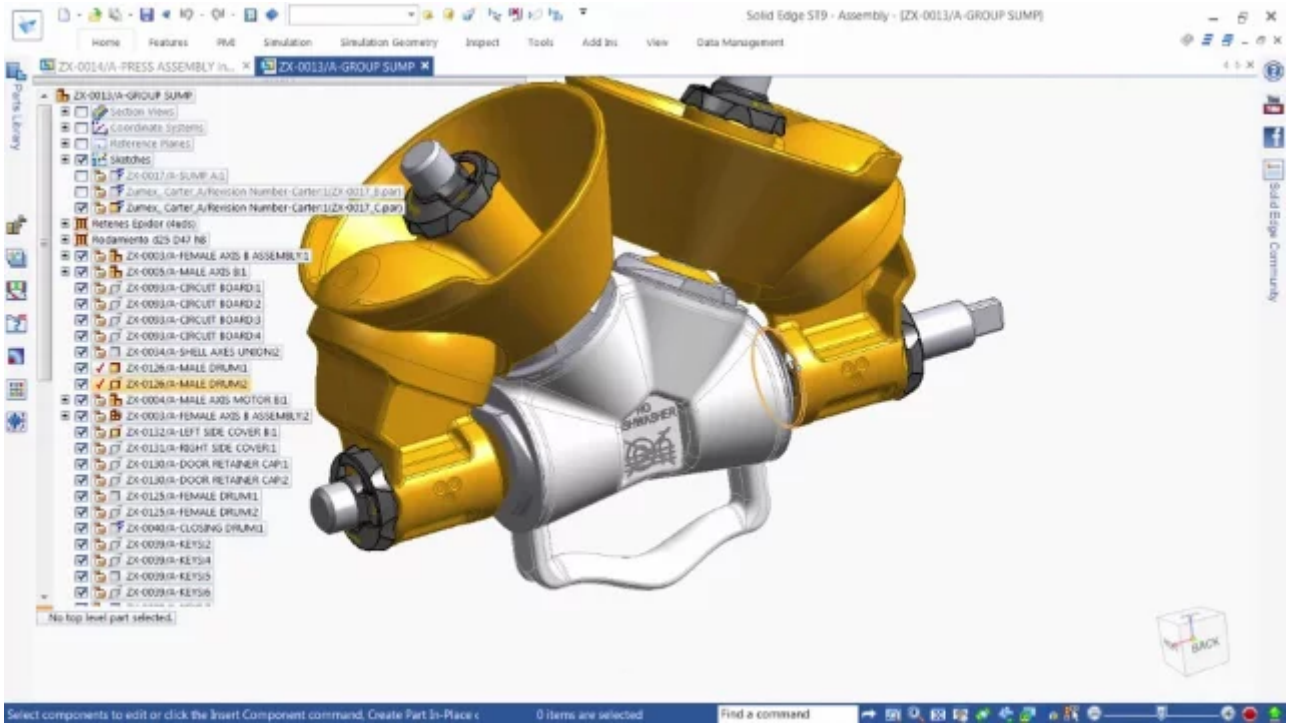
# SOLIDWORKS or Solid Edge?



Rolling Stones or The Beatles? Marmite or Vegemite? Solid Edge or SOLIDWORKS?

These are the questions that have plagued humankind for generations. In this article, we will address at least one of these dichotomies, and will hopefully enable you to make an informed decision about which CAD package is best for you.



*A screenshot of Solid Edge ST9. (Image courtesy of Siemens.)*

First up, I should declare any conflicts of interest. I am a long-term SOLIDWORKS user, and I write articles related mostly to that particular CAD package. I have used Solid Edge on a few occasions, primarily for basic modeling. So, I will therefore be writing this article largely as a Solid Edge noob and from a SOLIDWORKS user's perspective.

One of the reasons why I had experimented with Solid Edge in the past was because the institutions I was working for at the time had taken advantage of the product's free student licencing. If you are a student at an accredited university, you can do the same by clicking this link.

