

NX • Teamcenter

Toshiba Social Infrastructure Systems

Toshiba utilizes 3D-driven process to reduce locomotive assembly time

Industry

Automotive and transportation

Business challenges

Shorten the development lead time for locomotives

Drive further collaboration with overseas partners

Reduce overall development costs

Keys to success

Select the 3D CAD system that is most suitable for designing locomotives

Migrate efficiently from a 2D-based development approach to the new system

Use synchronous technology to expedite modeling

Utilize design data across the product development process

Results

Doubled the number of productive 3D CAD users

Reduced time needed to assemble a locomotive

Significantly improved operational best practices and work-in-progress efficiency

NX puts premier Japanese industrial firm on the right design track; Teamcenter provides complete PLM for seamless design-through-manufacturing collaboration

Using 3D CAD to improve process efficiency

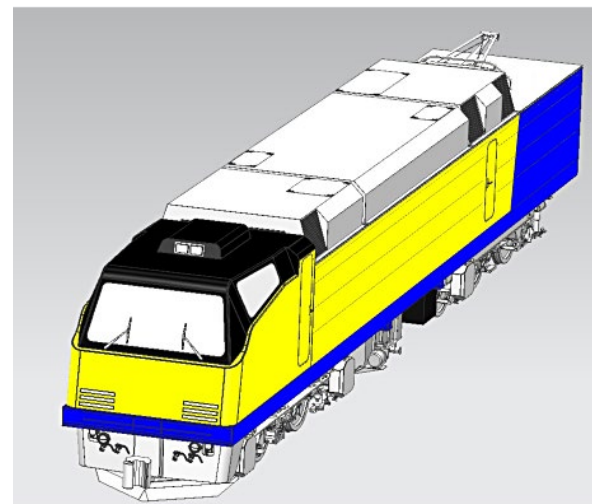
Toshiba Corporation Social Infrastructure Systems Company (Toshiba) spearheads the firm's efforts in the areas of power systems and transportation. It is located in the Fuchu Complex, which was opened in 1940 and initially served as a locomotive development plant. Toshiba's locomotive business was domestic until it recently expanded to China. With stiff competition being offered by three major locomotive manufacturers, Toshiba decided it was important to enhance its process efficiency, so it could shorten its development cycle from design to assembly.

To help it accomplish this goal, Toshiba selected NX™ software from Siemens PLM Software for 3D computer-aided design (CAD). By using NX to streamline its modular assembly production process, Toshiba reduced the time it takes to assemble a locomotive, from prototype to first production, by 40 percent.

"We have realized a variety of positive results since starting to use NX in the design process," says Masayuki Tachino,

chief specialist of the Transportation Systems Department at the Fuchu Complex. "For example, we have a very complex routing system for pipes or wires, and it's not easy to understand this complex layout in 2D drawings. By applying the 3D-based design process with NX, it has become very easy to lay out and check if the routing has been done properly."

Applying 3D data from the NX CAD system is by no means limited to the design department. Now 3D data can be used for a variety of outputs, such as parts assembly manuals and other related documents needed for production, as well as the development of fixtures. The production and design departments are also benefitting from the power of 3D product development.



Results (continued)

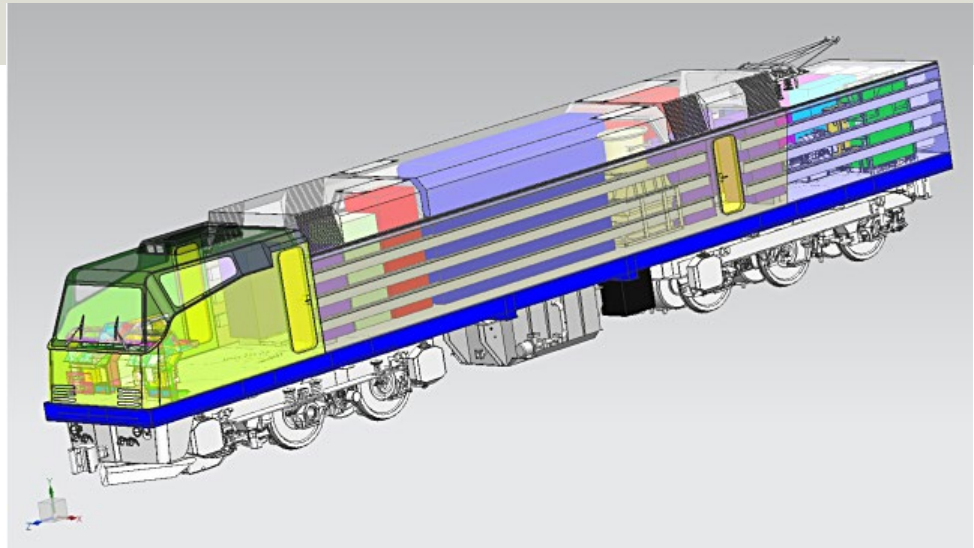
Enhanced collaboration with overseas development partners

Established a 3D-based product development process aligned for aggressive international expansion

“We needed to have a 3D CAD system that was more suitable for our locomotive design style, and NX fit that description.”

