INTEGRATING DESIGN-TO-MANUFACTURING WITH SOLIDWORKS
YOUR COMPLETE 3D DESIGN SOLUTION
CHAPTER 1: RECAP

In the first chapter of our ebook series on integrating design and manufacturing with SOLIDWORKS® solutions, we discussed the need to develop products that are innovative, as well as high-quality and cost-effective. We explained how hard it is to achieve all of these goals simultaneously. We outlined how streamlined design-to-manufacturing product development processes can give you the time to focus on product differentiation, and we concluded that one of the best ways to accomplish this is to integrate design and manufacturing.

Involving manufacturing earlier in the process creates some of your best opportunities to lower cost and improve quality. Plus, integration enables a seamless transition from design to manufacturing. This leads to improvements in manufacturability, plus fewer errors due to translation and miscommunication. The key is using tools that speak a common language. The result is a boost in productivity, reduction in cost, and higher-quality products.

SOLIDWORKS provides a complete design-to-manufacturing process solution that allows you to design, visualize, communicate, validate, cost, manufacture, inspect, compose, and manage—all in one environment. In this second chapter of our series of ebooks, we will focus on the Design portion of the process.

In this ebook, you’ll learn how SOLIDWORKS can help you design exceptional products while also bridging the gap between your design and manufacturing teams.
WHY SOLIDWORKS?
The complete solution from concept to manufacturing

Innovation, quality, and performance all come from great design. To create and make great designs, you need the right tools. Your design tools should be flexible enough to support creative thinking, yet powerful enough to handle the complexity of today’s products. They also need to enable exceptional design without getting in the way. In addition, your design tools should allow you to provide manufacturing with everything they need to take the design to finished product.

With SOLIDWORKS, you get all of this and more. First, as a 3D CAD software, it is easier to create, visualize, and even animate the final product. You can easily identify interferences between components and hole misalignments, and also check for tolerance stackup issues. For these reasons and more, with 3D, you reduce the risk of finding problems late in the game—during production and final assembly.

For documenting and detailing your designs, SOLIDWORKS offers three options. First, you can design in 3D and create 2D drawings that are associative, or update automatically, whenever changes are made in 3D. Second, you can design and detail in 3D only—commonly referred to as Model-Based Definition, or MBD. For those who want to work in 2D only, SOLIDWORKS also offers DraftSight.

You can also use SOLIDWORKS to run simulations and validate a design, ensuring it meets the performance and quality criteria customers expect. Then, you can correct any problems you find before manufacturing.

It is also easy to evaluate different design iterations so that your final design is more innovative and optimized. Associativity is part of what makes this so easy. With associativity, changes to the design model automatically propagate to all associated components, as well as related drawings, tooling, NC toolpaths, and other downstream deliverables. SOLIDWORKS also enables manufacturing planning and preparation work while concurrently developing the design.

SOLIDWORKS also offers a complete suite of tools to manufacture, inspect, and create technical documentation for the product. It is all tied together with a powerful data management tool, SOLIDWORKS PDM, to manage and control all product information and create a single source of truth.

A Community to Raise Your Design Game

One of the biggest benefits for users is the SOLIDWORKS Community of individuals. SOLIDWORKS software is so intuitive that it’s the tool of choice for more than 5.6 million users and over 33,000 educational institutions around the world. With this presence, it’s easy to staff your organization with designers who already know SOLIDWORKS.

You can tap into the power of this vast network of worldwide users to share best practices, refine tasks, and rapidly work through design challenges. At MySolidWorks.com, you can also leverage knowledge and resources from a global network of suppliers, consultants, manufacturers, and designers. Even better, the 3DEXPERIENCE Marketplace gives you a simple way to find and connect with reliable manufacturers using SOLIDWORKS. As a part of the network, you can also promote your services and respond to requests for quotes.
A COMPLETE 3D DESIGN SOLUTION
SOLIDWORKS scales to meet your solid modeling needs, whether large or small, simple or complex.

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. If a tool is overly complicated, or unreliable or can’t get the whole job done, it tends to be left on the shelf unused.