For those of you who are no longer students, there is a 45-day trial available for the full version of Solid Edge on the Siemens PLM Software website, which you can find at this link. Another nice feature of Solid Edge which I have touched on in another article, is the monthly subscription service. This is particularly good if you have a small number of staff and your CAD usage varies from month to month, where it may not be optimal to pay for a full annual licence when seats are remaining empty (when engineers may be

assigned to other tasks for example). You can check out more details of the monthly subscription here. Additionally, if you have a small start-up with funding of less than 1 million USD and less than 10 million USD in annual income, you could be eligible for 1 year's free subscription.

For the purpose of this review, I will be using the 45-day trial version, which promises to be part modeling, assembly design, drafting and simulation, as well as provides access to online training and videos, and also to the Solid Edge online community.

**Compatibility**

Similar to SOLIDWORKS, later releases of Solid Edge are incompatible with 32-bit machines. According to Siemens, Solid Edge ST9 is 64 bit only. Solid Edge ST6 was the last 32-bit version of Solid Edge.

The good news is that Siemens is still offering a student version of ST6 on its website. The bad news is that if you are used to 32-bit CAD software and wish to use a version of Solid Edge from 2015 or later, then you are going to need a new computer.

**Getting Started**

Upon starting Solid Edge ST9, you are given the option to open a document or create a new one based on several templates. Templates include ISO Metric Part, ISO Metric Assembly, ISO Metric Draft and so on. The defaults in this list can be changed to ANSI inch or metric, GB metric or whatever standard you prefer, so that you can use the standards you prefer the next time you open the software. It's pretty similar to SOLIDWORKS in that regard, which offers part, assembly or drawing options as default options when you open a new file.

For my exercise, I open a new part document, select ISO Metric, and the blank design window opens on screen.

It doesn't take long to reacquaint myself with the software's layout. On the right is a hidden panel for community and online functions, on the left is a panel for what appears to be the design tree from SOLIDWORKS, and hidden to the left of that panel are a few panels for simulation, sensors, layers and the like. The top panel is similar to SOLIDWORKS and contains sketching, surfacing and other features that are used for creating designs.

**Modeling**

I decide to see if my knowledge of SOLIDWORKS will allow me to do some basic modeling, without the need to check the manual or tutorials. I want to see how intuitive the software is.

I draw a circle of no particular dimension and click the Home>Select button in the top pane (see Figure 1).

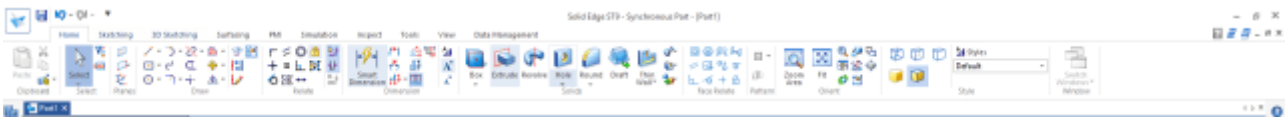


*Figure 1. Main option pane in Solid Edge.*

It seems that everything is driven from this selection arrow. According to the pop-up tip that appears when I hover over the arrow, the selection arrow will allow me to select an element for modification.

Indeed, when I click the circle, an extrusion handle appears. I drag it outward, and a cylinder is formed. So far, it's easy enough. I carry on messing around with the solids features in the top pane. Adding fillets to the edges is easy. I add a thin feature, turning my cylinder into a cup (see Figure 2). This is all very easy, and I haven't had to touch the keyboard yet. For the most part, it seems to be largely mouse driven and the features are accessible from the main panel at the top. I haven't had to scroll down through any lengthy menus yet.