“NX is easy for any engineer to use. Our previous 3D CAD system wasn't very user-friendly, so quite a few people had a hard time adapting a 3D-based design approach; less than half the engineers launched the 3D CAD system. After implementing NX, we found that every single engineer was using it.”

Norito Ogomori
Specialist
Transportation Systems
Department
Toshiba Corporation
Social Infrastructure
Systems Company



When the development process was based on a 2D approach, the assembly manual was developed while the first locomotive was assembled. All the images were photos of the actual locomotive. The company also used spreadsheet software to define process flow, but it wasn't linked to any other information technology (IT). So if any problems arose and changes needed to be made, those changes would not be reflected throughout the system; therefore, people would be working with outdated information.

After the spreadsheet software was abandoned for this purpose, the company planned to implement a manufacturing management system. However, its goal was to tightly connect systems in design and manufacturing so that, if any changes occurred, the information would be propagated to appropriate systems.

Teamcenter® software, a complete PLM solution, also from Siemens PLM Software, significantly advanced the company's goals because it is highly compatible and tightly integrated with NX. The combination of NX and Teamcenter enabled Toshiba to reduce product development cycle times, largely due to significantly improved process operations and design collaboration.

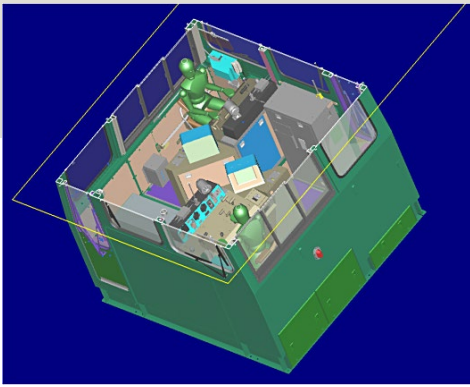
With the design-to-manufacturing process connected, Toshiba now creates a parts list directly from 3D data, and the manufacturing department leverages the data that was used upstream.

When 3D CAD data is used to develop assembly manuals, Toshiba can virtually simulate assembling locomotives before they create them. When the process was based on a 2D drawing, if there was anything wrong – including missing parts or interference in the drawing – it was difficult to catch the errors until it was being assembled.

“Now we can find errors before we go into the assembly process, because we can virtually simulate the assembly process with the 3D data created using NX,” says Tachino. “This helps compress the product development process.”

In the past, the company could only take photos of completed locomotives. It was not possible to stop the assembly process for the purpose of creating manuals, so all the required images could not be taken.

By using NX, Toshiba can create images for the manuals at any point or from any angle, and it actually increases the quality of the manuals. By automatically generating 3D data, the workload for manual development has been drastically reduced.



Seeking CAD for a flexible design environment

NX was not the first 3D CAD system used by Toshiba's locomotive developers. The process of locomotive development requires great flexibility in design, so strict parametric modeling was not easy for them. The firm's first 3D CAD system didn't have that kind of flexibility. Also, the firm works as a team, and sometimes one engineer takes over another engineer's work midstream. With history-based CAD, it is not easy to understand where someone else is in the modeling process, so it is not possible to readily make the necessary changes to the model. This approach slows down the design process.

"We needed to have a 3D CAD system that was more suitable for our locomotive design style, and NX fit that description," says Norito Ogomori, a specialist in the Development and Designing Group 1 of the Transportation Systems Department at the Fuchu Complex. "Also, 2D drawing functionality was another issue. Even though we standardized our process based on 3D within our company, 2D drawing is still required for communication with our external partners. So we must be able to use the CAD system to generate a 2D drawing from a 3D model. We are quite satisfied with the drawing-generation functionality of NX."

NX was introduced to the locomotive design team at the time that Siemens PLM Software had introduced the synchronous technology capability of NX. With synchronous technology, it is possible to directly modify geometry. Toshiba found that this functional flexibility fit its design process quite well. Such benefits drove the company to replace its existing CAD systems, including its 2D system.

"NX is easy for any engineer to use," says Ogomori. "Our previous 3D CAD system wasn't very user-friendly, so quite a few people had a hard time adapting a 3D-based design approach; less than half the engineers launched the 3D CAD system. After implementing NX, we found that every single engineer was using it."

As the engineers continue to increase their use of NX, the ability of the entire design team to respond to workflow needs has also increased. According to Ogomori, if one engineer gets busy, another engineer will help him with his work. But with 2D-based design, the engineer who steps in to help must be briefed to understand what is going on before starting. Ogomori notes that, using NX, it is easy to figure out how the design had been created to that point, so the second engineer and subsequent users can immediately pick up on where the design process left off. That has greatly increased the design department's agility.

In addition to being well-suited to Toshiba's design needs, the ease of implementation of NX was another key point. For migration to NX, Toshiba assigned a designer from the development team and a support engineer from the implementation partner. It only took 2 to 3 months to complete the migration.

