Citizen Watch Co., Ltd.

Accelerating watch development and engineering with SolidWorks and ENOVIA SmarTeam

CITIZEN
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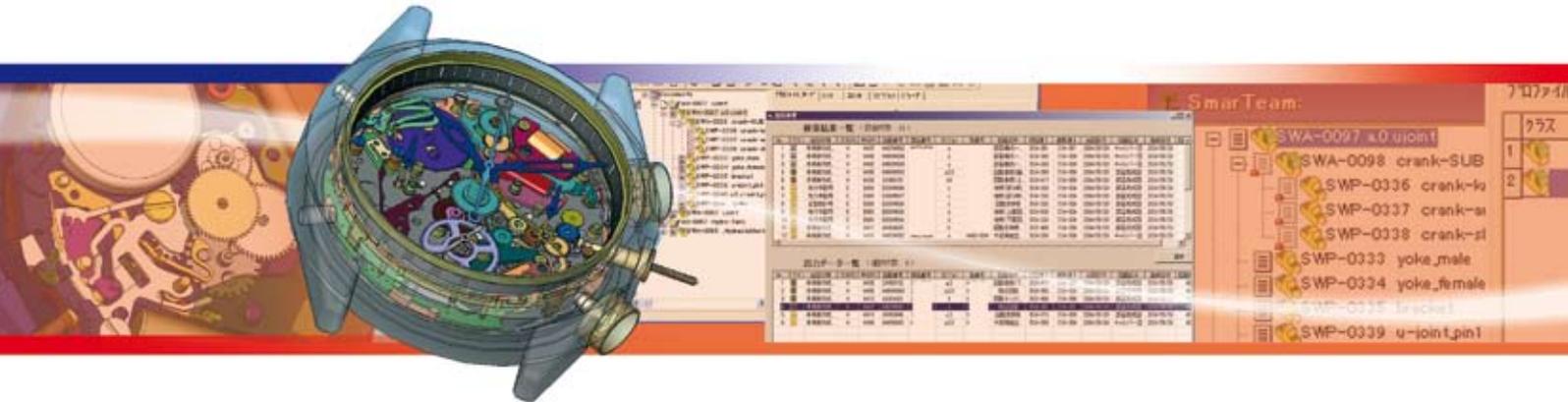
Overview

■ *Challenge*
Switch from 2D to 3D CAD, introduce concurrent design, and establish centralized design management, while accelerating time-to-market

■ *Solution*
Implement SolidWorks 3D CAD software and use ENOVIA SmarTeam to share 3D CAD data across teams using concurrent engineering practices

■ *Benefits*
Target a 30-percent reduction in development cycle time and costs using SolidWorks and ENOVIA SmarTeam

"Thanks to SolidWorks for design modeling and ENOVIA SmarTeam for data sharing and central management, designers and department engineers can more easily interact and collaborate."

Masayuki Watanabe
Asst. Mgr., Watch Business Control Center
Citizen Watch Co. Ltd.

Shifting fashion, shifting needs

Citizen Watch Co., Ltd. (Citizen) was founded as Shokosya Watch Research Institute in 1918. Since then, Citizen has steadily grown its business as a global watch brand. Originally designed as accessories for military purposes, watches had already reached mechanical maturity by the second half of the nineteenth century. However, new advances, such as photovoltaic (solar-powered) or wave (extreme precision) technologies have resulted in new state-of-the-art watches, attracting many consumers to a seemingly saturated market. Moreover, watches play an increasingly important role as fashion accessories.

"In a mature industry like watches, product differentiation with high-tech, sophisticated functionality or fashion taste is a key requirement," says Masayuki Watanabe, Assistant Manager, Section 2, Business Process Management Dept., Watch Business Control Center, Citizen Watch. "As the role fashion plays in product development grows, the product lifecycle or time-to-market required is compressed. To shorten development time while maintaining competitive pricing, we needed to shift from 2D to 3D CAD and strengthen collaboration with partner companies."

Move to 3D CAD and concurrent design

Citizen transitioned to 3D CAD and put collaborative design processes in place to enable multiple designers to proceed with development in parallel. As a first step towards extending the concurrent development process through to manufacturing, the company started with the implementation of a new 3D CAD system.

Promote use and popularity of 3D CAD

By evaluating manufacturability and ease of assembly before creating a detailed drawing, Citizen ensures compliance with quality criteria, such as schedule and cost.

DASSAULT SYSTEMES

In short, that means unifying all data around Monodukuri – the Japanese concept of industrial arts. People share product data in real-time across different processes such as design, production engineering, and manufacturing so that specialists in each discipline can proactively and professionally detect and fix problems.

To achieve the ultimate goal of integrating and sharing all information around Monodukuri and implementing concurrent engineering practices based on broad collaboration across processes, Citizen took a carefully thought-out, modular approach to implementing its CAD and PDM solutions right from the start. In the first phase, Citizen wanted to make its designers feel comfortable with 3D design, using a 3D CAD system alone for the first year, before installing a PDM solution.

