Top 10 Reasons Why Designers Choose Explicit Modeling

Ten of the Most Compelling Arguments for an Explicit Modeling Approach to 3D Design

As a designer, you're looking for the most sophisticated, yet easy-to-learn tools to support you on your daily design challenges and to help make your work even more attractive.

The following 10 points will explain why CoCreate® Modeling will enable you to make more changes – with far less clicks – resulting in a tremendous increase in design speed and creativity.

If you're reviewing or rethinking your 3D CAD system, consider the benefits of CoCreate Modeling – the explicit modeling solution from PTC.

Here are the top 10 reasons why users like you select our leading explicit 3D CAD system:

1. 'On-the-Fly' Model Modifications

Parametric 3D CAD systems – like Pro/ENGINEER® – capture intended product behavior with parameters, persistent dimensions, features, or relationships. CoCreate Modeling, an 'explicit' 3D CAD system works very differently. In CoCreate Modeling, designers first create 'profiles' that become 3D models. Then designers modify the 3D models through on-the-fly interactions with the model geometry.

With parametric modeling, you can still use your favorite machining commands like Extrude, Turn, Mill, Punch, and Stamp. In CoCreate Modeling, however, you'll find some other commands that particularly illustrate the modeling capabilities of an explicit 3D CAD system – commands you might not have seen before in parametric systems, or that work a little differently.

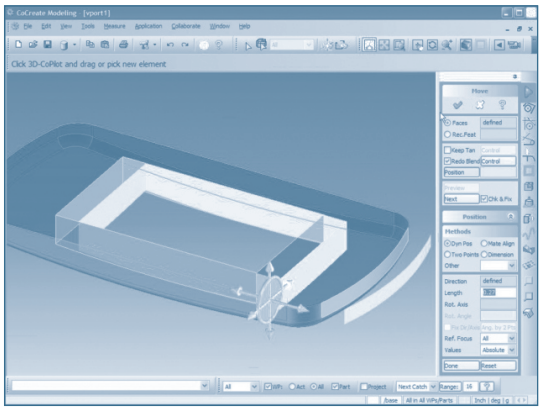
Here are a few CoCreate commands that you'll want to check out:

- **Align:** With Align, you can change the model geometry of one face to precisely align with the geometry of a reference face or reference plane. That means you can design and modify parts in context of the complete assembly design.
- **Taper:** You can taper at any time in the design and manufacturing process – because it's never "too late" to make changes in CoCreate Modeling.
- **Offset:** When you're working with plastic, uniform-walled thickness parts or snap-fit parts, you can use Offset to make on-the-fly design changes, such as relative dimensional changes, if your model needs a clearance of .010 inch, for example. This is just another convenient option to help you resolve complex design challenges.
- **Blend:** Just like Taper, you can Blend (that's a 'round' or 'fillet' to you parametric users) at any time in the design process, so you're totally free to explore new and different designs.
- **Scale:** When you're working with plastics, and you're preparing a mold design, you can use Scale to account for shrinkage and inevitable size changes.

2. Instant Design Changes

Because designers can create and modify 3D models via on-the-fly interactions with model geometry, CoCreate Modeling offers Microsoft Word®-like functionality to designers when they need to make instant design changes.

For example, designers not only can 'cut, copy and paste' whole groups of faces such as bosses, but they can also dramatically repurpose models by cutting or removing a section of a part and pasting the remaining two pieces back together. Blends on the newly rejoined pieces instantly 'recognize' each other and reconnect just as they existed on the original part – no 'healing' required.



With the explicit modeling approach, you can make instant design changes through on-the-fly interactions with model geometry.

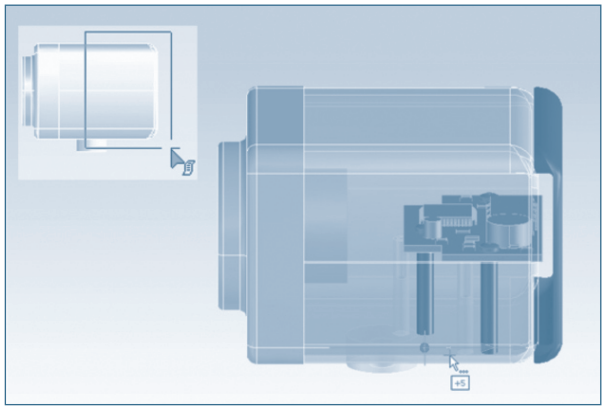
In CoCreate Modeling, you can remove any unnecessary model geometry at any point in the design process and continue to design without limitations, as if your modifications were always exactly what you intended. It's very similar to removing a sentence from a paragraph in Microsoft Word®. CoCreate Modeling completely removes the unwanted geometry, leaving no reminders whatsoever of your changes, so you're completely free to explore limitless design possibilities.

