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new!

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PTC Product Focus

What's New in Warp for Wildfire 2.0

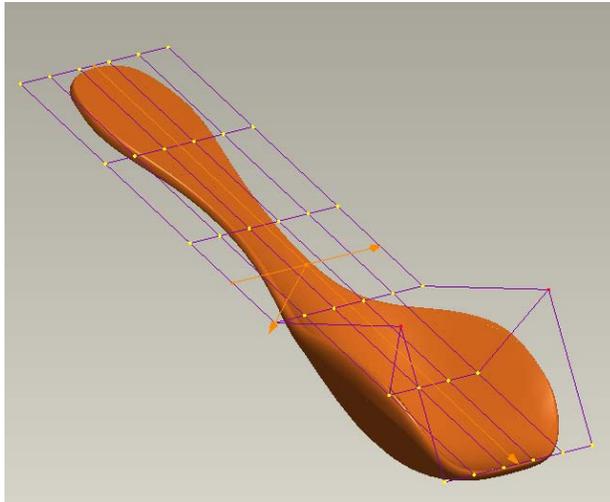
Warp is included in all seats of Pro/ENGINEER as core functionality. While not technically a "product," it represents an area of Pro/ENGINEER that can provide enormous return without a great deal of effort. Wildfire was the first release of Pro/ENGINEER to contain the Warp feature. Adapted from algorithms that originally existed in legacy PTC products such as ICEM and CDRS, the Warp feature enables the user to Warp, Stretch, Bend, Twist, and Transform the boundary geometry of a part. A Warp feature can even be placed on geometry imported from another CAD system that would have previously been considered impossible to modify. The uses of the tool can be anything from incorporating complex model transformations in the beginning or middle of a design to making last minute emergency changes and it can even be used in conjunction with analytical tools to predict distortion. Since the end result is still a Boundary Rep model, the geometry is capable of being machined, tooling for molds can be created from it, and as you will see in the tip of the week, it can be meshed and analyzed using Pro/E Structural and Thermal Simulation.

For those of you who have not yet worked with the feature, you simply choose Insert/Warp . You can select a solid, facet, a set of quilts, or a set of curves on which to perform the Warp operations and then middle-click. You next select a coordinate system or datum plane to be used as a reference for the Warp and middle-click. You are then given a new set of icons that you can choose from to perform the commands mentioned above.



While somewhat useful in Wildfire, the new functionality in Wildfire 2 really makes the tool practical. These new tools are called Sculpt, Spine, and Bend Damping. In the first release of Warp functionality, global changes were being made to geometry bounded by a box and you ended up having little local control on surfaces or geometry. The added functionality now gives the user localized control that was lacking in the prior release.

The first tool called Sculpt , was originally called the Inflate/Deflate tool by the developer. For those that use Warp a great deal, they now end up using this more than any other portion of the product. To better describe Sculpt, it is simply shape control via a surface mesh.



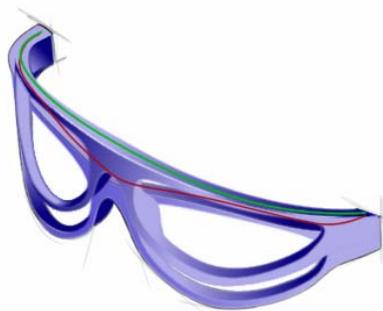
To see more this functionality click [here](#). Be sure to click on the Images and Video at the bottom of the page. The following is the toolbar for Sculpt:



The first icon lets you change the orientation of the grid. You can place the grid on any of the 6 faces of the model's imaginary bounding box but you can also reduce the size of the grid so that it does not affect the entire model. Using the previously mentioned damping, you can assure that geometry that needs to be unaffected by the Sculpt remains that way. The next 3 icons allow you to make the changes only to the side of the model closest to the grid, to opposing sides in the same direction, or opposing sides in opposite direction (as in an inflation or deflation). The coarseness of the mesh is easily modified by changing the number of rows and columns.

