0.

Usability Improvements

Remaining Mechanica objects merged into Pro/ENGINEER

- Including...
 - Spot welds
 - Rigid connections
 - Contact regions
- Enhanced capabilities include...
 - Improved UI
 - Object-Action interaction (direct editing)
 - Layers support
 - Model tree support
 - Improved display and controls
 - Much, much more...

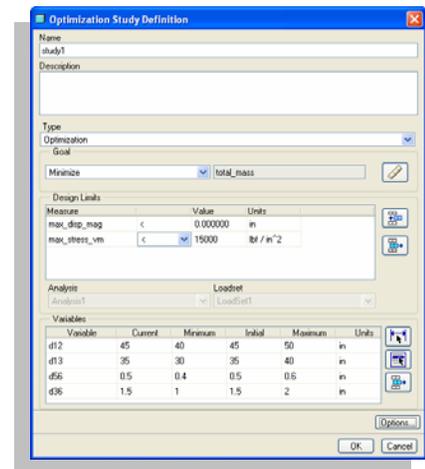


Automatic Contact Definition

- Select components and separation tolerance
- Contacts are automatically created

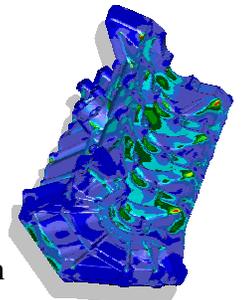
New design study UI

- The last of the “Old Style” UI to be removed
- Usability improvements to...
 - Optimization definition
 - Sensitivity study definition
 - Design Studies
- No more design variable definition
 - Use dimensions and parameters directly
- Greater control of optimization settings
- Feasibility studies added



Many smaller improvements....

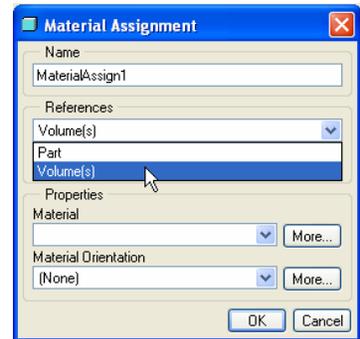
- Selection/Copy enhancements
 - Copy and Paste of simulation modeling objects
 - Multi-selection for delete
- Hide/Unhide for simulation objects in model tree
- Exploded views supported in modeling
 - Contact definition is much simpler
 - Define connections in exploded state
- Results improvements
 - Dynamic query labels don't erase when spinning model
 - Spin center control allows rotations about a user selected location
 - Legend settings don't reset when window is edited



Functionality Improvements

Volumetric assignment

- Ability to assign materials by volume
 - Volume regions in a part can have different properties
- Ability to assign heat loads by volume



Inertial relief

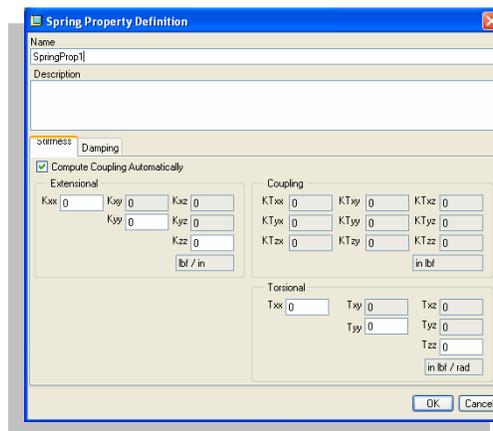
- This is the ability to run static analyses on “unconstrained” or “under constrained” models
 - Users simply select a checkbox on the analysis definition dialog
- Externally applied loads are balanced in the solver by equal and opposite body forces (accelerations)

“Weighted” links in Mechanics

- Similar in functionality to NASTRAN RBE3
- A point is tied to move the average of the displacements of selected geometry
- A great tool for “smearing out” singular effects over more of a model such as point loads