3. Combined Part and Assembly Modeling

In a parametric 3D CAD system, designers work in separate part or assembly modes, meaning they can work either on individual parts or on the complete assembly.

CoCreate Modeling embraces a different method for designing parts and assemblies. In CoCreate Modeling, designers can create and modify their 3D models completely in context of whole designs by referencing the existing 2D or 3D geometry of surrounding parts and assemblies. When designers find interfering parts in their designs, they can modify the necessary parts while working within the context of the complete assembly. Designers can also make modifications across multiple parts and assemblies in a single operation, which ultimately increases design speed.

For example, you can use Align to change the model geometry of one face to precisely align with the geometry of a reference face or reference plane. Likewise, you can use the Move by Box command to simultaneously move faces and position parts together. When you move a face, the geometry connected to the face stretches to change the size of the part. If you move entire parts or assemblies, CoCreate Modeling naturally adjusts the position of the parts and assemblies.



You can use CoCreate's Move by Box command to enlarge an electronic enclosure to accommodate a new, larger circuit board, for example.

4. Flexible Assembly Structures

CoCreate Modeling features a completely flexible, evolutionary Structure Browser that displays your list of parts, assemblies, and any other 3D elements you'll need to create your designs. In CoCreate Modeling, parts and assemblies act exactly like files and folders that you can 'drag and drop' to arrange and rearrange just like files into a folder structure.

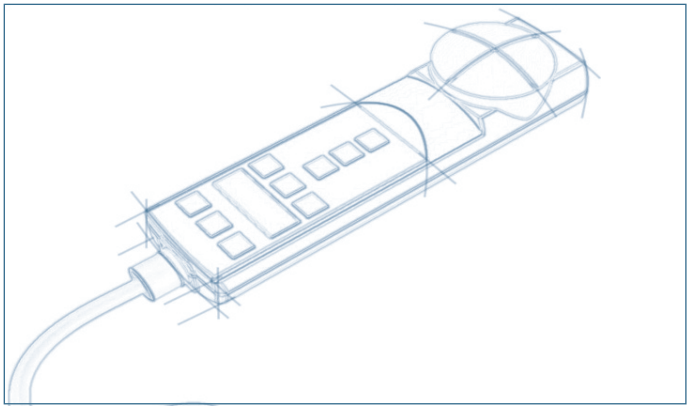
With this unique characteristic of CoCreate Modeling, you can arrange parts and assemblies as you design. Then, when you send your designs to manufacturing, you can restructure your design for their needs. When your designs finally reach production and distribution, you can rearrange your parts and assembly structure again to create a specialized view for your end-customers. Thus, you'll always maintain a logical product structure throughout the entire design process.

The Structure Browser is so flexible that you can leverage assembly structures from multiple 3D CAD systems and repurpose them into an entirely new product assembly. What happens when you import the 3D design data? The Structure Browser not only recognizes the part and assembly structure of the imported design data, but it also allows you to reorganize and manipulate the structure however you wish.

5. Intuitive Engineering and 2D-based Concepts

In terms of flexibility and technique, CoCreate Modeling is the closest 3D CAD system to 2D design. In CoCreate Modeling, designers don't need to plan their designs in advance. Instead, they can let their designs evolve freely and intuitively throughout the entire design process, exactly the same way they design in 2D. That means existing designers can easily transfer their 2D skills to quickly adopt CoCreate Modeling, and they can pursue exploratory design options, such as sketching in 2D and changing designs by adding ideas, or removing geometry that doesn't work.

Plus, CoCreate Modeling adapts certain 2D techniques to 3D modeling. For example, designers can move and stretch 2D geometry with on-the-fly 3D modify commands like Move, Position, and Cut, or use the convenient box selection of geometry to move entire sections of their models at once. Designers can even design directly within one or more 2D cross sections of a 3D model, or use 2D cross sections to visualize part and assembly interferences.



