
STREAMLINING PRODUCT DOCUMENTATION ACROSS THE MANUFACTURING ENTERPRISE WITH SOLIDWORKS COMPOSER

SUMMARY

For many years, manufacturers simply had to accept more time delays and greater costs as they developed product documentation in multiple languages to support growing global markets. But today, product developers are gaining competitive advantage, saving time, and cutting costs with a new class of integrated software tools. With 3D authoring software like SolidWorks® Composer, your company can use 3D CAD data to automate the product documentation process—without modifying product designs. By addressing the changing nature of CAD data, this associative documentation tool seamlessly and effortlessly keeps your documentation up-to-date.



Introduction

Over the past decade, dramatic advances in 3D computer-aided design (CAD) technology have given designers and engineers powerful tools for designing, engineering, and manufacturing new products. Powerful CAD tools are helping engineers not only create and visualize innovative designs, but also shorten design cycles, accelerate time-to-market, reduce development costs, and improve product quality. For many manufacturing organizations, however, most benefits associated with implementing CAD technologies have involved processes that occur before production. As a result, product design and engineering primarily reap the advantages of CAD data. While 3D CAD has made designers and engineers more productive and efficient, the innate value in the CAD models they create often ends with the delivery of 2D drawings or printed materials to manufacturing.

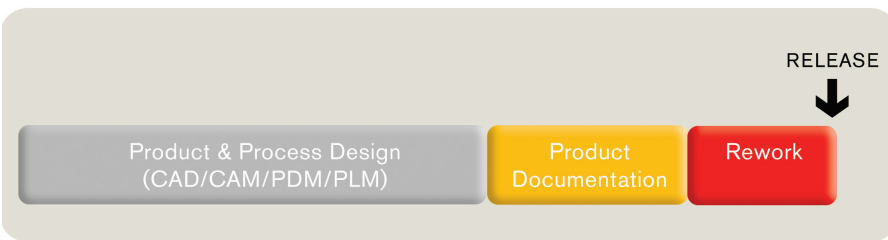
As many engineers can attest, requests for CAD-related information, images, and content—in a variety of layouts and formats to fulfill functions other than design and engineering—are numerous and often arise after a design’s release for production. All products need documentation, and most require the production of assembly, service, and training manuals. The utility of 3D data extends even to the creation of marketing materials and web-based content. For any company that designs and manufactures products, CAD models and their associated intellectual property are the fundamental source of product information, driving efficiency through all the subsequent communication functions that traditionally took place after product design.

As manufacturers strive to find ways to become leaner, more efficient, and more competitive in global markets, generating CAD data to satisfy all the product documentation requirements of the manufacturing enterprise may hold the greatest potential for improving productivity. Instead of cutting into an engineer’s time to do high-resolution screen captures, create special exploded views, or write instructions for manufacturing, service, and marketing purposes, you can use an integrated content authoring tool and other resources to create product graphics and illustrations directly and simultaneously from 3D CAD models.

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Product documentation is often a separate step that currently takes place after product design in many product development processes, creating delays and the need for additional rework. Shortening this step by using a 3D authoring tool to develop documentation content concurrently can accelerate time-to-market and increase competitiveness.

Historically, product design, documentation, manufacturing, and marketing processes have occurred sequentially, with one function closely following the other. Technical illustrations, exploded part diagrams, assembly instructions, and high-resolution graphics typically follow the release of the design for production. In addition to extending the time required to complete the product development cycle, the sequential approach is neither flexible nor automated. Whenever a design modification that requires a change to the CAD model arises late in the process, manufacturers must manually address all the attendant functions through a period of rework, creating opportunities for more errors, further delays, and cost overruns.

Now you can address all your product documentation needs—including materials for manufacturing, service, user manuals, and marketing—by using a new class of documentation authoring applications to repurpose 3D CAD data. Known as 3D authoring software, these tools extend the utility of CAD data and automate the development of product documentation and related materials. While many organizations already leverage 3D CAD content in some fashion, a 3D authoring tool allows you to avoid the rework associated with updating CAD models to incorporate engineering changes into downstream documentation. Software that updates content directly from the CAD model can distribute design modifications throughout all related deliverables.