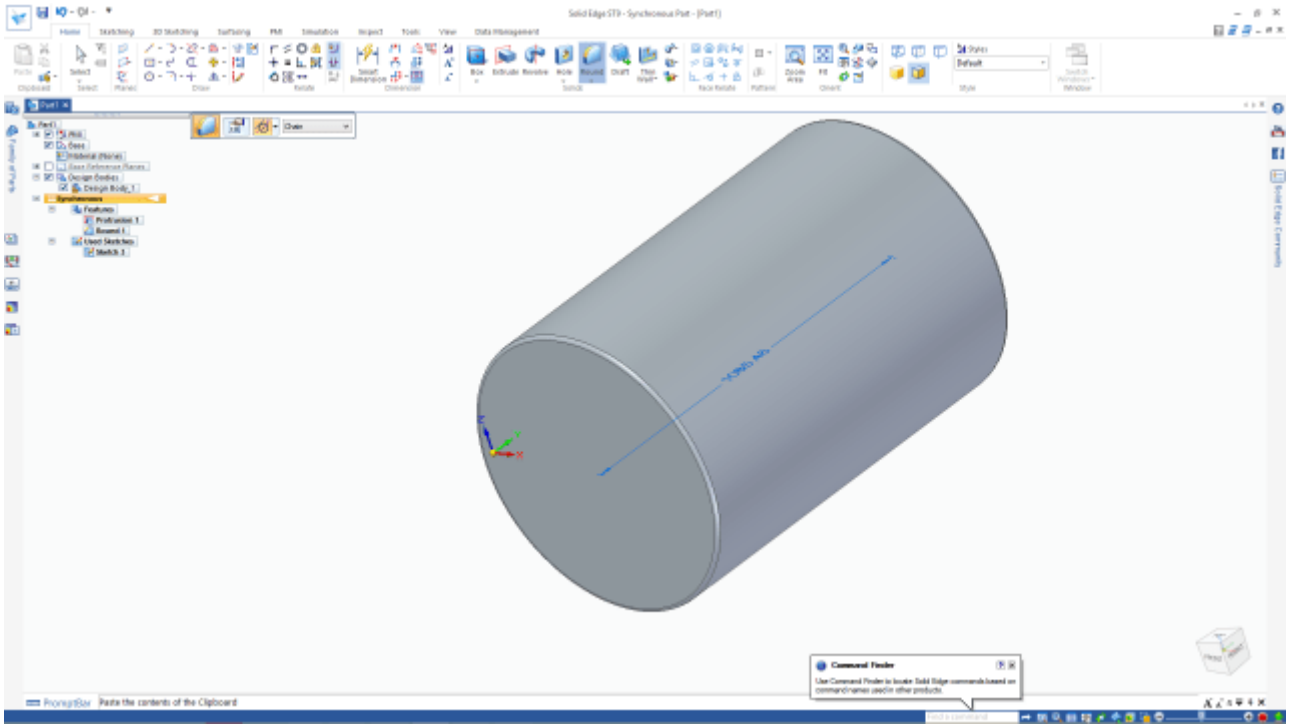


*Figure 2. Easy extrusions in Solid Edge.*

The hole feature seems quite user friendly. Clicking on this option allows a hole of specified geometry and features (such as a countersunk) to be dragged and dropped onto the main part.

The graphics window shows how the hole will appear on the part in real time (see Figure 3).