With CoCreate Modeling, designers can pursue exploratory design options like sketching in 2D.

6. Multi-source CAD Data

Geometry is the only common element across all CAD systems, and because CoCreate Modeling is specifically designed for on-the-fly interactions with model geometry, it excels at the import and modification of multi-source CAD data, and thereby enhances the interoperability between different CAD systems.

Companies that work across an extended supply chain for procured components or subcontracted design can import STEP and IGES files as essentially native 3D design data formats. CoCreate Modeling automatically recognizes the assembly structure, shared parts, sheet metal parts, surfaces, and even blends, which designers can either maintain or modify as needed. Again, in CoCreate Modeling, designers can modify imported 3D models as flexibly as they can copy , paste and then edit text in Microsoft Word®.

Plus, CoCreate Modeling offers additional features like Compare Parts, so you can compare imported designs with the original design data. Or, you can import 2D designs to re-create 3D models, which is helpful for companies migrating their 2D design process to 3D modeling.

7. Lightweight and Data Management-Compatible

In a parametric 3D CAD system, data files usually include parameters, persistent dimensions, features, and relationships that capture intended behavior. CoCreate Modeling, however, reduces data files to the 3D geometry only, dramatically reducing the design data of each individual part, so large and complex designs don't overwhelm your hardware or software performance. Customers of CoCreate Modeling report that files can be as little as 33% the size of a similar design file from a parametric 3D CAD system.

So, working within the same physical or virtual memory limits as parametric 3D design, designers using the explicit approach can load three times more geometry in CoCreate Modeling. Even shared parts don't increase file sizes, and you can modify shared parts instantly, without clogging your system performance. Smaller file sizes mean designers can: load and store data files faster; reload and update parts to new revisions instantly; and make better overall use of their computer memory.

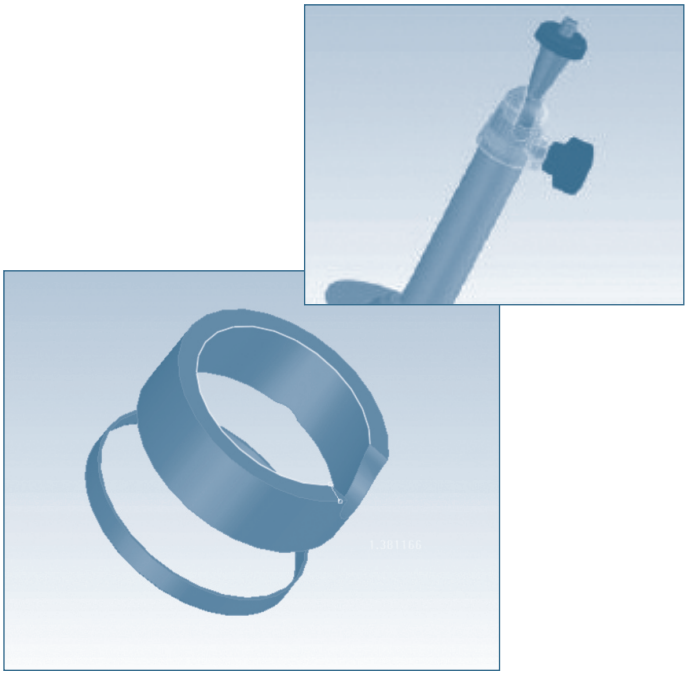
When you combine the Professional Version of CoCreate Modeling with CoCreate Model Manager – an integrated data management system, you can also load product designs using 'lightweight' models, which are ideal for the design of large assemblies and complex products. A lightweight model is a three dimensional graphical representation of a model that looks like any other model in the viewport. However, lightweight models use less memory because they only include 3D representations of the geometry data, 3D labels, and 3D annotations associated with a part.

CoCreate Model Manager can also help you manage complex relationships associated with large assemblies. For example, CoCreate Model Manager automates file revisioning, manages the 3D-to-2D relationships between parts and assemblies, and encourages true concurrent team design because all designers have access to the most up-to-date design data. When all design data is centralized in a common database, companies can ensure that no one either works on the wrong revision of a component, or changes a component reserved by someone else.