Advanced springs

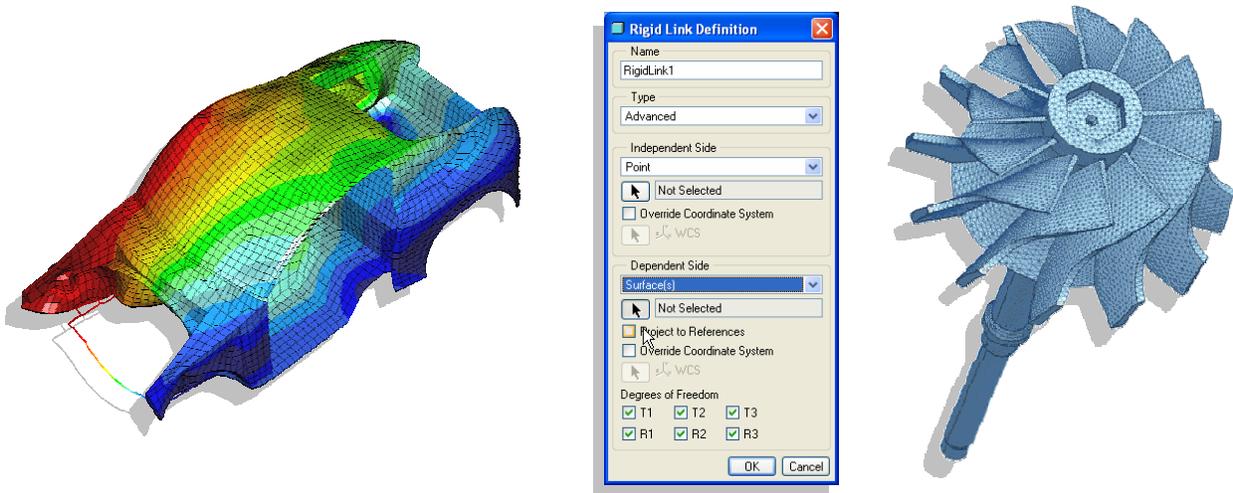
- Now advanced spring definition is supported inside of Pro/ENGINEER
- Full stiffness and coupling matrix may be defined
 - Users also have the option to disable the “auto coupling” of simple springs



FEM Improvements

FEM mode specific enhancements

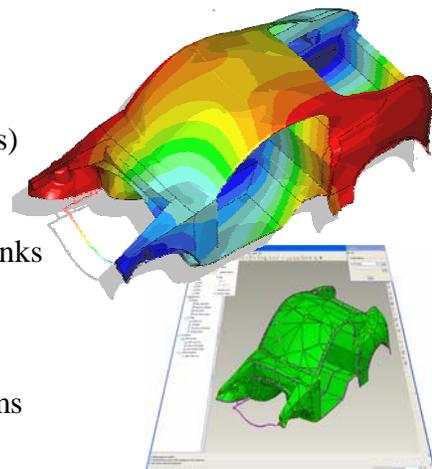
- Spot weld connections supported for ANSYS and NASTRAN
- Rigid links enhancements (one to many)
- New modeling entities output to ANSYS
 - Rigid links
 - Beam releases
- Display only mode in Run dialog
 - Allows preview of output without writing the model to file
- Supported solvers include...
 - ANSYS 9.0
 - MSC.NASTRAN 2005 r1



Robustness Improvements

Robustness

- Meshing robustness
 - Very large model AutoGEM robustness (200K+ solids)
 - FEM solid and tri surface meshing robustness
- “Assembly modeling methodology” in FEM
 - Mid-surface compressed models “joined” with rigid links
- Tolerance report



Performance Improvements

- Removal of the 8 Gb memory limit on 64 bit operating systems
- Mechanica running on Linux
- Windows XP 64-bit support
 - Intel Xeon 64
 - AMD Opteron 64

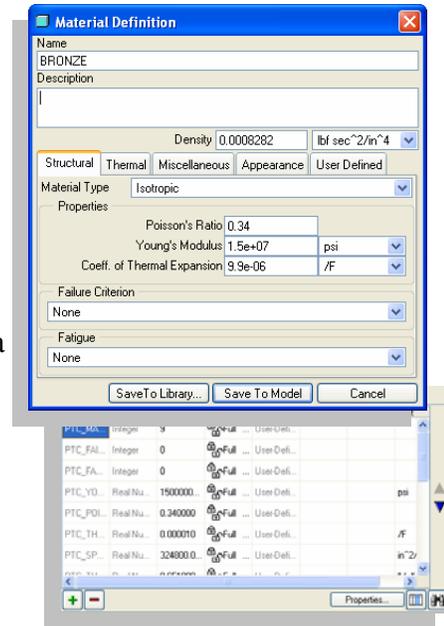
New Materials Definition UI/Database

Materials in Pro/E are completely overhauled

- Materials in Pro/E are being enhanced to support Simulation requirements
- Database will be open and extendable
 - Including the ability to add user defined parameters to materials
 - Each materials property has units associated
- Part materials will be “seen” at assembly level in Mechanica

New functionality includes...

- User defined material parameters
- Assign materials in family tables
- Assign appearance by material



New Process Guide

A user customizable “wizard” that can be used alongside the standard user interface

- Defined by a user specified xml file
- Each “process” consists of one or more tasks
- Users simply follow the steps listed in the tasks

What problem does Process Guide address?