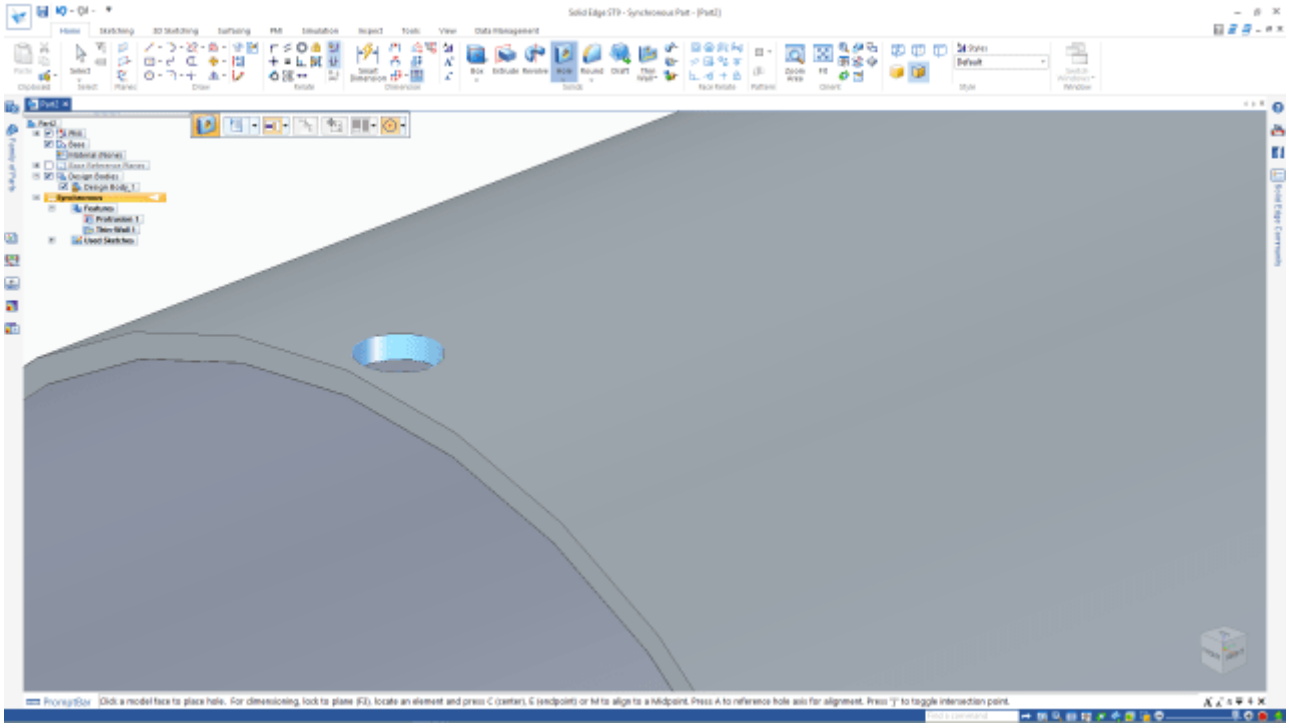


*Figure 3. Visual, real-time hole placement in Solid Edge.*

In conclusion, in terms of basic solid modeling, I don't think there is much difference between the two products. It depends what you are used to. If you have been using SOLIDWORKS for a decade, you're not going to find modeling in Solid Edge too tricky. And conversely, if you are a fresh Solid Edge user, it won't take you long to get up and running.

You can see a video on how to use the sweep function here:

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Try watching this video on www.youtube.com, or enable JavaScript if it is disabled in your browser.

**Simulation**

So, we've taken a brief look at solid modeling. Now let's take a look at another function that I use quite a lot in SOLIDWORKS: simulation.

SOLIDWORKS works pretty well for simulation. It's intuitive, it produces nice plots/animations and the computational engine is fairly accurate.  How does ST9 compare? Well, in terms of the engine, ST9 is using the NX Nastran solver, which is one of the better finite element analysis (FEA) solvers, given that Nastran has been around for decades and has had time to be improved.

I just want to run a simple simulation to see how intuitive the process is. I take my cylinder, and then click the simulation tab on the top ribbon. The simulation ribbon is fairly intuitive, and reading the icons from left to right, it gives a good indication of the sequential workflow (see Figure 4).

From left to right, I first click New Study, I select a Static Study next, and below that I select my material. The software GUI guides the user from the start (left) to the end goal, which is clearly the *solve* icon.

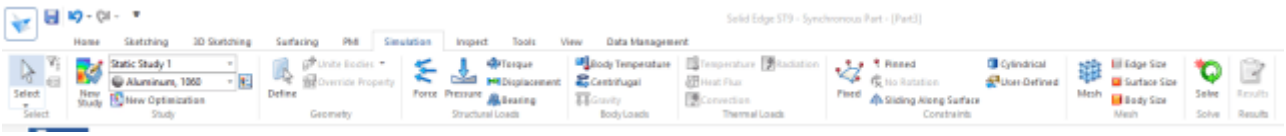

*Figure 4. The simulation ribbon in Solid Edge.*

After setting my material, forces, constraints and so on, I am ready to run the simulation. I click the *mesh* button and I am given the option to just mesh, or to mesh and solve. I choose a mesh size, and then select to mesh and solve. If there are any errors present, a geometry inspector window will open, and will then allow you to browse through a geometry tree to determine where the error has occurred. You can either alter your mesh size, or even go back to the model geometry to fix it and mesh again. This is much more user friendly than SOLIDWORKS in my opinion. In SOLIDWORKS, if the analysis fails, it's all somewhat vague and doesn't really help you much.