SOLIDWORKS 3D CAD is best known for its ease-of-use and reliability. Its robust capabilities shorten product development time, reduce costs, and improve quality. Intuitive 3D design and manufacturing solutions from SOLIDWORKS let you conceptualize, create, validate, communicate, manage, and transform your innovative ideas into great product designs. Along with advanced part, assembly, and 2D drawing functionality, there are also specialized tools to support manufacturing options such as sheet metal design, weldments and fabrications, mold design, DFM (Design for Manufacturability), and even CAM programming—all in one integrated package. Electrical cable and pipe routing is also available, which helps with planning and significantly cuts down assembly time.

SOLIDWORKS also supports advanced design capabilities such as surfaced, advanced surface flattening, and reverse engineering. In addition, it offers a sophisticated components and parts library, which will save you time.

SOLIDWORKS offers additional capabilities to help meet customer needs. Product configuration functionality will help meet individual customer needs while automated cost estimation will help make better decisions around product cost so that you can keep your products affordable for your customers. SOLIDWORKS also offers the tools to help you improve quality with design and drawing checking and structural and motion analysis capabilities. With the growing demand for smarter products, SOLIDWORKS will support you with solutions for ECAD design and ECAD/MCAD collaboration. You can even start to showcase your products before the physical product exists with advanced photorealistic rendering. Finally, to bring your teams together and improve efficiency, SOLIDWORKS offers advanced collaboration capabilities.
CREATE 2D DRAWINGS WITH EASE
Use SOLIDWORKS 2D Drawing for fast and easy creation of production-ready manufacturing drawings.

Do you find creating 2D drawings tedious or time-consuming? You’re not alone. SOLIDWORKS reduces the tedium with powerful features that make it as painless and efficient as possible, while still providing everything you need to clearly communicate how to manufacture and assemble your design.

First, SOLIDWORKS associativity allows you to link a 2D drawing directly with the 3D solid model, so updates to the 3D model automatically update in all affected views of the 2D drawing. There are no more tedious updates to each drawing every time there’s a change. More importantly, you do not have to worry about manufacturing errors due to conflicting information. For example, have you ever updated everything impacted by a change, but missed that cutout view in the corner? Those times are over. Associativity also means you can start your detail work sooner because the drawings are automatically kept up-to-date as the design evolves.

SOLIDWORKS also provides you with numerous functions to simplify drawing creation. You can place views with a simple click of the mouse. Dimensions, annotations, and balloons are automatically arranged in a clean layout, making it easy for manufacturing to interpret. Manufacturing standards are automatically enforced with templates to ensure consistent high quality. For example, hole callouts automatically include all of the information manufacturing needs, such as hole type, hole size, and tap-drill size.

With SOLIDWORKS PDM, you will also never have to worry about releasing the wrong version of the drawing to manufacturing. Access controls limit who can make changes, so no one can inadvertently make changes after design release, without getting approval.

Discover all the innovative drawing features in SOLIDWORKS.

VIDEO: SOLIDWORKS Drawings
ACCELERATE RELEASE TO MANUFACTURING WITH MODEL-BASED DEFINITION (MBD)

SOLIDWORKS MBD helps streamline manufacturing, offering both time and cost savings.

Tech-Clarity research found that 33 percent of design time is spent producing 2D drawings. For those who would prefer to invest that time in innovation or enabling manufacturing to produce parts sooner, SOLIDWORKS MBD may just be the answer. The research shows that those who have adopted it have enjoyed improved communication with suppliers and manufacturing. This leads to fewer mistakes and less rework.

MBD uses the 3D model engineering has developed, but instead of creating separate 2D drawings from it, the 3D model displays all the required information manufacturing needs to produce the part. Consequently, time isn’t wasted creating additional 2D deliverables. Plus, a 3D model is easier to understand as no one has to mentally project 2D views in their head. This greatly reduces the risk of errors, especially for newer workers.

SOLIDWORKS MBD supports industry standards such as Military Standard 31000A, ASME Y14.41, ISO 16792, and DIN ISO 16792. It organizes all the rich product and manufacturing information (PMI) into clean and structured 3D presentations with different views and display settings. It can even intelligently show and hide 3D annotations while you rotate the model to give extra clarity.

But what if vendors or customers don’t have SOLIDWORKS? The answer is simple. SOLIDWORKS MBD allows you to save 3D models with 3D dimensions and notes in a variety of formats, including PDF (some call it 3D PDF), eDrawings, and STEP 242. In these formats, you not only view your design, but you can rotate it, highlight dimensions, and see the features they relate to highlighted in the model. You can measure, explode views, and section views all interactively. Try doing that with a static 2D drawing. The viewers are free, so anyone can benefit, even if they don’t have SOLIDWORKS.