Each one of the yellow dots on the grid can be pulled up or down to affect the shape of the underlying part. You can move an entire row of dots at once by simply picking the purple grid line that connects them. As seen in the video, you can incorporate symmetry.

The next area of enhancement came in the feature called Spine . With this tool, you can locally deform individual curves on the model.

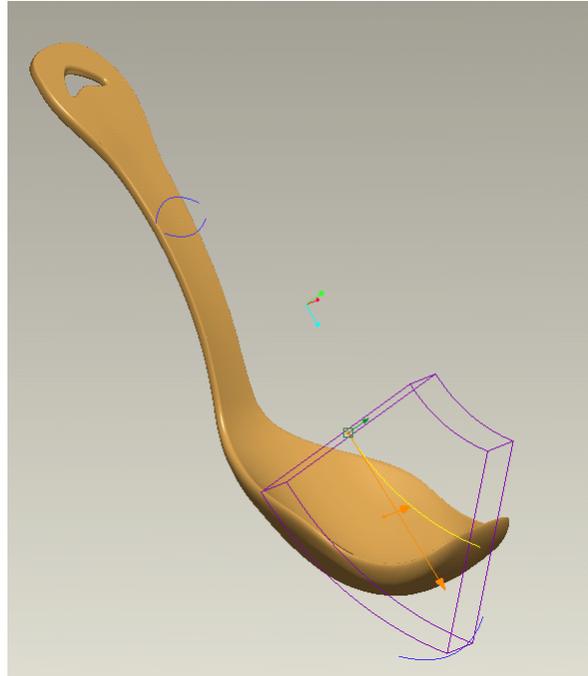


A full explanation of the feature can be found [here](#). As in the previous example, be sure to pick on the Images and Video at the bottom of the page. The following is the toolbar for the Spine:



The first icon allows you to transform the model in a rectangular fashion by dragging an edge. The second icon changes the model radially (great for axisymmetric parts) and the last lets you drag geometry axially. The Extend Curve checkbox allows you to work with the connection between what you are transforming and what remains unchanged. This check box is in many cases un-checked.

The final area of enhancement in Wildfire 2 came with Bend Damping.



For more information on this functionality, see [here](#). This is used when you want to introduce a bend but you do not want the bend to traverse across the entire model.

When using the Warp in Wildfire and Wildfire 2, the functionality works great for small models and the benefits are so great that when working with a large model, the user may be able to overlook the fact that it does get slow. In Wildfire 3, which is currently available for download in Pre-Production form, our developers added the lightweight preview. This is the same surface preview that you see when you create a traditional feature in Wildfire like an extrude. With the lightweight preview, the performance of the warp has been made orders of magnitude faster for large models.

More information on the lightweight preview can be found [here](#).

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PTC Product Focus

Pro/ENGINEER Wildfire Workspace Enhancements in Windchill PDMLink 8.0

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Tips of the Week

Using Warp to Simulate Deformed Geometry in an Assembly

As mentioned earlier, new Warp capability added in Wildfire 2 is Sculpt, Spine and the added concept of Bend Damping. The Sculpt and Spine really lend themselves to allowing the user to modify a model to include deformation due to physical loading.

After a traditional Pro/E Structural Simulation (otherwise known as Pro/MECHANICA Structure), you may be left with deformed geometry similar to the component below:

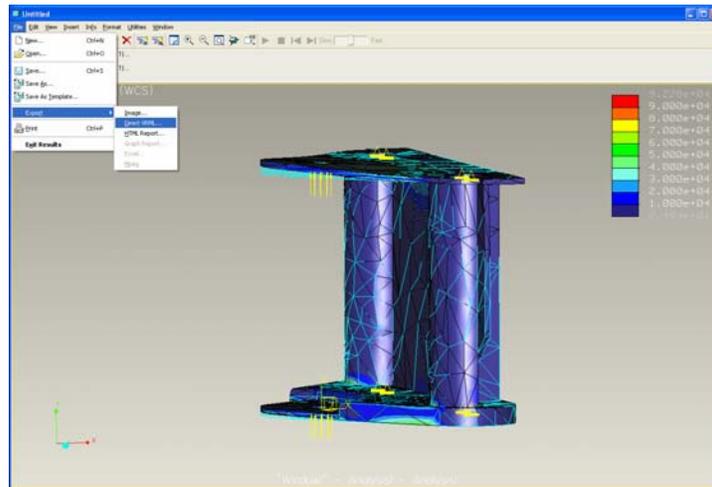


Figure 1. Deformed Geometry in Pro/E Structural Simulation

In order to assure that the deformation is accurate, be careful that you do not have the deformation scaled to a value of anything other than 1. You do this by un-checking the box for Scaling Percent and you put a 1 in the box for Scaling.

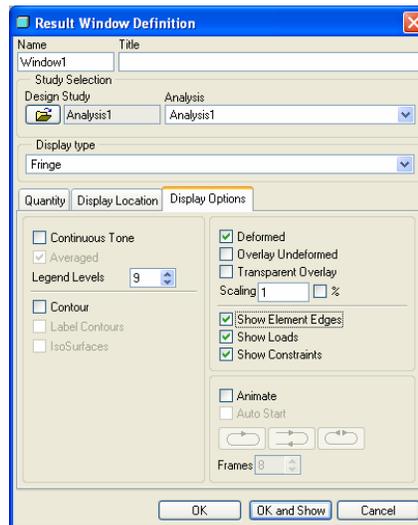


Figure 2. Post processing Display Options Dialog Box

The next thing you will need to do is export a VRML file of the deformed geometry. This is done by choosing File/Export/Direct VRML (a vrml file consisting of the deformed model geometry). This file with a wrl extension is a rather large file (this yoke part was originally 500k or so and the exported VRML file is about 7Mb).

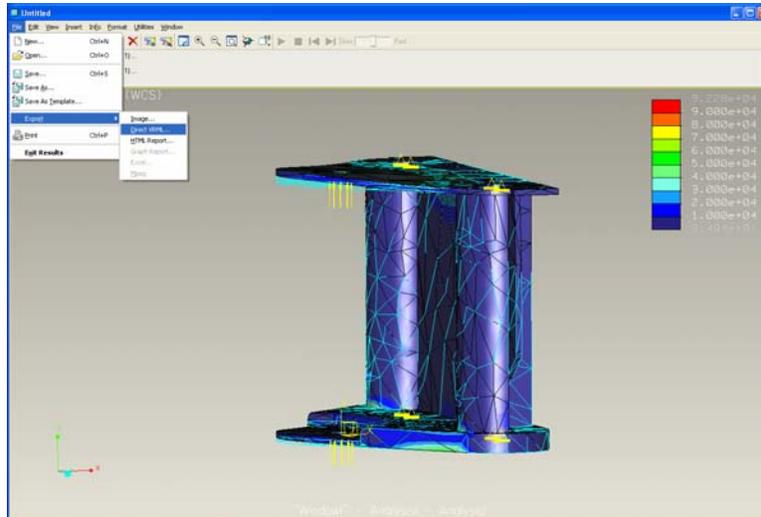


Figure 3. Commands required to export deformed Geometry

You may be able to use this tessellated model in your assembly directly first by creating a part and importing the wrl file that was exported from Pro/E Structural Simulation, however, this would only be for visual feedback as you cannot measure distances and clearances from a faceted model to regular Pro/E geometry nor can you include the facet model in an interference check. Not to worry though because we can superimpose the design model on top of the faceted model showing the differences in geometry.

One thing to note here is the output model scale comes out a little screwy. If you are working in units of inches, it is likely that the output model will be larger than it should be by a factor of 39.37 (or 1/.0254) because Pro/E is using units of meters during export of VRML. There is a TAN 127801 which explains this. What I usually do here is scale the model down by using a scale factor of 0.0254 (or 1/39.37).