- Some Product Development activities are very “process oriented”, such as manufacturing or analysis
- It is not uncommon for an engineer to perform analysis only a few weeks a year
 - If a design cycle is 9-12 months, only a few weeks of that time may be simulating the design...
- Some analysis tasks consist of repeatable processes
 - These may be dictated by expert users or analysts
- Pro/E’s simulation tools are robust and easy to use, but for infrequent users the difficulty is not in the “clicks and picks” but in the sequence of events

The process is made up of discrete tasks

- “Experts” or consultants can define process templates
 - These are an xml file with the data that will populate Process Guide
- 37 different actions and may be defined, including...
 - Info links – links to online help, company intranets, etc...
 - Action links – loads, constraints, idealizations, etc...

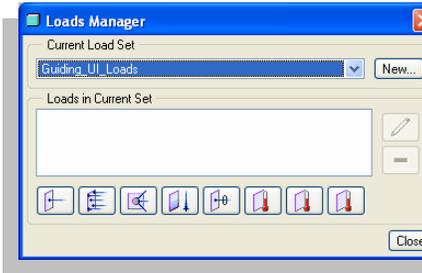
The resulting process file has some intelligence

- If created entity is deleted, task is invalidated
- Sub-steps may be created
- Some tasks are order dependant

- Analysis must be run before results may be viewed

Each task may contain

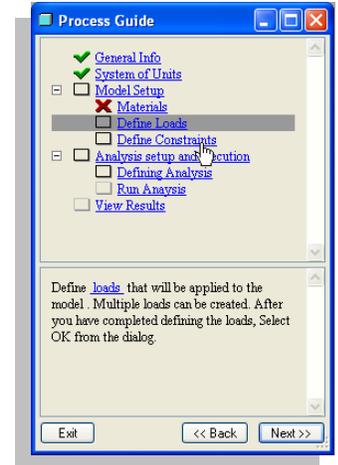
- Text
- One action and multiple informational links
- Embedded images



```

- <GuidingUIProcess>
  <header product="GuidingUI" fileVersion="1.0" />
  <!-- Process Definition for StaticAnalysis -->
- <process id="0" name="StaticAnalysis">
  <task id="1" object="ModelType" type="PStructural" />
- <task id="2" object="Info" label="General Info">
  - <description>
    This process template will guide users through the setup, solution
    results of a generic static analysis.
  <br />
  <br />
  For more details on the commands and dialogs used, the online
  accessed through this
  <infolink href="D:\User Profiles\ckatsis\My Documents\W\scratch
  \static_over.htm">link</infolink>
  </description>
</task>
+ <task id="3" object="UnitInfo" label="System of Units">
  <!-- Setup model task w/ loads, constraints, materials sub-ta
+ <task id="4" object="Info" label="Model Setup">
  <!-- Analysis setup and execution -->
+ <task id="10" object="Info" label="Analysis setup and execution">
  <!-- Show results for run of the analysis created in task 11
+ <task id="13" Object="ResultTemplate" Label="View Results" analysis="
  template="GENERIC_STATIC.rwt" mode="combine">
</process>
</GuidingUIProcess>

```



More Information on Mechanics What's New

To find out more about Pro/ENGINEER's [Mechanica](#) visit our Website.

[Back To Top](#)

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[Back To Top](#)

Tips of the Month

How to use Behavioral Modeling with Mechanics

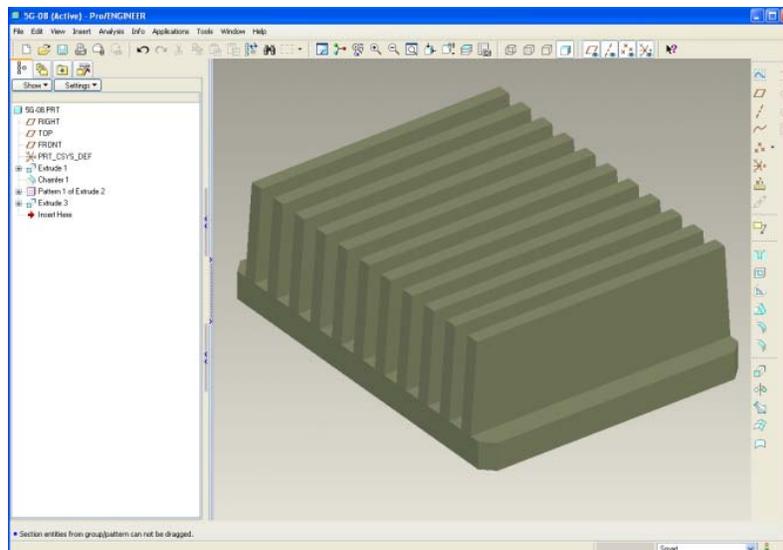
Pro/Engineer Wildfire gives you the ability to create behavioral modeling features using a previously defined Mechanics analysis. This enables you to create very powerful features to not only determine the correct geometry in your model, but help you drive to an optimal performance based model.

