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Accelerate consumer durables design with Solid Edge

INDUSTRY
INSIGHTS

Siemens Digital Industries Software

Manufacturers of consumer goods are facing increasing pressure to bring unique, optimized products to market faster while ensuring performance and reliability. Unfortunately, they are also facing an increasing number of challenges, including fluctuating demand, increasing global competition, growing demand for customized products, disruptions to supply chains and rising electrical and electronic content in their products.

A possible solution for these manufacturers is to implement an integrated solution for product development that creates a digital twin, a detailed 3D digital model of a proposed product. A digital twin adds data to a design as it progresses, then leverages this data throughout the product development lifecycle. It can be used as the basis for all areas of product development, including managing customer requirements, concept and detailed design, prototyping, simulation, manufacturing, installation and service.

The Solid Edge® software portfolio from Siemens Digital Industries Software enables small and medium-sized manufacturing firms to rapidly digitalize their product designs and development processes. This fundamental step in moving to a digital enterprise increases their flexibility to react quickly to changes in consumer demand and disruptions in their traditional supply chains. Solid Edge provides easy access to today's hottest design technologies for any size business. Enabled by next-generation technology capabilities such as generative design, reverse engineering, additive manufacturing and subdivision modeling, the Solid Edge portfolio boosts productivity.

Solid Edge includes unique convergent modeling capabilities that combine design information stored in mesh-based models, such as data created during reverse engineering and used for additive manufacturing, with that

The Solid Edge advantage:

- Speed design of complex parts and large assemblies with the simplicity of direct 3D modeling combined with the flexibility and control of parametric design, made possible with synchronous technology
- Create attractive product images and animations that communicate innovative products to potential customers
- Easily model attractive housings and bodies using Solid Edge subdivision and surface modeling design capabilities
- Use industry-leading advanced wiring, harness and PCB design techniques for efficient packaging of electromechanical components
- Rapidly create virtual prototypes for internal validation and customer acceptance testing
- Optimize components for weight and material usage

Solution focus

The Solid Edge advantage: *continued*

- Prepare parts and components for 3D printing using additive manufacturing techniques
- Define accurate and efficient machining processes
- Share design data internally and with suppliers and customers using mobile and cloud-based applications
- Streamline documentation by quickly creating interactive technical documents directly from Solid Edge parts and assemblies
- Manage customer requirements throughout the product development cycle
- Manage engineering change requests using robust data management tools

stored in traditional boundary representation (or b-rep) formatted 3D computer-aided design (CAD) models.

Using Solid Edge improves product development performance in these key process areas:

Visualize new products for sales and marketing

Significantly improve how you communicate designs to distributors and potential customers during the product development process, such as getting valuable feedback to fine-tune the final product, and after launch, by conveying your product's innovative features.

Using Solid Edge enables you to create 3D digital models, photorealistic images and animations of proposed products, which can be used to simply and quickly create attractive marketing materials and component catalogs. Augmented reality (AR) can be used to interact with 3D virtual designs of products for marketing and training purposes.

Manage customer requirements

Use integrated design capabilities to manage requirement documents and specifications as an integral part of the design project, helping you react to customer demands more effectively. Solid Edge, which links requirements to 3D CAD models, can reduce business risk by ensuring that requirements are visible to everyone, tracking how and when they are met. Requirements can be tracked and fulfilled using Solid Edge Requirements Management.

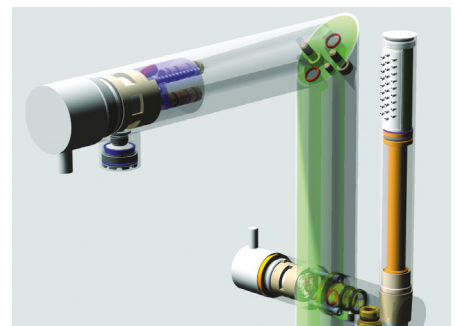


Speed mechanical 3D design and 2D drawings

Design complex parts and assemblies quickly and flexibly using unique synchronous technology available in Solid Edge 3D design. With integrated 2D and 3D sketching, synchronous technology allows you to begin concept design immediately without tedious preplanning and effortlessly make changes even to history-based models. A comprehensive, proven 3D CAD solution, Solid Edge enables faster and more efficient designs, eliminating errors prior to manufacturing and adhering to international drawing standards.

Use subdivision modeling to create stylized shapes

Create aesthetically pleasing shapes, including housings that feature complex surface designs, and develop product forms in a fraction of the time required with traditional products. Solid Edge 3D CAD includes subdivision modeling capabilities that allow for rapid conceptualization of ideas without the need for expert knowledge. Unlike regular surface modeling, subdivision modeling uses stylized design to model complex shapes quickly and accurately, all without having to leave the Solid Edge environment.