In ST9, the identification of faults in much more intuitive. Figure 5 shows the Geometry Inspector.

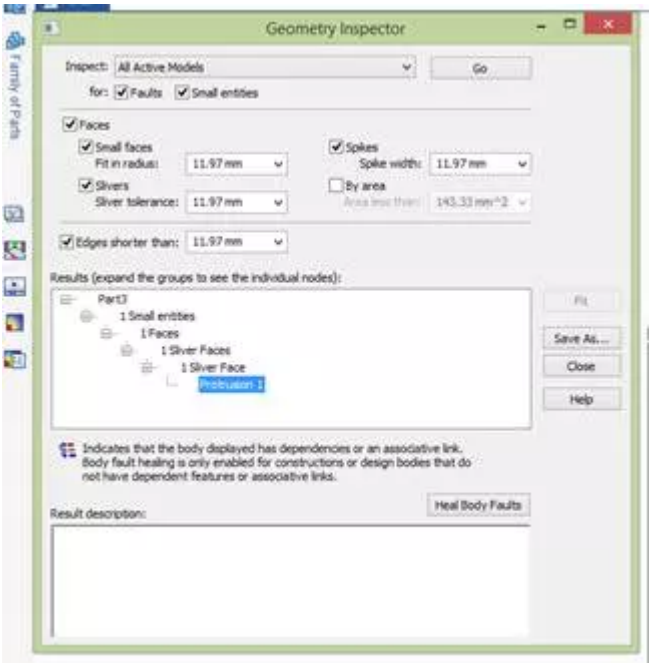


*Figure 5. Geometry Inspector in ST9.*

I run my simulation, and I can see a few different display options. I can animate, screen capture, change plot type (von Mises, displacement, etc.). Content wise, it seems to have the same information as SOLIDWORKS (only the workflow is much clearer). The displacement plot in Solid Edge is shown in Figure 6.