Here are some examples of how this could be used.

- How much force is required to move my part beyond the yield stress of my material
- How much force is required to move my part a given distance
- Optimization of a model based on surface area and stress

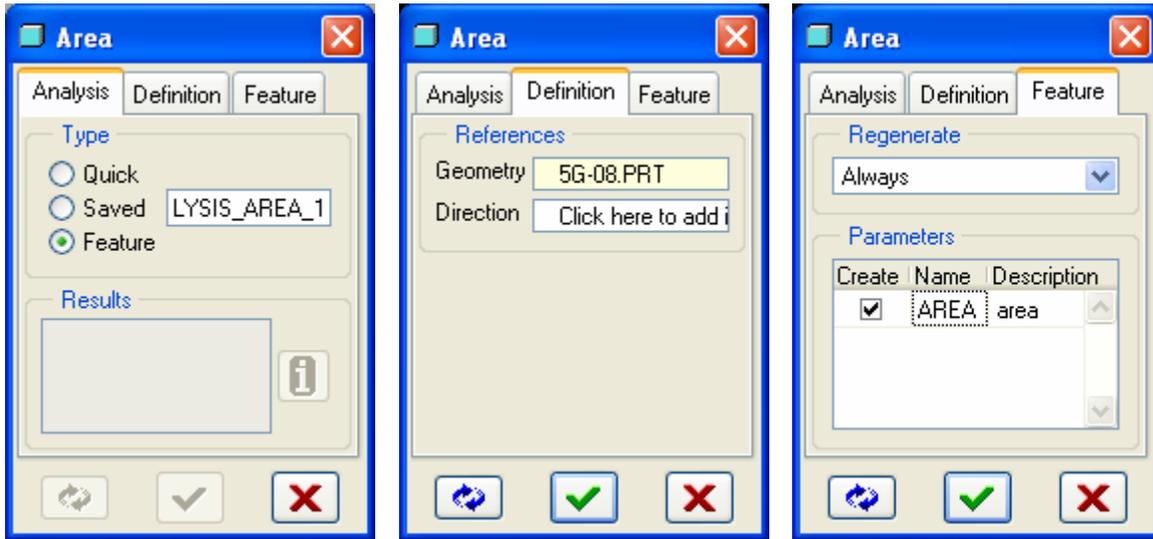
This capability takes many engineering problems that face designers everyday and gives them a simple method to let Pro/ENGINEER and Mechanics solve them in much less time than using any other method. The example that will be highlighted below is just one example of how you could use this technique to reduce your design time and improve the performance of your product.

The goal of this exercise will be to take a heat sink and optimize it based on surface area and natural frequency. These two measurements are very easily captured using Pro/ENGINEER and Mechanics, but what if you were to use these two measurements to determine what you want the final part to resemble? That is what we are going to do in this example.



The first step in this example is to find out what the surface area of the heat sink is. We don't want to just find out the static answer of what it is and write it down. We will use an analysis feature to do this measurement. This example is done with Pro/ENGINEER Wildfire 3.0, but the same basic techniques are used in any version of Pro/ENGINEER that you are using.

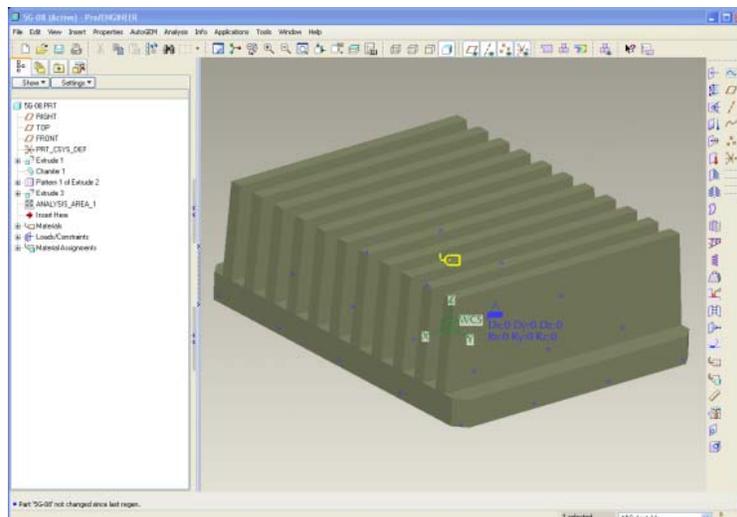
Analysis>Measure>Area. Create this measurement and save it as a feature. In this case we are measuring the area of the entire part. The following dialog boxes are displayed.