Key solution components

- **Solid Edge Mechanical Design:** 3D part and assembly design using synchronous technology – accelerates machinery design, speeds revisions and improves the re-use of proven components in new designs
- **Solid Edge Electrical Design:** Design wiring, cables, bundles and printed circuit boards – enables electromechanical co-design collaboration
- **Solid Edge Simulation:** Digital validation of critical components – reduces the need to create physical prototypes, lowers material/testing costs and improves reliability and durability
- **Solid Edge Manufacturing:** Define accurate machining, fabrication and assembly processes – improves overall efficiency with additive and subtractive manufacturing
- **Solid Edge Technical Publications:** Create illustrations and technical documents – communicates manufacturing, installation and maintenance procedures globally
- **Solid Edge Data Management:** Search, manage and share product data – improves collaboration within the design team and with other departments, suppliers and customers
- **Solid Edge Cloud Collaboration:** Online CAD management, viewing and collaboration

Design and integrate electrical circuits, wiring and cables

Address product complexity that results from an increase in electrical content. Solid Edge Wiring and Harness Design products exchange data interactively between mechanical and electrical environments, making it easy for engineers to see and react to changes made in the different disciplines. These tools enable the user to create and import schematic diagrams, assign physical wires and connectors, efficiently route wires and component interconnects in a connected 3D assembly and simulate wiring circuit performance. Wire routings can be optimized, correct cable lengths calculated and accurate bill-of-materials (BOM) created, resulting in more efficient manufacturing and faster time-to-market for new products.

Design and integrate printed circuit boards

Break down the communication barriers in printed circuit board (PCB) design by efficiently communicating design intent between domains. Integrated solutions can be used to create 3D models of PCBs and help with packaging PCBs in electromechanical assemblies in the most effective manner. Solid Edge PCB Collaboration provides a photorealistic view of components in a mechanical assembly, which enables efficient integration of PCBs into traditional mechanical design.

Simulate using virtual prototypes

Validate and improve performance with scalable simulation tools that use virtual prototyping and integrated analysis of static loads, buckling, vibration, fluid flow and heat transfer performance. Virtual prototypes allow you to identify design challenges prior to manufacturing, resulting in a significant drop in costs and time. Virtual testing can be used to eliminate interference between moving parts and minimize manufacturing issues. The integrated analysis capabilities of Solid Edge Simulation optimize designs for high performance and durability while minimizing material costs.

Optimize products using generative design

Design components that are optimized for weight, strength and material usage. Generative design techniques combine design tools with topology optimization, enabling you to quickly create lightweight, highly complex shapes. Solid Edge Generative Design Pro automatically computes a geometric solution based on identified material, design space, target weight and permissible loads and constraints. The software directly links to in-house 3D printing resources or cloud-based additive manufacturing services for immediate manufacturing.

3D print prototypes and spare parts

Use digital models to manufacture parts on demand and minimize the need for large inventories of spare parts. Solid Edge supports 3D printing needs from creating a virtual initial prototype, minimizing the cost and time required to build physical prototypes, to printing the final product. Solid Edge includes tools that help you design components to take advantage of the latest 3D printing techniques and prepare and output designs to different 3D printing hardware and services. It also supports a cloud-based bureau for additive manufacturing of parts in a variety of materials.

Manufacture accurately and efficiently

Manufacture parts accurately and efficiently on demand, reducing the need to maintain inventories to meet changing customer demand using a flexible, unified computer-aided manufacturing (CAM) system that allows you to get the most from your tools. Solid Edge CAM Pro, a powerful computer numerical control (CNC) programming software, can be used to create tool paths that are associative to Solid Edge digital CAD models. These tool paths can be automatically updated when the design is changed. Solid Edge CAD models can also be used directly with third-party CAM software.



Collaborate with customers and suppliers

Improve communication of design intent both internally and externally to reduce errors and speed the product development process. Solid Edge provides cloud-based collaboration tools that provide easy access and visualization of designs created in many different CAD formats. Share data in a controlled way with customers and suppliers while protecting your intellectual property. Solid Edge can also be used to directly import and re-use design data created in a wide variety of 2D, surface and solid model CAD formats.

Provide clear user guides and maintenance instructions

Create interactive 3D technical publications that clearly communicate the correct assembly process and provide information for online catalogs. Interactive technical publications can leverage design models and data to clearly and accurately communicate the correct manufacturing process to shop floor operatives. Clear documentation helps end users use, operate and maintain products correctly. Solid Edge technical publications solutions automatically create graphical user guides, maintenance instructions and online spare parts catalogues from your design. The free Solid Edge Mobile Viewer app allows you to quickly view parts, assemblies and drawings using any mobile device.

Managing design projects and engineering change

Use Solid Edge to manage everyday processes and ensure data integrity, irrespective of your organization's size, with scalable data management solutions. To speed product development, manufacturers need to quickly retrieve data, optimize their resources and manage changes efficiently. Capabilities built into Solid Edge allow you to review and edit the properties of multiple files and perform revision and release operations on Solid Edge parts, assemblies

and drawings. Teamcenter® software Integration for Solid Edge provides access to a full range of product life-cycle management (PLM) capabilities to further optimize the design-through-manufacturing processes.

Realizing significant benefits

Manufacturers in the consumer durables manufacturing sectors that use Solid Edge consistently achieve significant benefits from designing their products in 3D and using integrated Solid Edge solutions. Some examples from published case studies include:

- Reduced rework by 80 percent due to inconsistencies
- Reduced development time by 50 percent
- Increased production of new products by 43 percent from 140 to 200
- Substantially decreased need for prototypes, saving time and raw material costs
- Performed fewer repetitive operations, which let designers focus on innovation
- Delivered unlimited creativity and more stylish designs
- Delivered sophisticated, high tech components in a small space
- Provided a valuable marketing tool that presented a compelling technological and design impression of the products

For more information on this offering and to read customer case studies, please visit solidedge.siemens.com/en/industries/consumer-durables/