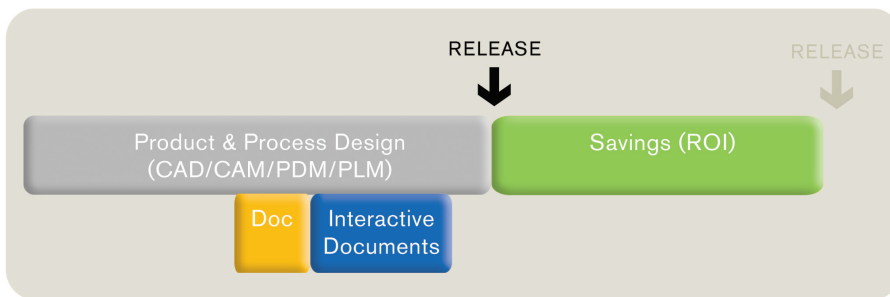
As the design changes, 3D authoring software enables technical illustrators to create and update exploded views. Manufacturing specialists can develop and update graphics in assembly instructions, and customer service personnel can do the same in service documentation. This powerful software also allows marketing professionals to render and update catalog images. If the CAD model changes, you can automatically update all of the related content. This concurrent approach serves to compress development time, squeeze costs out of the process, and alleviate demands on engineering, all while maintaining the integrity of the original CAD data.

By implementing a documentation authoring solution, your company can realize greater accuracy, increased efficiency, and a more significant return on investment (ROI) within the first year. Time and cost savings related to resource reductions in publication creation, assembly operations, engineering change order (ECO) processes, and warranty claims will eclipse the cost of the solution during the first year and continue to grow with each passing year. By integrating and automating the creation of product documentation, you can decrease labor costs associated with document publication, localization of materials, and training. At an organizational level, the ROI associated with the new processes becomes most evident through shorter time-to-market, improved operational efficiencies, and better quality documentation.

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Using a 3D authoring tool like SolidWorks Composer software, manufacturers can generate CAD data to meet documentation, assembly, manufacturing, training, service, and marketing content needs, automatically and simultaneously. SolidWorks Composer software enables you to produce documentation as much as 30 percent faster than with conventional methods, and realize significant ROI by reducing documentation, training, and localization costs.

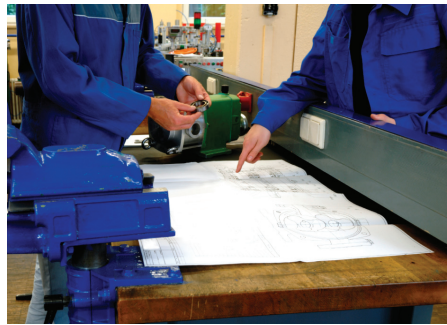
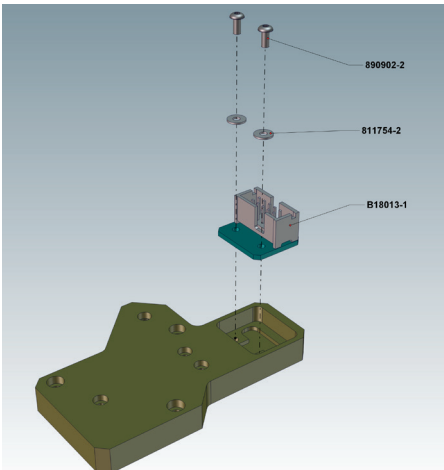
Automating manufacturing and assembly instructions

By implementing an integrated documentation solution, you also can enhance an important internal function—the efficient creation of more effective 3D manufacturing and assembly work instructions. Traditionally, manufacturers have relied on the use of 2D engineering drawings—with exploded views, annotations, callouts, and balloons—to instruct manufacturing personnel and assemblers in producing components, subassemblies, and assemblies. Some of these work instruction documents are quite lengthy and wordy, heavily relying on the use of text to convey important production details to an audience on the shop floor who may lack both English-language and reading skills.

In a global economy, unanticipated language and literacy barriers between design and manufacturing personnel can get in the way of achieving right-first-time production. Often, time is wasted in finding and verifying components, or in trying to understand manufacturing and assembly work instructions. Manufacturing personnel on the shop floor—who may speak another language or reside in another country—cannot simply place a call to engineers to clarify a design. Even if production resides in the same building, the literacy levels of personnel on the assembly floor can lead to questions, difficulties, and delays. That's why nontextual, visual 3D content is becoming increasingly important for communicating vital manufacturing information.