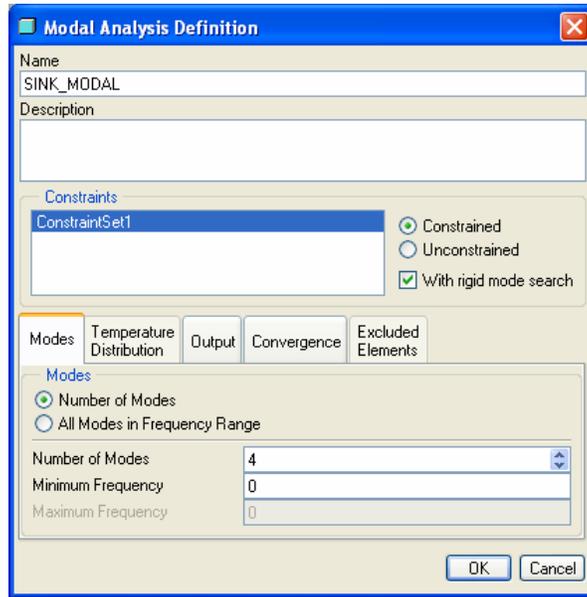
The surface area of the entire part is currently 95.5 in² and is now displayed as a feature in the model tree.

The next step is to run a modal analysis of this part inside of Mechanica. This will give us a reference for when we run our behavioral modeling analysis feature later.

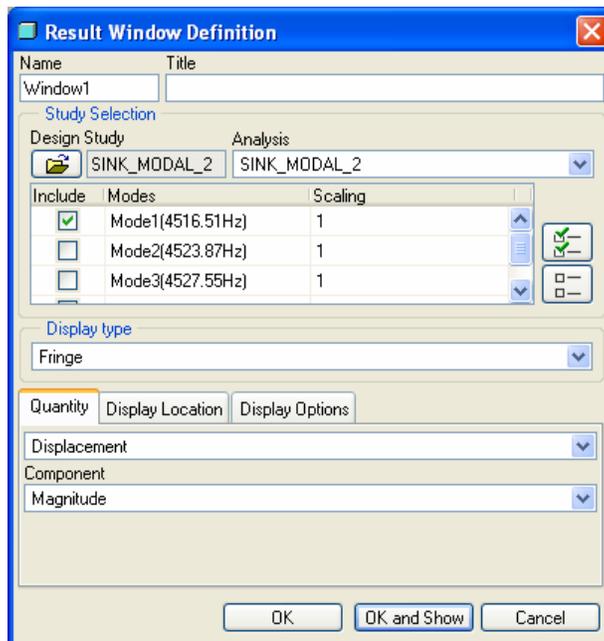
Applications>Mechanica. One constraint is applied to the model to hold the heat sink fixed on the bottom surface. Also, material properties are checked to assure that the material is correct. It looks like this in Mechanica.



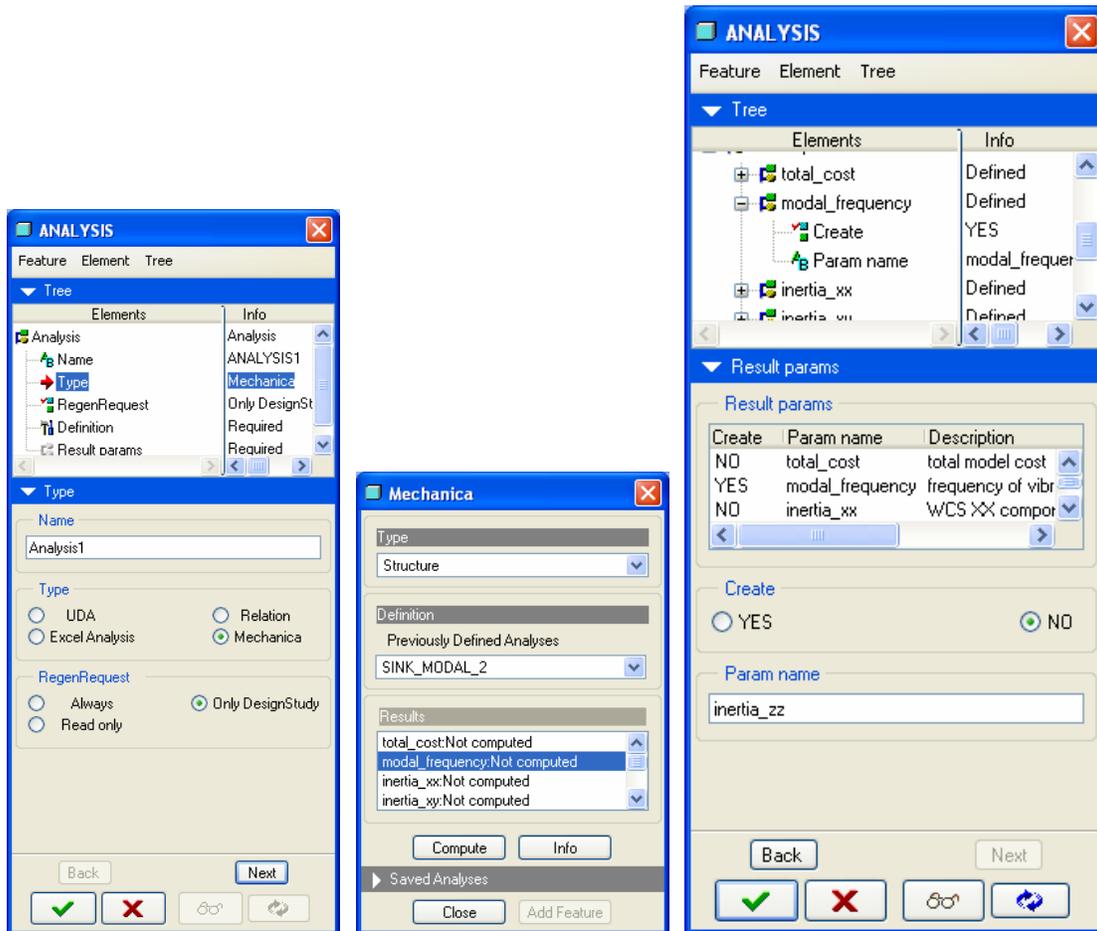
An analysis is then set up to run a modal analysis. In this case, we'll check for the first 4 modes.



