SMB Roundtable: Straight Talk from CAD Designers

Is Pro/ENGINEER® the Ideal 3D CAD for Small or Medium-sized Businesses?

3D CAD Users Talk about the Value of Pro/ENGINEER to their SMB Organization

PTC®

Just a few short years ago, SMBs – small and medium businesses – began discovering that 3D CAD was a good fit for their fast-growing business needs. Today – remarkably – more than two-thirds (67 percent) of SMBs are designing products in 3D - and that number grows each day. And the biggest reason for the switch to 3D? According to a 2008 report by the Aberdeen Group, SMBs are reporting that 3D CAD dramatically reduces product development time.

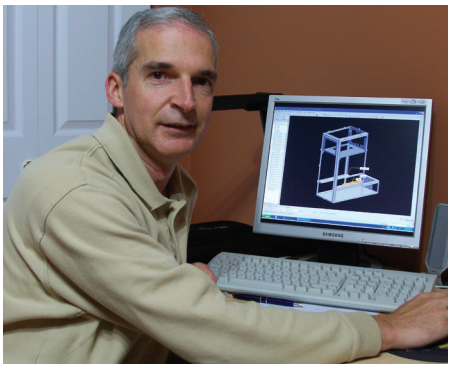
But that's not all 3D CAD does for SMBs. Its solutions also enhance the quality and reliability of their products, while meeting SMB demands for increased product complexity. These benefits – speed, quality, reliability – are even more appealing to SMBs than to larger manufacturers because SMBs have fewer resources, and thus must "do more with less."

But not all SMBs are enjoying these results. In order for resource-starved SMBs to benefit from 3D CAD, their software must offer the capabilities, plus the scalability, affordability, and most important – simplicity – that SMB designers and engineers need to succeed.

Since 1988, Pro/ENGINEER has been the most popular – and most powerful – 3D CAD in the industry, with the broadest range of advanced product development capabilities on the market. Today's Pro/ENGINEER is easy to learn and use, and it's affordable even for small and medium businesses. In short, it has everything SMBs need to be successful.

But don't take our word for it. Listen to first-hand feedback from your peers. We recently asked representatives from four SMB companies in different countries and industries why they chose Pro/ENGINEER and how it's impacting their businesses. Here's what they had to say.

Participants



Luc Rossignol
Mechanical Designer, Instadesign
Laval, Quebec, Canada

Luc Rossignol has been personally using Pro/ENGINEER for 19 years. His current company, Instadesign, has been using it for 12 years. Instadesign also works with a number of Pro/ENGINEER design add-on modules, including Freeform Surfacing, and Mechanism Dynamics. Instadesign employs roughly 40 engineers, with 30 Pro/ENGINEER licenses.

Mike Kline
President, ALM Machine, Inc.
Phillipsburg, Pennsylvania

ALM Machine purchased Pro/ENGINEER in 2006. The firm also uses Pro/ENGINEER's Manufacturing modules, including tools for machining, as well as prismatic and multi-surface milling. The company is now implementing PTC's Pro/VERIFY module for computer-aided verification of machined parts. ALM Machine employs five engineers, three of who muse Pro/ENGINEER within a single floating license.

Steve Williams
Chief Engineer Design
Antonov Automotive Technologies Ltd
Warwick, Warwickshire, United Kingdom

Antonov Automotive Technologies has a six-person design team with nine Pro/ENGINEER licenses. Steve Williams has been using Pro/ENGINEER since 1996, and most of his team began using it before joining Antonov. The firm also uses the Pro/ENGINEER Mechanism Dynamics module.

What design tasks does your team perform on a daily basis?

Jason Williams: Our company, K Development, helps companies that manufacture consumer products, medical devices and toys to integrate plastics into their products. If a customer wanted to create a plastic product with a 'swoopy' or curvy body, they would provide the electronics and we would perform all the mechanical development, including surfacing and assembly. For example, one of our products is a wearable device that measures calorie burn.

Luc Rossignol: Instadesign is a mechanical engineering consulting company that does modeling and sheet metal design for aircraft parts and electronics packaging. Most of the time I do top-down design – drafting, modeling, and large assembly management – for sheet metal projects.