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A simple, animated 3D work instruction can convey manufacturing and assembly instructions more clearly, effectively, and universally than text-based 2D drawings—and can help manufacturers reduce production errors and lower manufacturing costs.

An integrated 3D authoring application provides the opportunity to minimize the use of text in work instructions and reduce the potential for misunderstandings. The visualization of products that forms the basis of 3D work instructions represents a universal language that can help convey manufacturing and assembly tasks in a straightforward manner with less chance for misinterpretation. The simple animation of a CAD model can explain the finer details of assembly operations more clearly and effectively, and thus replace an entire stack of documents. By providing universally understood 3D manufacturing and assembly work instructions, your company can minimize iterative cycles and disagreements between Engineering and Production. Addressing the root cause of errors, delays, and rework can drive additional costs out of the production process.

Creating better user manuals and product documentation

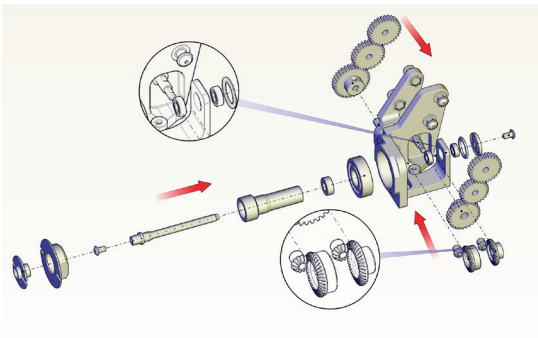
While product documentation can fulfill a range of uses, its core purpose is twofold: to provide customers with the information they need to use and enjoy a manufacturer's product and to develop customer loyalty for that product. Therefore, the production of user manuals, part lists, and product schematics is an important function for building customer satisfaction and loyalty—one that requires the contributions of illustrators, writers, and publishing specialists. Whether product documentation personnel are engineers or have a limited engineering background, they can substantially increase their chances of success by creating graphical content directly from CAD models.

With a 3D authoring tool like SolidWorks Composer, product documentation specialists can avoid using a CAD system or asking an engineer to produce product information such as exploded views, vector line art images, or annotations. Instead of re-creating visuals from the finished product, they can create 2D and 3D visuals to meet any documentation requirements. Whether the need is vector line art of an exploded view for technical illustrations or a detailed view of a high-resolution raster image for a user manual, documentation professionals can save time and improve the visual's quality by accessing and reusing native CAD data. The flexibility of integrated documentation software eliminates the need to go back and forth with Engineering to obtain the precise views, angles, and colors required for documentation; you can create this content from the CAD model, but cannot alter or change the design.

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Product documentation professionals can save time and improve the quality of documentation visuals by utilizing a 3D authoring tool like SolidWorks Composer software to create documentation graphics directly from native CAD data.

With the explosive growth of digital and online documentation systems, 3D authoring software also enables documentation publishers to use animations within user manuals and product help systems. The interactive nature of 3D provides an effective means for showing your customers how to use a product and for illustrating how that product works. With more and more user manuals published either online or on CD-ROM, animation capabilities are fast becoming an important part of the product documentation toolkit. Integrated documentation software provides the capabilities for creating interactive content from the actual product CAD file.

Delivering accurate field service, maintenance, and repair information

In a global economy where customers reside in different countries, the ability to provide accurate and universally comprehensible field service, maintenance, and repair documentation is critical. No matter who executes the service, maintenance, or repairs—the customer, an authorized service representative, or an employee—the ability to perform service and maintenance procedures efficiently, with as little downtime as possible, is vital for retaining customers. It requires access to self-explanatory, clear, and concise product documentation.

Providing this type of product documentation has presented greater challenges, added demands on engineering resources that do not carry primary responsibility for its development, and increased operational costs. For example, documenting the intricate details necessary for showing how to dismantle a machine, perform a maintenance service or repair, and reassemble it might require a series of step-by-step graphics from Engineering. Service technicians frequently call in to engineering departments to get this type of information for use in the field. Complicating this challenge even further is the fact that the field service technician may speak another language, requiring translations of service or repair documentation materials, which adds further costs and also delays product shipment in many industries.



The interactive nature of 3D provides an effective means for showing your customers how to use a product and for illustrating how that product works.