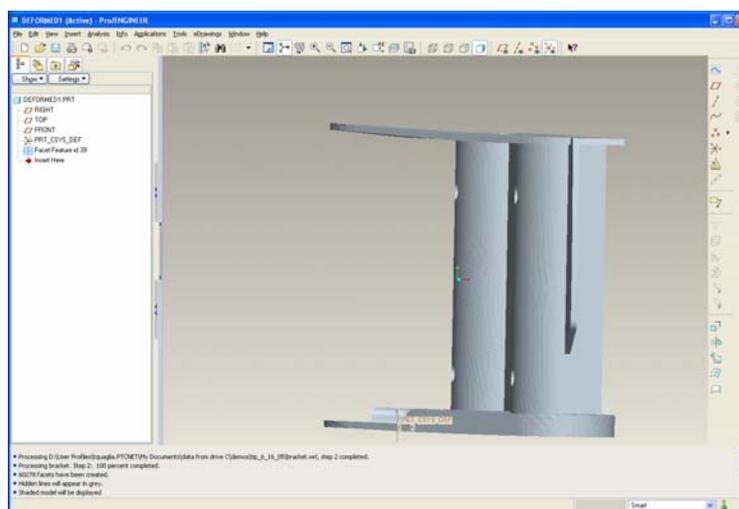


Figure 4. VRML data imported into Pro/E model

To end up with a truly usable model, you simply need to superimpose your tessellated model that was constructed as a result of the Simulation deformation on top of your original design model. If you have no

issues with creating an assembly, you can simply have just these two parts. If you choose to assemble the tessellated model into your assembly, be sure to filter it out of the BOM.

The next thing we do is import a Warp feature to distort the design model to look like the deformed model. We do this by first Activating the design model and inserting a Warp feature. For this example, you get pretty good results if you use the Sculpt command. You simply make the grid a decent distribution and start pulling on points until the design model matches the distorted model. Note that this model is negligibly bigger in file size than the original design model that this was made from.

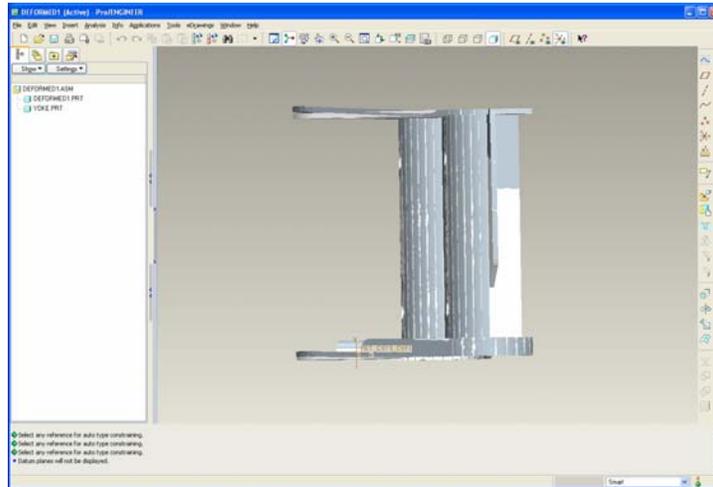


Figure 5. Superimposing tessellated deformed model on top of original model.

Because this new distorted model is a Surface Boundary Representation (BREP), it is much lighter weight than the tessellated model. You will have the ability to measure distances and clearances to and from it. You can check for interferences with this model. Most interesting of all, you can even re-mesh and resolve the model using Pro/E Structural Simulation. This is helpful if a model has undergone creep and now needs to be loaded up again.