Mike Kline: ALM Machine is a jobshop machine shop. We design aerospace parts and aluminum housings that hold electronics. Our customers give us guidelines, but they don't give us finished drawings. We use Pro/ENGINEER to create our own designs and part models for customers. We send our designs to the manufacturer, who verifies the model, makes prototypes and manufactures the production parts.

We also design custom parts. For example, one of our clients is a repair center that insures a music game for a major retailer. The drum pedal for the game is very poorly made and it often breaks. Our customer didn't want to have to keep replacing the pedal, so they asked us to reengineer a solid metal aluminum drum pedal that would fit into the assembly and wouldn't break. We designed that in Pro/ENGINEER.

Steve Williams: At Antonov Automotive, we create drawings, models, and assemblies for 2-, 4-, and 6-speed automatic transmissions. The 2-speed transmissions are used in super charger drives, while the 6-speed transmissions are used in passenger cars, which will primarily be sold in China. We are currently at the feasibility stage with various customers and are looking to progress to volume manufacturing. We also design engine parts for rockets.

Jason Williams
Principal, K Development, Inc.
Erie, Pennsylvania

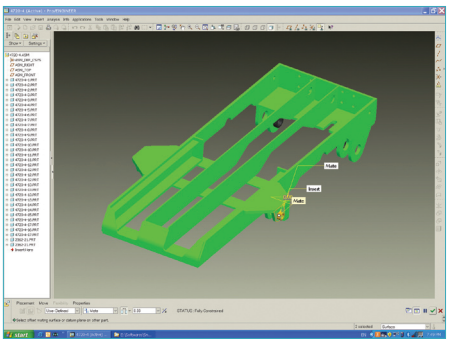
(Lecturer in Engineering, Pennsylvania State University – Erie, the Behrend College)

Jason Williams has been using Pro/ENGINEER since 1989. His firm, K Development, has a three-person engineering team working with three Pro/ENGINEER licenses. The firm also uses the Pro/ENGINEER Interactive Surface Design Extension (ISDX), Advanced Assembly, and Mechanica modules.

What Pro/ENGINEER functionality do you find most valuable?

Jason Williams: Most of our day-to-day tasks involve product design. We start by creating an overall design for the main component/assembly using the Pro/ENGINEER Skeleton Design and ISDX freeform surfacing. Next, we put plastics on the model to create the surfacing and styling. That design drives the design for all the sub-components of the product.

Pro/ENGINEER allows us to drive the entire design from a single file. When we use Pro/ENGINEER, we are particularly careful about specifying our references in the beginning. Then, if we need to make any changes to the design, Pro/ENGINEER will automatically change the design and measurements of the sub-components accordingly. This is a huge time-saver and makes Pro/ENGINEER quite powerful. If we didn't have that capability, we'd have to model each component separately, and if the overall dimensions of design change, we'd have to go back and change each component. For example, if we're designing a mouse and our customer wanted to change the buttons or the roller, Pro/ENGINEER would change the button and mouse housing.



Instadesign does modeling and sheet metal design for aircraft parts and electronics packaging. This illustration shows a trailer frame, which is part of a large assembly.

We also use Pro/ENGINEER Advanced Assembly functionality to create the assembly. When we send the 3D files to the manufacturer, the manufacturer can build the tooling directly from our files. Because this 3D file contains all the critical measurements, it also saves us from having to create the 2D drawings the manufacturer previously needed to inspect the part. We simply call out all the critical measurements they need to do a complete measurement analysis in the 3D file. This saves us about 20 percent of the time we would otherwise spend on this process.

Luc Rossignol: Personally, the Pro/ENGINEER functionality I use most is large assembly management and sheet metal – particularly modeling and the Define/Redefine feature, which allows us to easily change aspects of a product, such as depth or style. Pro/ENGINEER features have a lot of intelligence, so I can create complete parts very quickly and easily. For example, with the AutoRound feature, I don't have to be precise about the order in which I pick the edges when I create a part. Pro/ENGINEER makes a lot of assumptions, so it can select the right sequence automatically. Otherwise, I would have to find the right sequence for the edges by trial and error. As a result, I have reduced the time it takes me to perform this process by at least 60 percent.

Another function I really like is the Import Repair Data function. When I import a file such as an IGES file from a customer, there can be gaps in the intersections between groups of parts. Pro/ENGINEER fixes any gaps in the edges of the imported geometry very nicely. Without that capability, it can sometimes be impossible to fix the drawing, so we'd have to spend a couple of days redrawing it.