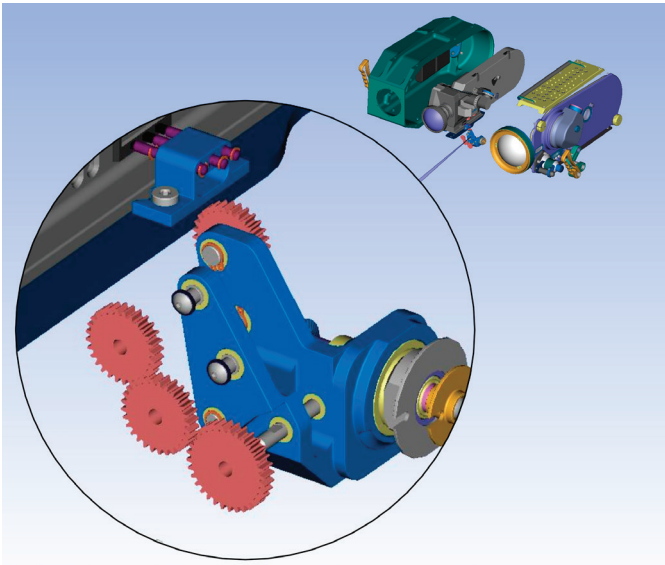


With SolidWorks Composer software, manufacturers can replace text-based field service instructions with graphics and video animations, thereby improving service operations, minimizing the need for language translations, reducing training needs, and decreasing operational costs.

Using 3D authoring software, manufacturers can create animated, graphically rich service instructions directly from CAD models. Instead of having field service technicians call in to Engineering, manufacturers can show service technicians how to complete maintenance, service, and repairs in the universal language of visualization. By replacing unwieldy service books and text with step-by-step graphics and images, you can share interactive, animated service instructions with global partners over CD-ROM or via the web, ensuring the effective distribution of product knowledge to customers and field service professionals. In addition to improving field service instructions and reducing demands on engineering resources, using 3D authoring software can minimize the need for language translations, decrease the number of service calls to Engineering, and lower operational costs.

Publishing effective training materials

The ongoing development and publication of product training materials—for customers, new employees, and global partners—is another area where the repurposing of CAD design data can pay big dividends for today's manufacturers. Because the native CAD files serve as the single source for all product content, using a 3D authoring tool to customize training materials for specific groups is far easier and more efficient than crafting these materials independently. This capability is especially useful—you can create effective training materials without using the costly textual translation services once required for communicating with overseas audiences.



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Using SolidWorks Composer software, manufacturers can manage the development of online product training materials—for customers, employees, and global partners—efficiently and cost-effectively through the reuse and generation of CAD design data.

With integrated documentation software that can embed 3D content, markups, and animations in any ActiveX®-compatible business application, manufacturers have the power to create, manage, and deploy product training documentation on a global scale, at much lower cost. This capability allows you to embed product training content in common communication applications, such as Microsoft® Word, Excel, and PowerPoint®; as a standalone executable for viewing with free player software; or in HTML format to distribute over the web.

With this flexibility, manufacturers can maximize the use of graphics, animations, and visual content—while minimizing the amount of text, language translation requirements, and related costs. In addition, the widespread compatibility of 3D content created with an integrated documentation application helps global manufacturers to streamline the localization process for product training documentation. While helping you to drive down costs and improve profit margins, SolidWorks Composer simultaneously enhances the quality, reach, and customization of your training materials. Support for HTML content can expand your company's product training reach to virtually any computer with Internet access.