As with 2D drawings, SOLIDWORKS MBD has customizable templates so you always include standard company information. Because 3D models are so easy to understand, multiple departments will find them useful. You can take advantage of predefined templates or customize your own for different audiences, such as manufacturing, operations, QA, and procurement. In addition to drawing information, you can use SOLIDWORKS MBD to create requests for quotes (RFQs), and inspection reports when they are combined with SOLIDWORKS Inspection. Plus, these deliverables are available in a variety of formats such as eDrawings and 3D PDFs. You can even print 2D drawings from the 3D model if needed.

Take a look at the powerful capabilities of SOLIDWORKS MBD.

Viecelli Móveis accelerated their custom furniture business with SOLIDWORKS MBD capabilities.
INNOVATE WITH SMART PRODUCTS
SOLIDWORKS Electrical solutions embed the intelligence in your designs.

Making products smarter is an incredibly powerful way to add innovation and differentiate products. In fact, Tech-Clarity research finds that 52 percent of companies developing smart products fear losing market share unless they continually make products smarter. On top of that, 47 percent worry about reduced revenue. Considering this, the amount of software and electronics going into products will continue to increase. However, Tech-Clarity’s research also finds that an overwhelming 89 percent report that they have challenges due to poor collaboration. Respondents reported that these challenges hurt profitability by driving up costs, creating market delays, and causing missed customer expectations. Consequently, it is essential that engineers across disciplines have tools that support better collaboration. With this in mind, SOLIDWORKS offers a full suite of tools that integrate mechanical and electrical design.

SOLIDWORKS Electrical solutions maintain bidirectional links with the mechanical design, so you never have to worry about them becoming out of sync. This helps you avoid potential conflicts in design information that could lead to manufacturing problems later on.

SOLIDWORKS PCB allows you to bring together the PCB design with the mechanical design, so you never have to worry about discovering problems during assembly, like an enclosure not fitting around the PCB. When you combine it with the other powerful validation capabilities in SOLIDWORKS, you can identify potential problems with the PCB overheating and adjust the enclosure as needed, before beginning any manufacturing work.

With SOLIDWORKS Electrical 3D, you can take the guesswork out of final assemblies by optimizing wire routing in the virtual design and calculating the optimal lengths for wires, cables, and harnesses.

Explore the power of SOLIDWORKS Electrical solutions.
COLLABORATE SEAMLESSLY WITH SUPPLIERS AND CUSTOMERS

Import, reuse, and share data no matter where they came from, or where they’re going.

In addition to exceptional design tools, you also need the capabilities to collaborate with customers and suppliers. SOLIDWORKS product collaboration tools help members of your design team work closely with other project stakeholders. SOLIDWORKS also provides ways to protect your designs before sharing them with those outside of your organization. With eDrawings, your suppliers and customers can easily view your CAD data so you can collaborate, while still protecting your intellectual property (IP).

While the vast network of 5.6 million SOLIDWORKS users makes it easy to find suppliers using SOLIDWORKS, there will still be times when you need to work with multi-CAD data. SOLIDWORKS has multiple functions to simplify the process, so you have the flexibility to work with the data the way you want. With SOLIDWORKS 3D Interconnect, you can maintain a direct integration with native multi-CAD data. And if you need to work with them as native SOLIDWORKS data, Automatic Feature Recognition makes that possible too.

Take a closer look at the powerful capabilities available in SOLIDWORKS for working with multi-CAD data.
CHAPTER 3

VALIDATING MANUFACTURABILITY

Download the next ebook chapter to learn how SOLIDWORKS solutions can help you provide manufacturing with everything they need to produce your design.

The next ebook chapter will cover these topics:

• Catch problems and identify cost drivers that will impact fabrication.
• Take the guesswork out of injection molding and produce high-quality parts the first time.
• Avoid assembly problems leading to costly scrap and rework.
• Manage and understand changes to keep all design details up-to-date.
• Improve quality by enforcing standards.

Learn more about how SOLIDWORKS solutions can take you from design to manufacturing by visiting https://www.solidworks.com/whatsnew2019.