Mechanica then works its magic and comes up with the natural frequencies of this heat sink. The first mode of natural frequency is 4517 Hz. We will be drastically changing this value in our example. The next step will be to set our Analysis Mechanics feature. Below is a picture of the Mechanics result so far.

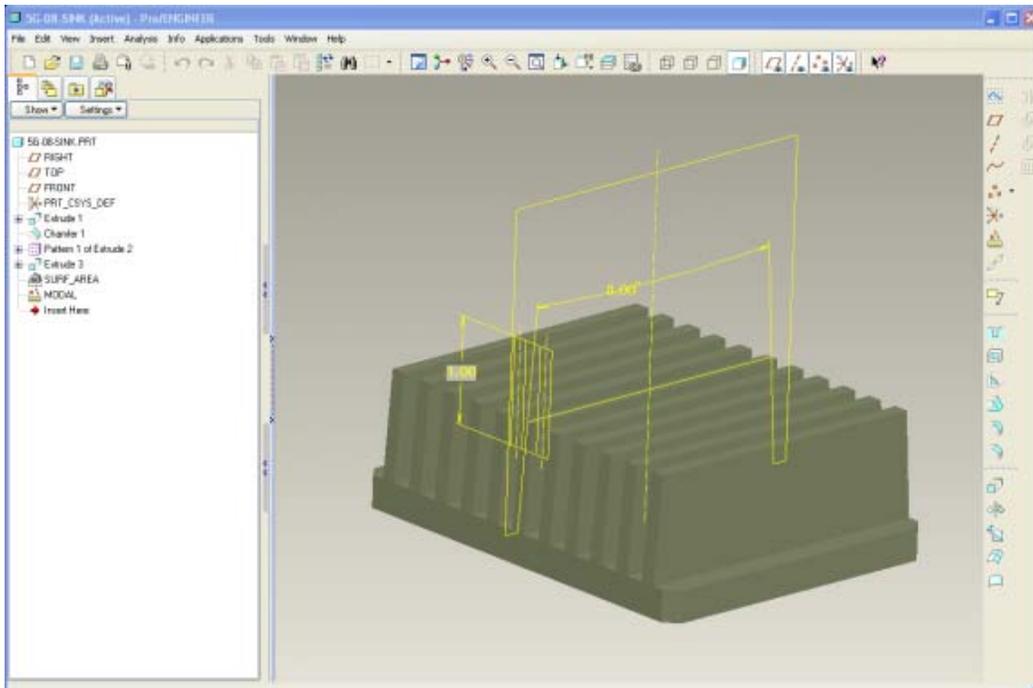
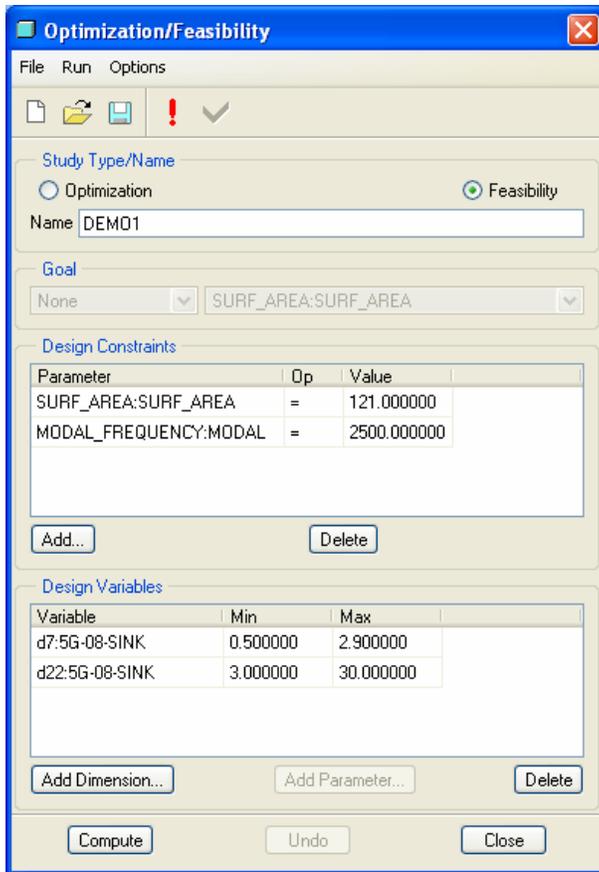


