INTEGRATED DESIGN-TO-MANUFACTURING SOLUTIONS
YOUR COMPLETE 3D DESIGN SOLUTION
CHAPTER 1: RECAP

In the first of our series of eBooks 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 simultaneously achieve all of these goals. We outlined how a 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 sooner creates some of your best opportunities to lower cost and improve quality. Plus, integration enables a seamless transition from design to manufacture. 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? Enjoy boosted productivity, reduced costs, 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 manufacture.

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 great design without getting in the way. In addition, your design tools should enable 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 3D CAD software, it makes it easier to create, visualize, and even animate the final product. You can easily identify interferences between components and hole misalignments, and even check for tolerance stack up issues. For these reasons and more, with 3D, you reduce the risk of discovering problems late in the game—during production and final assembly.

You can also use SOLIDWORKS to run simulations and validate a design, ensuring it meets the performance and quality criteria customers expect. Then, any problems you find can be corrected prior to 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, any change to the design model is automatically propagated to all associated components, as well as related drawings, tooling, NC toolpaths, and other downstream deliverables. It also enables manufacturing planning and preparation work to be concurrent with 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, that ensures a single source of truth to manage and control all product information.

A Community to Raise Your Design Game

One of the biggest benefits for users is the SOLIDWORKS Community of like minded individuals. SOLIDWORKS software is so intuitive that it’s the tool of choice for more than 4.7 million users and over 32,000 educational institutions around the world. With this presence, it’s easy to find designers who already know SOLIDWORKS to staff your organization.

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. You can also leverage knowledge and resources from a global network of suppliers, job shops, consultants, manufacturers, and designers. Even better, the MySolidWorks Manufacturing Network 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.

The natural design process begins with high-level ideas. You need a tool that supports conceptual design. **SOLIDWORKS** has all of the capabilities needed to manage that front-end phase, including collaborative conceptual design software purpose-built for **Industrial Designers**, so you get started on the right foot. Once you have the right concept, you can fully detail your design, leveraging the work you did during the concept phase.

The Top Down Design approach is one where all parts in an assembly reference each other for size and position (through in-context mates and/or sketches located in the assembly). In a Bottom Up assembly, all parts are independent.

**SOLIDWORKS** has an easy-to-use, intuitive user interface so you spend your time focused on the design, rather than trying to learn the tool. Commands are context sensitive as you interact with the model. This means that rather than hunting through tedious menu picks or cumbersome workflows, you’ll find everything you need at your fingertips. You also get immediate visual feedback as you create features, so you know you’ve built the model correctly.

You can also increase your productivity with many of the automation features built into **SOLIDWORKS**. Functions such as **SmartMates**, **Smart Components**, and **Smart Fasteners** anticipate how components should be assembled, which allows you to automate the process of developing an assembly. Save hours with design automation and easy access to **catalogues** of standard supplied comments. Plus **SOLIDWORKS** continues to innovate with new functions such as Generative Design, which allows you to define design criteria and then let the software come up with the geometry.
CREATE 2D DRAWINGS WITH EASE

Use SOLIDWORKS 2D drawings 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 your design should be manufactured and assembled.

First, SOLIDWORKS associativity allows you to link a 2D drawing directly with the 3D solid model, so updates to the 3D model are automatically reflected in all impacted views of the 2D drawing. There are no more tedious updates to every drawing view each 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 cut-out 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. Views can be placed 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 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 inadvertently makes changes after design release, without 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 be just the answer. The research has shown that those who have adopted MBD have enjoyed improved communication with suppliers and manufacturing. This leads to fewer mistakes and less rework.

MBD uses the 3D model developed by engineering, but rather than 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.

Easy Share and View Options

SOLIDWORKS MBD supports industry standards such as Military Standard 31000A, ASME Y14.41, ISO 16792, and DIN ISO 16792. It organizes all of 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 you 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, tolerances, and notes in a variety of formats, including PDF (some call it 3D PDF), eDrawings®, and STEP 242. In these formats, you can not only view your design, but rotate it, highlight dimensions, and see the features they relate to 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.

Viecelli Móveis accelerated their custom furniture business with SOLIDWORKS MBD capabilities.

As with 2D drawings, SOLIDWORKS MBD has customizable templates so you always include standard company information. Because the 3D model is so easy to understand, multiple departments will find it 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 request for quotes (RFQs), and when combined with SOLIDWORKS Inspection, inspection reports. 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.
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. Consequently, few products today are strictly mechanical. With the amount of software and electronics on the increase, they have become increasingly critical to product development. 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 PCB design with the mechanical design so you never have to worry about discovering problems during assembly, like the enclosure doesn’t fit 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 manufacturing begins any work.

With SOLIDWORKS Electrical 3D, you can take the guesswork out of final assembly 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.

VIDEO:
SOLIDWORKS PCB
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 4.7 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. On the other hand, 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.

VIDEO: 3D Interop
CHAPTER 3
VALIDATING MANUFACTURING

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 http://launch.solidworks.com.

References