

# MHI's Nagasaki Shipyard uses PTC Windchill® to Standardize Processes and Manage All Development Data

Maker of turbochargers for ship diesel engines installs PTC's Product Lifecycle Management (PLM) solution for business-process standardization and BOM-centric PLM

Mitsubishi Heavy Industries, Nagasaki Shipyard & Machinery Works, Tokyo, Japan

Mitsubishi Heavy Industries, Ltd. (MHI), founded in 1884, has the world's second-largest market share for turbochargers for vessel-propulsion diesel engines. The company's Nagasaki Shipyard and Machinery Works was established to produce turbochargers for MHI's Mitsubishi UE diesel engines. Without turbochargers, marine engines could generate only 20–30% of the power necessary to propel a vessel at the desired speed. The MHI Nagasaki Shipyard's turbochargers are respected world-wide for their high quality, exceptional reliability, and ease-of-use.

## The Challenge: Establish a Standardized Process for Building New Turbochargers

- Manage all CAD and product development data created across the enterprise
- Establish a BOM-centric approach to product development
- Find product configurations and change information faster and easier
- Quickly identify and deliver appropriate parts for faster service and support
- Centrally manage and access all product data and after-market support information

## The Solution: PTC Windchill

- A powerful, comprehensive Product Lifecycle Management (PLM) solution
- Provides easy access to product information from a Web browser
- Includes data management, as well as change and configuration management
- Creates a single source of product data—centrally located for easy access
- Ensures that product development stakeholders are using the latest version of data

## The Results: Reduced Time-to-Design New Products by 87%

- Also reduced the time-to-design variants when reusing existing data by 55%
- Improved product development productivity, collaboration and efficiency
- Enabled users to better manage and understand all changes to product configurations
- Improved management of project status information, workflows, 3D models and 2D drawings

## 10,000+ Units Shipped

MHI's turbocharger products, which support a wide range of diesel engines with between 500kw and 28,000kw outputs, are delivered from its Tokyo headquarters to shipbuilders and engine manufacturers around the world. The company has the world's second largest share of this market, having shipped more than 10,000 units to date.

## Engineering Challenges and After market Support

Once Nagasaki Shipyard and Machinery Works' production reached 1,000 units per year, the Turbocharger Designing Section faced two critical challenges:

- 1) how to standardize on engineering processes, so as to stabilize product quality and increase cost-competitiveness; and
- 2) how to maintain the quality of aftermarket support—which uses a limited number of resources—as the volume of production grew.

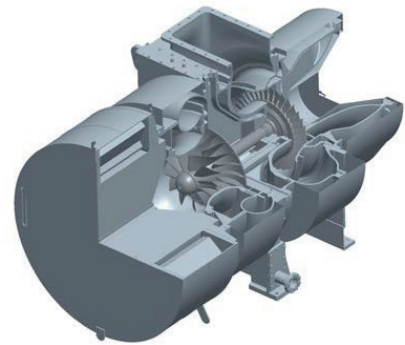
Yasuhiro Wada, Group Leader of the Turbocharger Designing Section, proposed a system that would enable BOM-centric product data management. They selected PTC's Windchill, a family of web-based Product Lifecycle Management (PLM) solutions that enable companies to improve their product development processes by optimizing their data management, enterprise-wide project management, visualization, process management, and other areas of development.

## Benefits of Managing Structured BOMs

When the Turbocharger Designing Team implemented PTC Windchill, they modified their bill-of-material (BOM) structure so it was better aligned to the product's functional units and manufacturing processes. Their previous BOMs were very "flat",



MHI turbochargers help optimize the speed performance of vessel diesel engines.



With long lifecycles for vessels, fast and reliable access to data is critical to efficient service and maintenance.

without a deep hierarchical structure, a shortcoming that limited development efficiency as many of MHI's turbochargers are variants of existing designs. When working with flat BOMs, the work of selecting what components should be reused versus what would be developed, and then defining the specifications, was dependent mostly on individual engineers' knowledge and skill sets.

"The work—which required our engineers to find appropriate drawings, find the right part numbers, and look for the drawings for those particular parts—was a very time-consuming and cumbersome process," explains Yasuhiro Wada.

The MHI team, with the help of PTC Global Services, utilized the configuration capabilities in PTC Windchill, so the solution enables MHI users to select options and define product specifications for each order, based on a predefined master BOM.

The benefits of implementing the solution were clearly identified in a pilot project: variant design reusing existing data to create a design, which previously required four hours of work, was cut by 55%. New product design, which previously required 14 hours of work, has been reduced by 87%. "We were able to reduce design time while improving our product management practice," says Wada.

The solution has also had a major impact on the company's after-market support process. Vessels have a long lifecycle of 40 years, requiring frequent servicing and maintenance of turbochargers. As MHI's volume of product shipment increases, so does the number of units requiring service. Also, components are continually being modified and improved to address market needs and to improve reliability.

In the past, appropriate replacement parts were identified and delivered based on the service history record, which contains the "as-shipped" BOM information and service history, along with information about the interchangeability of the parts. This process required advanced knowledge and experience, as well as many hours of manual work. Today, PTC Windchill centrally manages all change information, enabling users to easily find product configurations and change information, and quickly identify and deliver appropriate parts.

### Moving to PLM

Based on its initial success with PTC Windchill, the MHI team expanded the system to support additional users, and began a next phase of the implementation project, taking the solution from PDM to the world of PLM.

"If we are afraid of making changes," explains Wada, "we will risk being left behind. It was important for us to start centrally managing engineering changes, in addition to product information, in order to enable our team to continue addressing market needs and requirements. A product information management solution, such as PTC Windchill, enables us to manage and understand all the changes we make to product configurations. This way, we're not afraid of making changes," he says.

PTC Windchill today is used to manage project status information, workflows, 3D models and 2D drawings. The MHI team has started a pilot project to manage product configurations, order files, and other types of information, and plans to manage projects and manufacturing processes. The company is also considering using the PTC Product Lifecycle Management solutions in its sales and procurement groups.

Going forward, Masataka Kimura, Section Manager, feels the team will be able to expand PTC Windchill system to the areas of environmental regulatory compliance and supply chain management.

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