Go back to standard mode in Pro/ENGINEER and start the Analysis feature wizard. Select Mechanics for the type. Then click on compute to have Mechanics solve for all the values in the list. Once the analysis is complete you will see values for all the fields. You then select either yes or no for which parameters to create. In this case the only one that we want is the modal frequency value. Once we have this parameter, we now can optimize on it in addition to the surface area parameter that we already have.

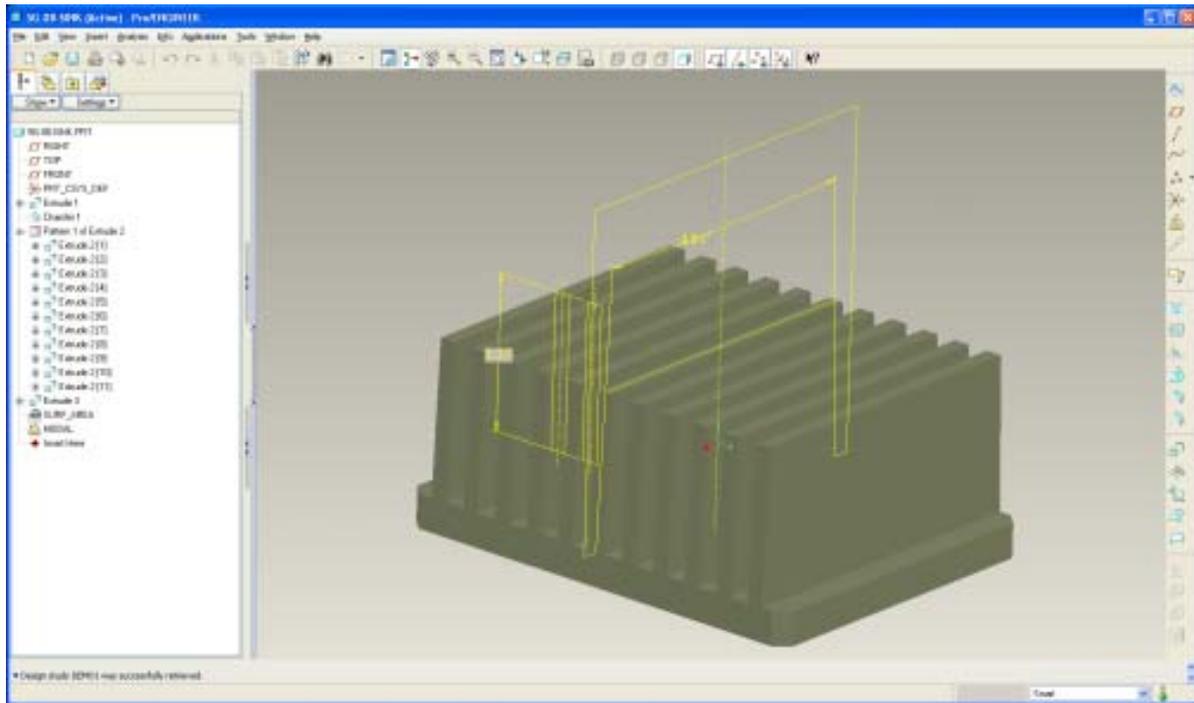


The next step in the process is to initiate a feasibility study. Analysis>Feasibility/Optimization. Feasibility studies are ran when you know the answer that you are trying to get. Optimization is used when you would like Pro/ENGINEER to solve for the best possible solution within the range of values that you've given as variables.