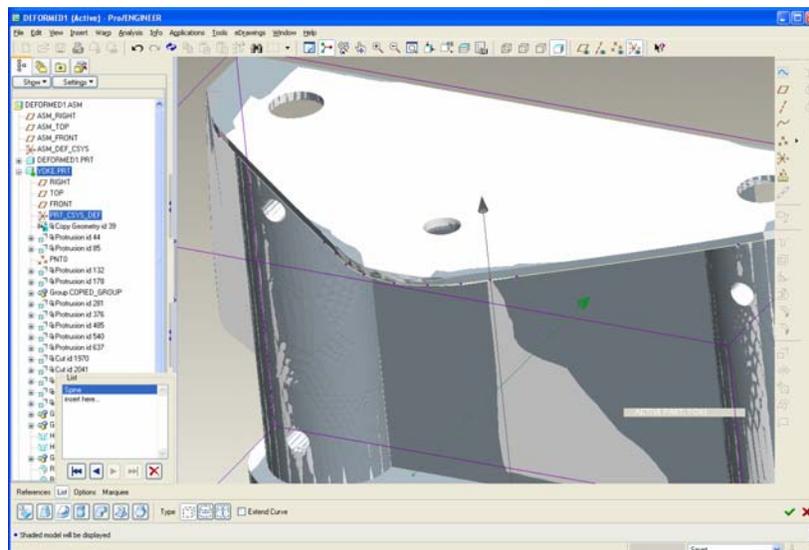


Figure 6. Example of matching Spine feature to the deformed geometry.

This Warp feature can easily be turned on or off by suppressing or resuming it. It is also quite stable because it acts on the boundary of the part instead of forcing a regeneration of all features before it. This Warp feature may be added to a Family Table. You can have multiple Warps in a Family Table and you

can also have more than one Warp feature present. Aside from being a really neat tool, the Warp feature is proving to be very powerful functionality within Wildfire.

It is also important to note that once you have output a VRML file from Pro/E Structural Simulation, you could also construct surfaces automatically using the auto-wrap capabilities inn Wildfire 2.

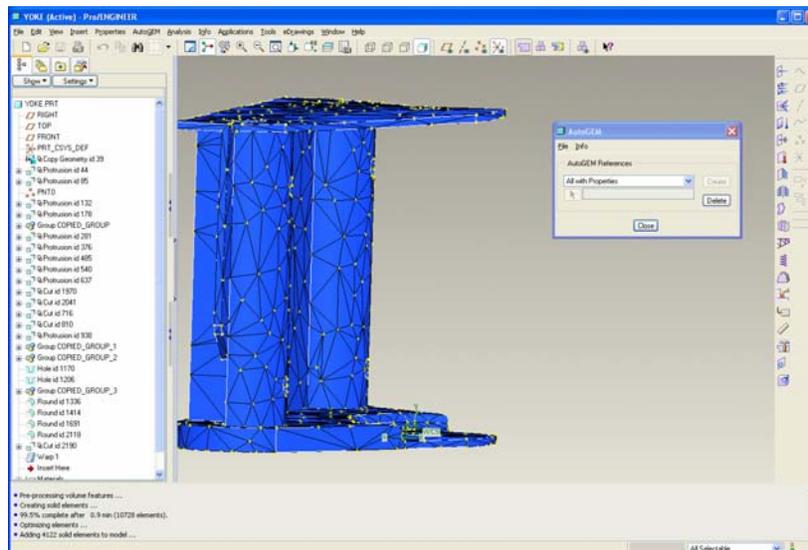


Figure 7. Warped Model Meshed and run in Structural Simulation

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Tips of the Week

[How to View Pro/ENGINEER Parameters in Windchill PDMLink](#)

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Announcements

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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

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Thinking About Pro/ENGINEER Wildfire? Check this out.



<http://www.ptc.com/go/engineering/index.htm>

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

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Upcoming Events & Training Class Schedules

Upcoming, 2005 Your local Pro/Engineer User Groups
<http://www.ptcuser.org/rugs/>

Upcoming, 2006 TBD
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.

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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.

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