Creating vibrant, exciting marketing content and web-based catalogs

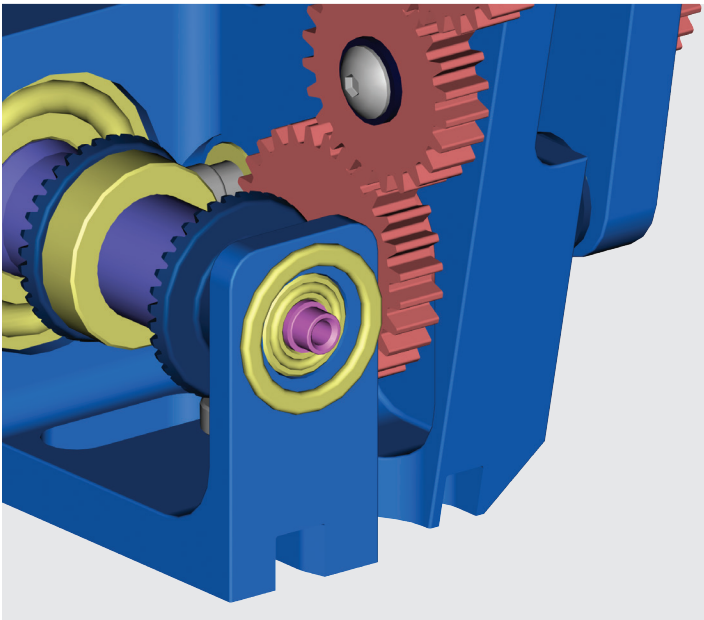
Because CAD data enables you to create imagery for print and online marketing purposes with a 3D authoring tool, it is an incredibly valuable asset. Many manufacturers spend millions of dollars annually on professional product photography to present and market their products when a more cost-effective, high-resolution, CAD-derived image could satisfy the same need. Some media, such as television and magazines, always will require live-action video and photography. However, the burgeoning need for digital content and the explosive growth in online, web-based catalogs both demand visual content that manufacturers can best supply by repurposing product design data.

Even if a manufacturer already derives catalog visuals from CAD files, the process requires the input of both an engineer and a marketing professional to separate engineering data from marketing needs. With an integrated documentation system, marketing professionals can render, modify, and change images to meet specific printing or marketing needs, such as controlling resolution—pixels and dots-per-inch—which is not easy to do with CAD screen captures. Because the CAD model can be used to update views and animations that match the final product, marketing professionals no longer need to wait for Engineering to finish the product to create content.

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Many manufacturers spend millions of dollars annually on professional product photography to present and market their products when a more cost-effective, high-resolution, CAD-derived image could satisfy the same need.

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High-resolution images and animations derived from CAD models using SolidWorks Composer software are better suited—and more cost-effective—for supporting marketing vehicles online and via digital media than traditional professional photography.

With CAD-derived imagery and animations, manufacturers can make their online and digital media marketing vehicles more exciting, dynamic, and interactive, while saving money at the same time. Web-based catalogs, presales demonstrations, trade show displays, and online brochures are much more vibrant and effective when they utilize interactive animations instead of static images. Creating these types of visuals in the past required significant skill and resources. With an integrated 3D authoring tool, however, just about anyone can transform a CAD model into a dazzling interactive animation.

Furthermore, manufacturers can begin marketing the product upon its release for production rather than waiting on initial production runs or photography to begin creating market demand. By repurposing CAD models as marketing visuals and animations with content creation software, you can reduce photography costs, increase visual flexibility, and get out in front of product introductions.

Conclusion

As manufacturing organizations strive to identify ways to save time, cut costs, and improve their competitiveness in global markets, mining the value contained in their product design and 3D CAD digital assets holds great potential for substantially improving productivity. By automating downstream product information publishing functions—ranging from assembly, manufacturing, and field service instructions to product documentation, training, and marketing materials—your company can realize shorter times-to-market, improved operational efficiencies, and better quality documentation.

Manufacturers that use an integrated documentation authoring package not only enjoy greater accuracy, increased productivity, and more cost savings, but also realize significant ROI within the first year. Reductions in the costs and resources associated with document publication, localization of materials, assembly, and training will more than pay for the solution in just a few months— and will generate savings in time and costs for years to come. Instead of performing product documentation functions independently after a design's release for production, product development organizations can use an integrated 3D authoring tool, like SolidWorks Composer, to meet all documentation needs directly and simultaneously from the 3D CAD model. In addition to improving efficiency, saving time, and cutting costs, an integrated documentation system enables documentation to change as the CAD model changes, keeping associated product content up-to-date.

By automating the creation of product documentation and related content—and linking it directly to 3D CAD models—manufacturers can improve profit margins, achieve faster times-to-market, and increase sales related to better customer education. A 3D authoring tool empowers you to produce documentation faster and at lower cost, while reducing levels of rework and lowering production overhead. With more effective training and service, your company not only will enhance customer satisfaction, but also will realize shorter maintenance downtimes and greater profit margins.

Call for action

To see online demonstrations of how you can cut costs and improve documentation, try out a 3D authoring software package yourself, or discuss your documentation requirements with your local authorized reseller. Visit www.solidworks.com/solidworkscomposer today.

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