SOLIDWORKS

3DEXPERIENCE®

PROVEN STRATEGIES
TO FUEL YOUR DESIGN TEAM
White Paper

OVERVIEW

Continuous improvement separates great companies from mediocre ones. Innovative products, efficient manufacturing, and an energized staff are attributes of a company constantly looking at itself and asking, "How can we do this better?"

SIMTEK
Real Time. Real Results

DASSAULT SYSTEMES

Manufacturing companies' design teams are an often underutilized asset for continuously improving products and processes. Given the right environment, design teams' work can extend beyond product design to improve other critical business areas. Design teams can help shorten time to market, reduce production errors and costs, and increase revenue.

If companies expect design teams to help fuel continuous improvement, they must foster an environment where the design team can continuously improve. It doesn't take big, disruptive changes in operations to create that kind of an environment. Although some business legends started with big, radical ideas, continuous improvement stems from many small changes that produce big results.

An increase of just 6 percent in the output of a manufacturing plant may not sound like much, but 6 percent increases over a dozen years will more than double a factory's production. The return on investment (ROI) is enormous. The best strategy is to focus on myriad small innovations and watch them accumulate into big gains.

This paper focuses on strategies for applying the principle of continuous improvement to product design teams. It suggests ways to focus design teams on important and interesting work, provide them with the right tools, improve design and manufacturing efficiencies, and enable them to contribute to manufacturing and sales in a meaningful way.

When designers see that they can positively impact the business, it fuels a passion for implementing even more productivity strategies—a win/win for everyone involved. Consider the following ideas for continuous improvement.

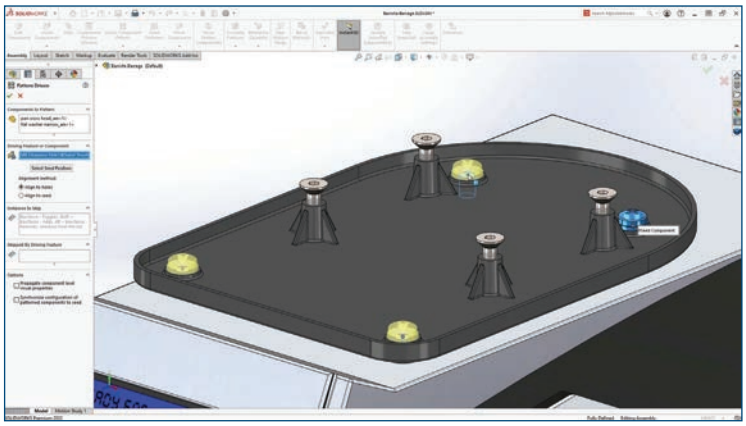
OPTIMIZE DESIGN AND MANUFACTURING TIME

Designers spend hours each day performing repetitive tasks, but don't confuse repetitive with trivial. Many repetitive tasks are essential to the design process. Being repetitive makes these tasks excellent candidates for automation to optimize design time.

Some examples of automation:

1. **Library functions such as the SOLIDWORKS® Toolbox, library parts and features**
2. **Automated fastener placement and hole creation such as the SOLIDWORKS Hole Wizard, Hole Series, and Smart Fasteners Technology**
3. **Part configurations and design tables**
4. **Patterns of parts and features**
5. **Product manufacturing information (PMI) to speed up downstream CAM applications**
6. **Interfaces that format and copy data to other systems**

By automating routine tasks, designers can improve products faster, helping to drive down costs and speeding time to market.



IMPROVE COLLABORATION BETWEEN DESIGN AND MANUFACTURING

Improved collaboration across design and manufacturing has advantages too, often enabling extended teams to find problems earlier in the process. Numerous studies have shown that design decisions have a significant impact on production costs and product quality. By the end of the design phase, you've determined 70 to 80 percent of the final production costs and 80 percent of the work impacting product quality.

If manufacturing doesn't have insight into the design until after design release, options to improve manufacturability are minimal. Changes become far more difficult and costly. However, since design decisions impact 80 percent of production costs, without early manufacturing input, you could be missing lots of opportunities to cut costs and improve quality. Also, any problem found on the production floor becomes extremely costly to correct.