In this case we are going to have two constraints or desired outcomes and two variables. The two design constraints are to increase the surface area from 95.5 to 121 in² and to decrease the modal frequency by about half the original value. Two variables are defined, one is the fin height and the other is the chamfer angle of the heat sink. You can see the ranges in the given dialog box. Also shown is the model and the values chosen from it.



After executing the feasibility study, it runs for approximately five minutes and the results are right on target. The surface area increases to the desired amount and the first mode of natural frequency drops to approximately half of the original value.



The fin height increases from 1 inch to 1.37 inches and the angle of the heat sink walls went from 8 degrees to 4.81 degrees. The feasibility study was very successful and the engineering requirements are now right where they are supposed to be.

I hope that you found this tutorial enlightening on how you can use Analysis features more often in your design activities. Remember that whenever you are making tedious inputs in trying to capture a desired result such as any mass property value, try using behavioral modeling features to make your work easier

Work smarter, not harder.

[Back To Top](#)

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[Click Here To View](#)

[Back To Top](#)

Announcements

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Learn things you always wanted to do - but didn't know you could.

This one stop educational resource library will help you learn more about PTC Solutions and provide you with technical materials developed by the product experts to help you become more productive.

Get tutorials, how-to videos and expert advice for:

- Pro/ENGINEER
 - Conceptual and Industrial Design
 - Detailed Design
 - Simulation/Analysis
 - Production
 - Design Collaboration
- Windchill PDMLink
- Windchill ProjectLink
- Pro/INTRALINK
- PTC Online Tools

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[Tips & Techniques: Work Smarter Not Harder!](#)

E-PROFILES IS HERE!!

We have been eagerly anticipating the debut of the new electronic version of Profiles Magazine and now it is here! This new web site will supplement the print edition of the magazine and will

provide new useful features not feasible with paper media. e-Profiles will provide you with 24x7, worldwide access to key information previously available exclusively in the print version. "Tips & Tricks," a popular feature pioneered by Pro/USER, has also moved to the web and will be expanded as the site matures.

Please take a few minutes to check out this new web site. We don't think you will be disappointed.

<http://profilesmagazine.com/>

[Back To Top](#)

Upcoming Events & Training Class Schedules

Upcoming, 2006 Your local Pro/Engineer User Groups
<http://www.ptcuser.org/rugs/>

June 3 - 6, 2007 Tampa, Florida
PTC/USER International Conference
<http://www.ptcuser.org/>

Events

Our seminars and conferences seek to provide you with relevant information regarding product development trends in your industry as well as innovative software learning experiences. Think of them as a constructive day off where you can share experiences and swap ideas with your peers.

If you can't manage to get away, we'll bring it to you. Check back often for regularly scheduled live webcast events.

[You're Invited to Attend...](#)

Please visit the [PTC Education Services](#) website for the latest training information including course descriptions, schedules, locations, and pricing.

- Attend a course at any PTC Center and receive a **free** copy of Pro/ENGINEER Wildfire Student Edition!

<http://www.ptc.com/services/edserv/index.htm>

Live Instructor-Lead Virtual PTC Training Courses

Virtual Classrooms provide interactive learning with a trained PTC instructor in convenient and manageable sessions that last approximately 4 hours over a series of days. It's easy to join a class right from your desk using a phone or voice-over IP technology.

Sessions are performed just like a traditional ILT (including interactive exercises where you and the instructor can work on lab exercises together) and feature some of our most popular ILT courses. These sessions cover the exact same material as the traditional ILT in-center courses. Also look for some of our most frequently requested mini-topics delivered in the same format that are only an hour - two hours in duration.

If you have any questions about these sessions or would like to see getting other courses, not on this list, on the schedule please feel free to contact me for more details. They are a great way to bring training to you without you having to worry about location or being out from work for long stretches.

You can register for these sessions just as you would for any normal ILT class either by:

1. calling order admin at <http://www.ptc.com/services/edserv/training/registra.htm> or
2. you can go to PTC University directly at <http://www.ptc.com/learning> and submit a registration request directly. All you have to do is search the catalog by typing in “virtual” in the search field and you will see a listing.

PTC

Note: This PTC E-Newsletter will continue to be used for the following:

- 1) Inform you on events related to PTC products (user groups, conferences, training schedules, etc.)
- 2) Educate you on solutions that are available at PTC
- 3) Tips & Techniques using PTC Products

Note: These messages are compiled in the local PTC office and will be distributed via e-mail.

[Back To Top](#)