"Now we can find errors before we go into the assembly process, because we can virtually simulate the assembly process with the 3D data created using NX. This helps compress the product development process."

Masayuki Tachino
Chief Specialist
Transportation Systems
Department
Toshiba Corporation
Social Infrastructure
Systems Company

Solutions/Services

NX

www.siemens.com/nx

Teamcenter

www.siemens.com/teamcenter

Customer's primary business

The Toshiba Corporation's Social Infrastructure Systems Company is committed to key businesses that support various sectors of social and industrial infrastructure, offering equipment, systems and services worldwide.

www.toshiba.co.jp/sis/en

Customer location

Fuchu-shi, Tokyo

Japan

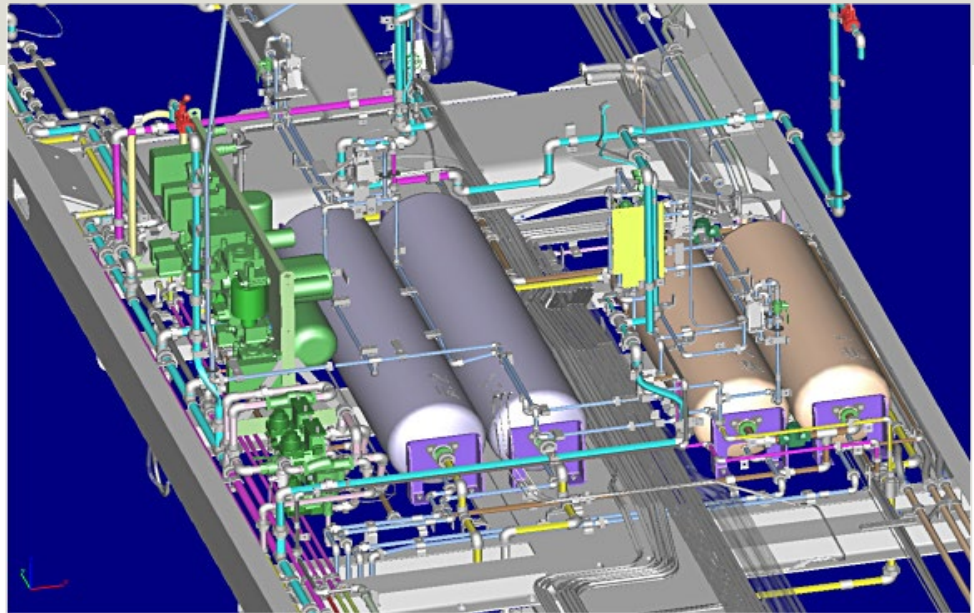
"We have realized a variety of positive results since starting to use NX in the design process. For example, we have a very complex routing system for pipes or wires, and it's not easy to understand this complex layout in 2D drawings. By applying the 3D-based design process with NX, it has become very easy to lay out and check if the routing has been done properly."

Masayuki Tachino
Chief Specialist
Transportation Systems
Department
Toshiba Corporation
Social Infrastructure
Systems Company

Siemens Industry Software

Americas +1 314 264 8499
Europe +44 (0) 1276 413200
Asia-Pacific +852 2230 3308

www.siemens.com/plm

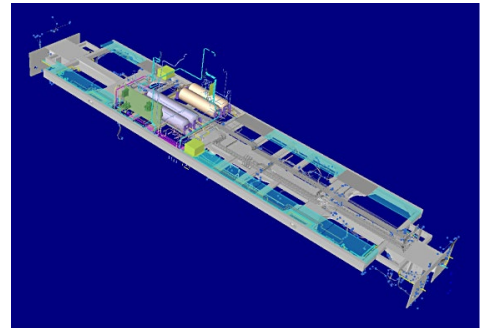


Now, Toshiba is working to further improve its 3D-based design process with NX to achieve even greater efficiency across product development operations.

Pursuing aggressive international expansion

Prior to adopting NX, Toshiba had expanded its railroad operations to China, encountering some difficulty with its overseas partners because they were primarily using 3D CAD technology. Similarly, associates in Europe and North America had already moved to 3D-based tools.

Moreover, with localization key to success across its many markets, collaboration with regional manufacturers is critical, especially in the railroad industry. As Toshiba continues to become increasingly adept in the use of 3D, it commensurately improves its ability to collaborate around the world, where NX is widely used. With Toshiba aggressively expanding its international operations, the future with NX, one of the industry's most integrated product design, engineering and manufacturing solutions, looks bright.



© 2013 Siemens Product Lifecycle Management Software Inc. Siemens and the Siemens logo are registered trademarks of Siemens AG. D-Cubed, Femap, Geolus, GO PLM, I-deas, Insight, JT, NX, Parasolid, Solid Edge, Teamcenter, Tecnomatix and Velocity Series are trademarks or registered trademarks of Siemens Product Lifecycle Management Software Inc. or its subsidiaries in the United States and in other countries. All other logos, trademarks, registered trademarks or service marks used herein are the property of their respective holders.

Z8 34238 6/13 A