K Development helps companies that manufacture consumer products integrate plastics into their products. K Development designed the plastics for this wearable device that measures calorie burn.

Mike Kline: Most small shops like ours use blueprints from their customers. Using the Pro/ENGINEER Manufacturing module, we don't have to use our customers' blueprints. We can take their rough ideas and create what they want – even if they don't know exactly what they want. That's really changed our business. Being able to create the design for our customers has given us a competitive advantage because we can be different from other machine shops down the street.

I also use the Pro/ENGINEER automatic toolpath generation tools. We're always looking for ways to streamline the toolpaths we use to cut parts. Plus, we're always using new tools because everyday someone comes out with better tools. For example, we might purchase a new cutter that breaks chips two times faster, or one that cuts deeper. With Pro/ENGINEER, we can change our model to automatically update the toolpaths for all of the tools necessary to create the part – such as roughing, finishing, corner finishing – to take into account the characteristics of the new tool and create a better path that helps us make the part for a lower cost. In contrast, with our previous tool, we would have had to change the toolpaths for every tool involved in the process separately.

In addition, my customers are constantly changing their minds. They might want the part a 10,000th larger or moved to the left. Pro/ENGINEER allows us to automatically regenerate the toolpaths. This capability saves us major amounts of time, although actual time-savings varies depending on the complexity of the part.

Steve Williams: We mostly do 3D modeling, assembling, drawing and surfacing for case structures. We use skeletons to model parts parametrically. When it's necessary to change something, we can easily regenerate the assembly without having to redo individual components. We use [Pro/ENGINEER's] shrinkwrap capabilities that allow us to do a surface copy of the complete structure, so we can show managers or customers what our designs look like when we're making presentations.

We also use Pro/ENGINEER to create output files that we use to machine components directly from our models. We use this capability when creating StereoLithography apparatus rapid prototypes that we use to create molds for casting rocket parts.

Why did you select Pro/ENGINEER, and do you feel that it offers a good value for the cost?

Jason Williams: There's a perception that Pro/ENGINEER is 'elitist' and expensive software that small companies can't get into, but I disagree. While other CAD products like SolidWorks® and Solid Edge® are available for a comparable price, I've found that Pro/ENGINEER offers greater functionality.

Luc Rossignol: I'd agree. Pro/ENGINEER provides a lot of tools and functionality for the price. If you want the same functionality with another package, it would cost at least double the price – that's if they have comparable functionality. That's the main reason we chose Pro/ENGINEER.

Mike Kline: The reason we bought Pro/ENGINEER to replace GibbsCAM was because Pro/ENGINEER offers a great deal of functionality at a reasonable price. If we had stayed with GibbsCAM, it would have cost considerably more to add 3D modeling, Rotary Axis and other features, and I still couldn't have made a drawing that I could print and ship to someone. I estimate that if I'd stayed with GibbsCAM, it would have cost about 30 percent more for considerably less functionality.

We also looked at NX® (formerly called Unigraphics®), GEM®, Mastercam®, SolidWorks and Solid Edge because they claimed they would allow us to do drawings. However, these products do not work off a single model. With Pro/ENGINEER, you can start machining your part using toolpaths taken directly off your model. In the other systems, we would have to load our model into their manufacturing system. And, if we edited a model in the manufacturing package, we would have ended up with two different versions of the models. In contrast, because Pro/ENGINEER offers interoperability between applications, we only have one version of the file no matter what module we're using.

Antonov Automotive creates drawings, models and assemblies for 2-, 4-, and 6-speed automatic transmissions. The 2-speed transmission shown in this image is used in supercharger drives.

How easy was Pro/ENGINEER to learn?

Jason Williams: For the work I do, Pro/ENGINEER is very approachable and easy to use. In my role as an instructor at Penn State Erie, I teach freshman Solid Modeling courses. We use Pro/ENGINEER in all of our courses and all of our engineering students in mechanical engineering and plastics go through a lot of solid modeling. I've found it very easy to teach Pro/ENGINEER.