Citizen focused on three main criteria in selecting a 3D CAD system:

•*Intuitive Product Design*
a cost-effective, easy-to use, parametric 3D CAD system for designing and visualizing new watch concepts, resolving production issues, and reducing its prototyping and development costs.

•*Integration with CAE and CAM Applications*
a 3D CAD system that supports design validation and manufacturing from within the native CAD system as well as input and output of compatible data formats

•*Automated Output of 2D Drawings*
Although Citizen needs a 3D CAD system for design modeling, visualization, virtual prototyping, and manufacturing planning and pre-production, the company continues to require integration with its legacy 2D CAD system and existing procedures for numbering of parts and drawings, drawing releases, and generation of bills of materials (BOMs).

Citizen evaluated and compared different 3D CAD systems based on these criteria and finally selected the solution that met all of its product design criteria – SolidWorks 3D CAD software.

Benefits of SolidWorks

After choosing SolidWorks software as its preferred 3D CAD system, Citizen installed 27 seats in its design department. The company's design engineers were able to start using SolidWorks software immediately. Following training, Citizen designers employed SolidWorks software on a new project to develop a high-end sport watch targeted at the

Western market. After completing this project, Citizen designers created 30 additional new products.

Greater design collaboration

Using SolidWorks 3D CAD software, design teams comprising between one and five designers can collaborate more efficiently on new watch design, which range between 50 and 300 individual components. With SolidWorks large assembly capabilities, design teams can share design information and communicate more effectively, which has helped to reduce product development cycles. By implementing SolidWorks in concert with the ENOVIA SmarTeam PDM system, Citizen has increased its new product development while reducing its development cycle.

Improved virtual prototyping, use of CAE

By moving to SolidWorks 3D CAD software, Citizen will benefit from the greater opportunities afforded to examine 3D virtual prototypes and analyze solid models using COSMOSWorks CAE software. These capabilities not only will help the company to reduce prototype development costs but also to improve product quality and innovation.

CAD/CAM Integration

Citizen's implementation of SolidWorks 3D CAD software, and subsequent deployment of the ENOVIA SmarTeam PDM solution, has set the stage for the complete integration of CAD and CAM processes. The company anticipates this integration will culminate in a further shortening of the prototyping and pre-production planning process.

Citizen focused on three main criteria in selecting a PDM tool:

•*Concurrent Collaborative Design*
check-in and check-out functions to let designers refer to data even while it is being edited concurrently by another user

•*Seamless Integration with 3D CAD*
a PDM system that is initiated from within the SolidWorks environment and, at the same time, enables viewing of CAD models and their structures without accessing the CAD.

•*High customizability and flexibility*
for applying Citizen's procedures to number parts and drawings, drawing releases, and integration with 2D CAD. Following on-site demos at headquarters and repeated rigorous assessments, in November, 2002, Citizen selected ENOVIA SmarTeam.

"Entire development time has been reduced since we introduced SolidWorks."

Masayuki Watanabe
Asst. Mgr., Watch Business Control Center
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Benefits of ENOVIA SmarTeam

"In the watch industry, companies generally release new products on June 10, known as "Time Day", and at Christmas so migration to the new development environment needs to be completed by September at the latest," said Mr. Watanabe. In the first phase, 25 ENOVIA SmarTeam seats were implemented in the design department. Three months later, the implementation was extended to the mold & die and production engineering departments. In 2003, a PLM environment bridging from design to manufacturing used ENOVIA SmarTeam was used to manage the product data of the high-end sports watch project.

Collaborative design environment

Multiple designers can concurrently work on assembly components using ENOVIA SmarTeam to exclusively control Check-in and Check-out. Conventional file server management cannot show which part is being modified, who is currently working on the data, how to edit an assembly that is currently open and in use by another designer, nor can it avoid overwriting data. With ENOVIA SmarTeam, as each part is linked to user information and managed separately, all of the issues cited above were resolved.

Centralized data management

ENOVIA SmarTeam centrally and securely manages data, enabling restrictions on visibility or operations. Management of 3D CAD and 2D CAD data preserves links to relevant documents such as Excel (BOM), Word and other image data. As a single system of record, no data stored in ENOVIA SmarTeam ever needs to be retyped into any other system. Also, as raw design data no longer needs to be manually converted into E-Draw or PDF, the workload of designers has been significantly reduced. ENOVIA SmarTeam provides product tree display, attribute management, and revision management as standard features, eliminating having to open 3D CAD files, and resolving all these issues.

Aiming for further growth

Citizen took a decisive first step towards concurrent engineering by utilizing the SolidWorks CAD and ENOVIA SmarTeam PDM solution; now the company aims at further growth by taking a next step in PLM, adding CAD-CAM integration.

"We aim to reduce costs and development time by 30 percent using SolidWorks for product design and ENOVIA SmarTeam for data collaboration."

Masayuki Watanabe
Asst. Mgr., Watch Business Control Center
Citizen Watch Co. Ltd.

For more information or to contact a sales representative, visit www.3ds.com/contacts or www.solidworks.com