IDENTIFY ERRORS AND AUTOMATE STANDARDS

Manufacturing is more productive when drawing information is complete and consistent. Enforcing best practices, however, can be hard without some level of automation. The good news is that with SOLIDWORKS CAD Standards Checking, SOLIDWORKS can automatically check your drawings and models. Simply define the company standards and best practices you would like it to check. SOLIDWORKS will automatically find every instance that fails the checks. Rules can include items such as dimensioning standards, fonts, overlapping dimension lines, and standard units.

By automating the checks, engineers save time because they don't need to manually search for errors or omissions. No one needs to waste their time looking up standards either. The software will automatically let you know and enforce the standard. Manufacturing saves time as well because they receive more consistent and complete documentation.

Even the best engineering organizations make mistakes, and new design concepts rarely work perfectly the first time. Engineering software and related technologies can reduce costs and keep projects on track by replacing prototypes at many junctures of the design process.

Here are some examples:

- **3D CAD software can ensure proper fit and detect interference between parts.**
- **Kinematic simulation allows designers to visualize how moving parts can interact with one another.**
- **Dynamic simulation allows engineers to estimate the effects of inertial loads on high-speed machinery.**
- **Finite element analysis (FEA) helps engineers visualize distributions of stresses or temperatures within solid objects, and then eliminate stress concentrations or hot spots that might cause problems.**
- **Simulated drop testing can assist engineers in identifying weak areas in products subject to rough handling.**
- **Checks for manufacturability ensure designs are ready for molding, casting, machining, and sheet metal operations before they are released for production.**
- **Realistic rendering allows designers to simulate the appearance of products, including materials and finishes.**
- **3D printed prototypes allow complex cast parts to be fabricated without tooling, and let designers see how products will physically look and feel before costly tools are designed.**
- **Software for assessing environmental impacts, such as SOLIDWORKS Sustainability, can help engineers make better material choices early in the product development process.**

LEVERAGE CAD DATA

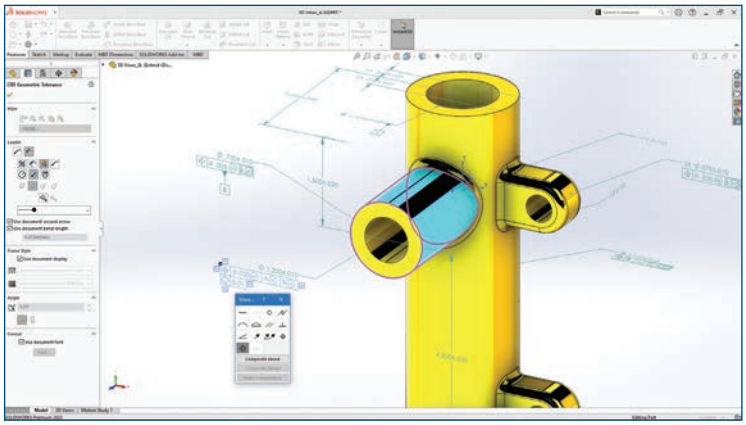
Your CAD software should be your design team's favorite tool. Just like any other tool—a saw, a drill, or a wrench—it should be easy to use and reliable, but powerful and sophisticated enough to get the job done quickly. Segregated engineering and manufacturing systems (and data) create a host of problems. Not only do data translations add extra steps, but they can also introduce errors. With any change, downstream work, such as tooling and fixture creation, inspection documentation, shop floor assembly instructions, in-process drawings, and NC toolpath data, must be recreated entirely or updated manually.