Luc Rossignol: I agree that another good thing about Pro/ENGINEER is that it's easy to learn and use. Some people say it's hard to learn, but I haven't found that at all. It's certainly no more difficult than other software and it's easier than many other packages. The training and materials are very well packaged. The way PTC builds the training material around the "Tell me, show me, let me do" model makes it very easy to learn the software. And there's lots of information you can refer to after the training.

I'm also a trainer for Pro/ENGINEER. Some of my students are a little skeptical about Pro/ENGINEER before they begin the training, but after two or three days, they agree that Pro/ENGINEER is easy to learn and fun.

Are you able to meet all your design challenges with Pro/ENGINEER?

Luc Rossignol: Pretty much. Not only have I had no problem meeting my design challenges with Pro/ENGINEER, it's exceeded my expectations. Because I can quickly do "what if" analysis to try things different ways in a short time, Pro/ENGINEER allows us to come up with better solutions.

Mike Kline: I agree. Pro/ENGINEER does everything we need it to do. It definitely meets all our design challenges.

Is the product's scalability important for you?

Jason Williams: Yes. In particular, I like how Pro/ENGINEER is integrated with the Pro/ENGINEER Mechanica® prototyping tool because this allows me to do faster iterations. I can do a finite element analysis on a design and then make changes without having to reset my model. Mechanica remembers all the surfaces, so I can do multiple analyses very quickly. In contrast, if I used a different solution, I'd have to make a change to the geometry in the design tool, export the file, import it into the analysis tool, and then reset the constraints. By using Pro/ENGINEER, we can perform this analysis as much as 30 to 40 percent faster.

Luc Rossignol: For us, the fact that we can take files created in other parts of the system and use them with new modules is very important to us. For example, someone may not need the Advanced Surface package at first, but if they do need it later, it's easy to add that to your environment and reuse the existing models they've built in Pro/ENGINEER. If we had to buy functionality from a different vendor, it may not work or it may not work perfectly.

Mike Kline: I'd say that the product's scalability has been very important for us as well. In fact, we're already looking at the next module we'd like to implement – Pro/VERIFY. Customers today no longer want to take the time to verify the measurements on all the parts that come in the door, so they ask us to do it. Right now, we manually document that the measurements on our parts are correct. It costs us a lot of money to create reports proving the dimensional quality of our products – not to mention that if we had five guys using the same micrometer to measure a part, we'd get five different readings. Don't get me wrong, we provide good quality, but it takes a lot of time. In the future, we hope to use an electronic height gauge to measure the part and download the measurements to Pro/ENGINEER. Pro/ENGINEER can automatically create a model from the data and overlay it onto the original reference model. It shows green, red, and yellow where the measurements are correct and where they are off. This will eliminate human error.

What do you see as the biggest benefit of Pro/ENGINEER?

Jason Williams: The biggest benefit for us is the ability to do all the assemblies at once, rather than having to design the components separately.

Luc Rossignol: At Instadesign, we really appreciate the interoperability between modules. Because all the modules are built on the same core, it's easy to share drawings among all of them without having to redo anything. Another major advantage is that the software is very reliable and robust; we don't have to worry about the software crashing.

Mike Kline: Our customers are so diverse, we never know what kind of files we're going to get. Because Pro/ENGINEER has a huge customer base, we can usually send our customers solid models in the native PRT file format, which always works better than having to go through conversions from formats like IGES or STEP. Another major benefit is that Pro/ENGINEER can open nearly anything created by any other system. If someone sends something created in Venro, IGES, Mastercam®, Autodesk®, etc., we can open any of them.

Steve Williams: The biggest benefit? Hard to say. I'd say that Pro/ENGINEER is a good design tool that allows us to do what we want it to – from creating an initial concept to creating drawings for use in manufacturing.

Conclusion

As you can see from the perspectives of these four different engineers using Pro/ENGINEER in different companies and different industries, Pro/ENGINEER offers a full range of capabilities, along with the scalability to meet future requirements – all in an affordable, easy-to-use package. Most important, Pro/ENGINEER saves these designers significant development time by eliminating manual or repetitive processes, even as it enables them to create complex and high-quality product designs.

To learn more about how Pro/ENGINEER can help your small or medium business, or to read case studies on how other SMBs are applying PTC solutions, please visit the SMB Resource Center on **www.ptc.com** or contact your nearby PTC representative.

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