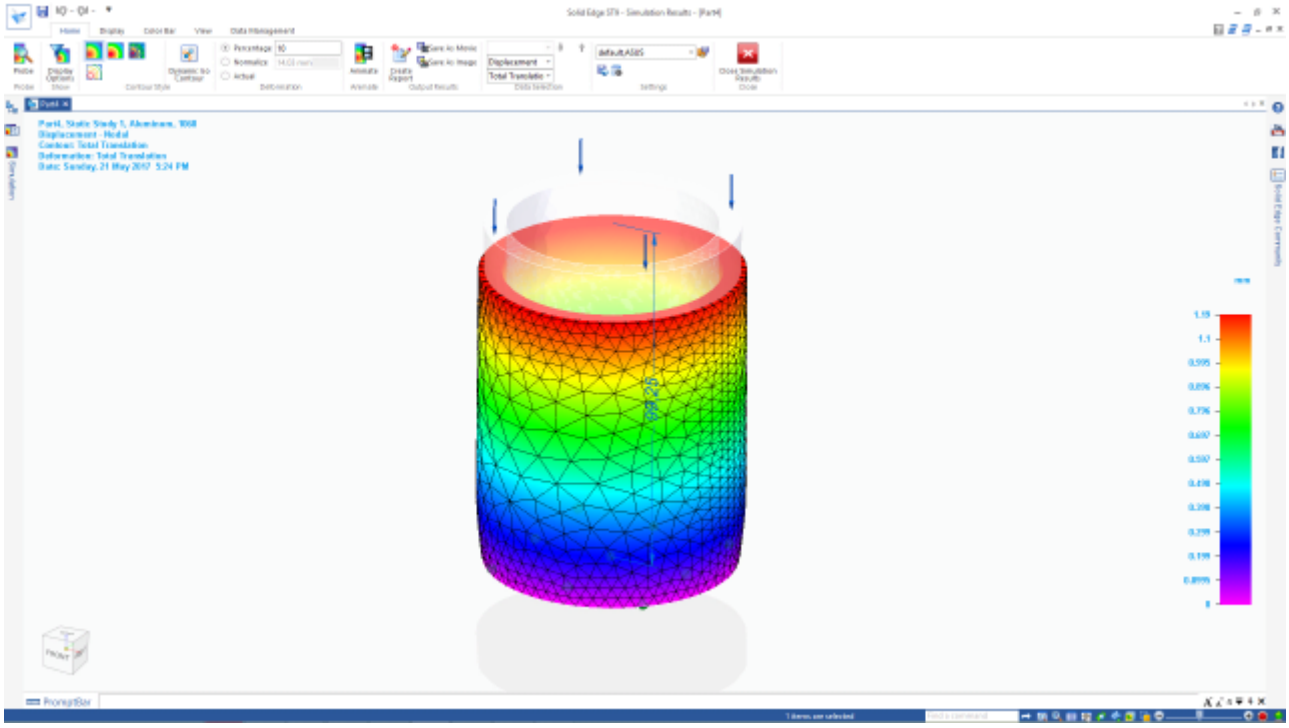

*Figure 6. Displacement plot in Solid Edge.*

**Other features**

All in all, the differences between SOLIDWORKS and Solid Edge are very fine.

SOLIDWORKS can render as can Solid Edge. Both products have simulation capabilities. SOLIDWORKS seems to have more in-depth simulation (for fluids especially), and Solid Edge has a better solver and is more user friendly. So, on the face of things, there isn't much difference between the two. But scratch a little deeper and you will see that the one thing that differentiates the two is the one thing that separates them *completely*.

*Synchronous Technology* is that one thing.

You see, SOLIDWORKS is history based, and everything you create using the software is based on (and linked to) everything that came before it. This means that if I want to go back and add a chamfer to an edge that I made a dozen moves previously, and that edge is constrained to other features that were created afterward, then I could potentially lose everything created after that edge. This "feature" in SOLIDWORKS really means that you have to plan your work in advance, and there isn't much room for improvisation.

The *Synchronous Technology* in Solid Edge does away with all of that and allows geometry to be created and modified on the fly, without regard for the order in which previous elements were created. This video explains the technology in more detail.

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Try watching this video on www.youtube.com, or enable JavaScript if it is disabled in your browser.

For more information, see Matt Lombard's book Comparing History-based CAD to Synchronous Technology.

**Conclusion**

Generally speaking, ST9 seems to be fairly user friendly and appears to be aimed at keeping the user away from the keyboard and firmly based on the mouse. In terms of features, it has pretty much the same as those in SOLIDWORKS, and all of the basic solid and surface modeling features (extrude, cut, loft, sweep) are present in both packages. The simulation package of ST9 is more user friendly and intuitive, and seems to run a bit more quickly than SOLIDWORKS. Having looked at renders from both packages, I can say that there isn't much difference between the two. You can use the same render engine (KeyShot, for example) with either CAD package, so they are both pretty equal in that regard.

For a new user learning CAD software, I think ST9 will provide a gentler learning curve to get better models, while SOLIDWORKS will take much longer to grow accustomed to (but may have some more options in terms of simulation and plastic mold design).

That's ultimately what it boils down to. If I were to advise someone who has zero experience with either package on which CAD program to use, I would say that it depends on the job you'll be using the software for.

For usability, fast learning curve, higher productivity and easier modeling, I would recommend Solid Edge. If like me, you are a long term SOLIDWORKS user and you are thinking of trying Solid Edge, then I would recommend to get a trial version or student version and see for yourself.

As for me, it's never too late to learn, and I still have a valid student email address, so I will indeed be claiming my free student copy. The free student edition, the year's free subscription for start-ups and the monthly subscription make a lower financial barrier to entry for using the software, which is another good reason to give Solid Edge a try.

And in case you were wondering, the correct answers to the questions posed at the beginning of this article were "Stones" and "Marmite."

*Siemens PLM has sponsored this post. They have no editorial input to this post. All opinions are mine. — Phillip Keane*