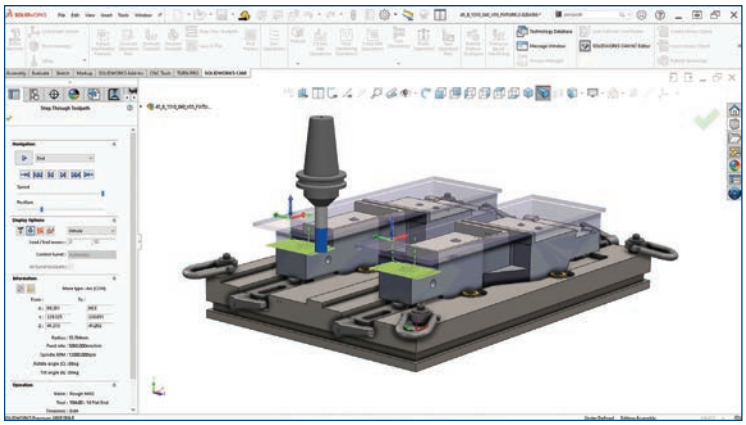
SOLIDWORKS provides a complete concept-to-manufacturing solution that allows you to design, visualize, communicate, validate, cost, manufacture, inspect, compose, and manage—all in one environment. By integrating design and manufacturing systems via the **3D**EXPERIENCE® platform, teams can share design information seamlessly and avoid the excess costs, delays, and quality issues that arise with poor collaboration. An integrated platform streamlines workflows and enables concurrent design and manufacturing, so you can do the following:

- **Accelerate time to market by 20 to 90 percent, catch problems sooner, reduce scrap by up to 75 percent, and lower manufacturing costs by up to 40 percent.**
- **Save time by avoiding the need to import, export, or repair model data.**
- **Avoid errors introduced during data translation.**
- **Lower software maintenance costs due to fewer systems and reduced training.**

Because changes propagate from design to manufacturing, you can incorporate them and minimize the need to push out delivery dates. So, if you must make last-minute changes—for design, competitive reasons, new features, or to accommodate suggestions from manufacturing or industrial designers—you are covered!

Your design tools should help you provide manufacturing with everything they need to produce the finished product. Throughout the entire life cycle, you should also have the right information at the right time to guide and support the right decisions. When you use SOLIDWORKS as part of the **3D**EXPERIENCE platform, you can have access to all the data, tied together in a single location in the cloud.





AUTOMATE BID AND PROPOSAL PROCESSES

Engineers typically have far less exposure to production environments, which makes it hard to know what drives cost on the shop floor. Plus, engineers tend not to have the training or access to the resources to accurately assess the cost impact of a design decision. Consequently, while they have the most influence on cost, engineers may make most of those decisions blindly.

Knowledge applications such as SOLIDWORKS Costing and SOLIDWORKS CAM automatic feature recognition can help you to quickly estimate costs for quick proposal generation. If your company sells made-to-order products, the more details you can provide to the customer with your proposal, the more likely your company is to win the business. CAD software enables design teams to produce configurable product designs in minutes instead of hours or days.

With SOLIDWORKS as your guide, you can determine precisely which areas of your design add the most cost, so that you can possibly reduce costs through cost-reduction redesign as well as generate more-accurate bids and proposals.

OFFER PRODUCT MODELS ONLINE

If your company sells components that are used in other systems, having 3D models online along with product specifications can boost sales. Your customers' design engineers will be more likely to specify your products if you offer them 3D models in common formats that are easily integrated into their designs. PartSupply on the **3D**EXPERIENCE Marketplace provides a comprehensive and intelligent catalog of 3D components. Within a single environment, your customers can find and choose your products, which streamlines the workflow for both you and your customers.

HELP EVERYONE VISUALIZE YOUR PRODUCTS

The appearance of your products is important. Use CAD models to produce realistic renderings to show your products in the best possible light. Renderings help product marketing people design websites and literature without waiting for photographs of physical prototypes. Enabling salespeople to visualize your designs will allow them to solicit customer reactions and generate buyer interest sooner.

WORK WITH YOUR SOFTWARE SUPPLIERS

Software developers need suggestions from their customers about how to make their products better. Providing this feedback costs customers time and therefore money. However, in the spirit of continuous improvement, the time spent today will make designers more productive in the future. Here are actions your design team can take to help improve the software they use:

1. **Join performance-monitoring programs that help suppliers improve speed and reliability. Participation requires little effort and costs nothing.**
2. **Formally report errors you and your workers encounter. Bugs won't get fixed if they're not reported.**
3. **Meet with software developers to suggest improvements that would increase productivity. Submit suggestions online and follow up with project managers in regional or national user groups.**
4. **Invite suppliers to study your work processes and data in your office. Show them how you use their software and the activities that could be made more efficient. Software developers appreciate the opportunity to learn from their customers.**