8. Full Fit, Clash and Interference Analysis

You can avoid costly mistakes in manufacturing, as well as unnecessary investments of time and money on physical prototypes, by checking your 3D models for both potential problems and overall quality first, with Clash Analysis in CoCreate Modeling.

When you use Clash Analysis to investigate potential problems earlier in the design process, you can substantially reduce the number of expensive change orders later. And when manufacturers produce fewer physical prototypes and change orders, they create better quality designs, shorten their time-to-market, and reduce product development costs.



With CoCreate's Clash Analysis tool, you can identify any potential problems with interfering parts and avoid costly mistakes before they happen.

Clash Analysis takes you far beyond the standard clash capabilities like investigating interferences and checking assemblies for touching parts; it also guides the annotation and classification of existing clash issues, checks the same parts or assemblies in different configurations, and walks you through each individual clash issue for clarity and resolution. Plus, you can store and reuse your clash checks and results between your CoCreate Modeling sessions, or run a Clash Analysis on revised models to track common volume problems and touching parts.

In the Professional Version of CoCreate Modeling, you can validate your product designs to make sure they meet the necessary physical demands, using CoCreate Finite Element Analysis – the integrated stress and thermal analysis add-on module for CoCreate Modeling.

9. Fast, Accurate 2D Engineering Drawings for Manufacturing

CoCreate Modeling includes a 3D-to-2D associative add-on module, called Annotation, that's fully integrated with CoCreate. In Annotation, designers can leverage the 3D model to instantly create 2D manufacturing drawings with drawing views such as cutaway, section, and broken views. Annotation can also leverage 3D information like GD&T specifications.

The tight integration of CoCreate Modeling and Annotation assures and maintains the association between models and drawings, so if models are modified, drawings are automatically updated to reflect the changes. Thus, while engineers are designing, drafters can annotate drawings, and downstream departments can work concurrently with design teams.

With the Professional Version of CoCreate Modeling, you also receive CoCreate Drafting, a stand-alone, industry-proven, 2D mechanical CAD system–perfect for sketching out freeform design ideas and supporting the entire 2D product development process. CoCreate Drafting offers the same flexible part and assembly structure capabilities as CoCreate Modeling, matching how mechanical engineers design and manufacture products. It also includes specialized features, such as shared components and parametrics, that extend beyond the full set of standard 2D design capabilities.

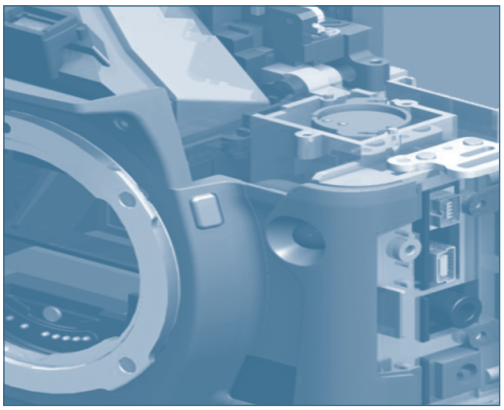
10. Complete Visualization and Improved Communication

Visualization and communication are critical parts of the product design process. That's why CoCreate Modeling offers several options to help designers visualize a complete product design and communicate those design details to anyone involved in the product development process.

For example, with the powerful rendering capabilities automatically included as part of CoCreate Modeling, you can produce photorealistic images of models that improve both visualization and communication. You can select from a variety of different materials to simulate the look of your part or assembly, then adjust the lighting and add background scenes for your models.

In addition to generating first-class images, designers can create 3D Configurations in open or closed states to easily visualize how all the components of their mechanical designs will move in different positions. With the Professional Version of CoCreate Modeling, designers can use Animation to create complex animations of their product designs, which they can then share as an AVI file with others.

Since most communication is done via email today, the Professional Version of CoCreate Modeling also includes CoCreate 3D Access, a native, multi-CAD viewer that easily shares both 2D and 3D design data with team members across the entire organization. And, with the eDrawings Professional for CoCreate Modeling add-on module, you can share 3D or 2D design data with partners or customers.



Use the powerful rendering capabilities, included as part of CoCreate Modeling, to produce high -quality 3D images of your products long before you ever build the first prototypes.

Learn more

For more information about CoCreate products and PTC, please visit PTC.com. If you have additional questions, or if you'd like to see a live demonstration of any PTC software product, please contact your PTC representative.

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