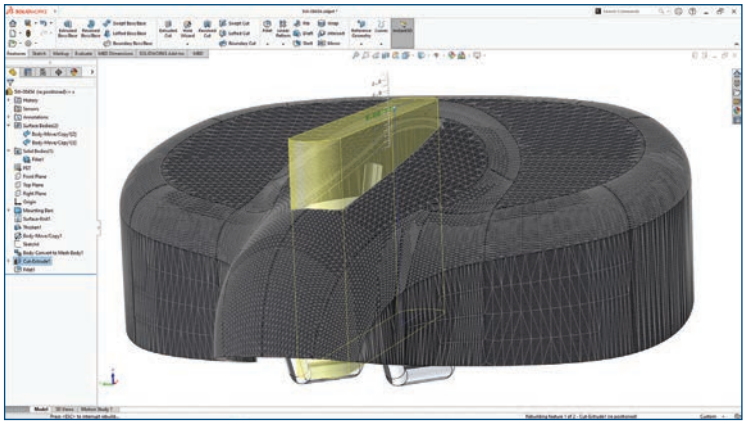
FIND FREE TRAINING DOLLARS

If 20 designers each waste just 30 minutes per day as a result of poor training, the cost will be about $100,000 per year (0.5 hour/person X 20 people X $40/hour X 250 working days per year). In contrast, if your company devotes one day per worker per month to training, the labor cost would be about $76,800 (20 people X $40/hour X 96 hours). The $23,200 difference could be spent on additional training and instructional materials. The productivity of better-trained workers will continue to accrue in future years, whereas time wasted cannot be recovered.

When planning your training, consider these basic principles:

1. **Teach people only the features and functions needed to do their jobs.**
2. **Give prospective training dealers or consultants an outline of topics that pertain to your company's business.**
3. **Customize programmed self-training aids for your company's design practices.**
4. **Learn about curricula at local schools and free dealer classes to discover how these resources can complement your homegrown training efforts.**

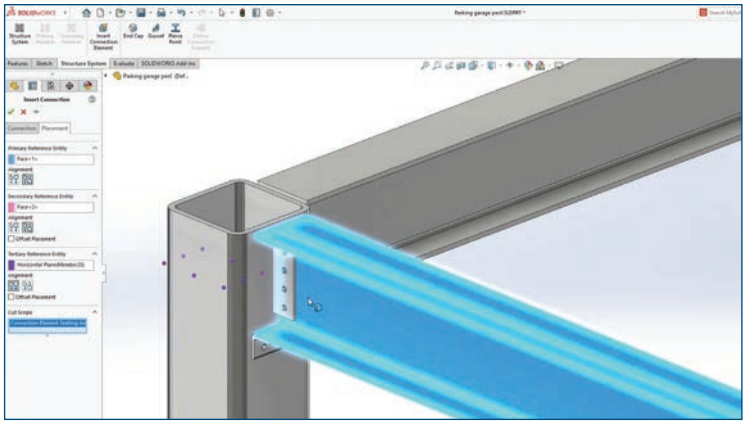
One of the most important and overlooked forms of training is the sharing of new ways to use existing software. Engineering software is complex and sophisticated. Nobody can expect to master every feature. Sharing ideas spreads these discoveries throughout the design team. Organize weekly, biweekly, or monthly user-productivity meetings to share ideas. If you use SOLIDWORKS connected to the **3D**EXPERIENCE platform, then you can create a community online to include your entire team, regardless of location.



CONCLUSION

A motivated design team can be a manufacturing company's greatest asset. Product design and the data it generates can make manufacturing more productive and help bring sales through the door. Whether through easily accessible product data to plan tooling, or models ready to drop into customer designs, design teams create intellectual property that yields enormous value when properly channeled. Companies that continuously improve their design operations will continuously improve their fortunes.

By connecting your SOLIDWORKS data to the **3D**EXPERIENCE platform, you gain easy, secure access to advanced design, data management, and manufacturing tools that allow you to implement new product strategies and workflows. Your connection to the cloud-based platform also means you can collaborate with more people more easily—colleagues, vendors, and customers—whether in the office, on the road, or working from home.



TO LEARN MORE ABOUT HOW YOU CAN USE SOLIDWORKS TO BETTER CONNECT AND COLLABORATE WITH YOUR TEAM, **CONTACT YOUR LOCAL RESELLER.**

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