Navistar Builds Better and Faster With I-DEAS®

SITUATION

Navistar International Corporation designs, manufactures and markets medium- and heavy-duty trucks, school buses, and midrange diesel engines. The company's Engine & Foundry Division produces most of the engines used in Navistar's International® brand trucks, and also sells to OEMs such as Ford Motor Company, Detroit Diesel Corp., and Perkins. Ford, for example, offers Navistar's 7.3L V8 diesel engine in its heavy-duty pickup trucks under its 7.3 Powerstroke brand name. This engine helped Ford capture a 65% share of the commercial diesel pick-up truck market. However, for the Engine and Foundry Division, this development program sent a clear signal that its existing 2D-based CADAM system and serially oriented process was too slow and costly. The development program took longer than anticipated, was over budget, and needed more development phases than originally projected. To remain competitive, division leaders knew they had to move to concurrent engineering and integrated product development.

OBJECTIVES

- ✔ Reduce cycle time by 50%.
- ✔ Meet customer expectations by:
  - achieving 100% program timing
  - scoring 85% on a customer satisfaction index
  - eliminating rework at the customer site
- ✔ Improve product quality by 10% each year for key measurables.

PROCESS VISION

✔ Replace drawings with digital models as the principal form of design documentation, and move to a concurrent engineering environment enabled by an integrated CAD/CAM/CAE system.

✔ Use FEA and other simulation methods (mechanism analysis, CFD, casting simulation) to guide designs rather than for "after the fact" design characterization.

✔ Increase use of rapid prototyping for both design visualization and testing.

✔ Maintain availability of legacy (CADAM) data.

ACTIONS

✔ Navistar purchased I-DEAS®, because of all the software evaluated, it provided: 1) the best capabilities for managing engineering data (through I-DEAS Team Data Manager™) and 2) the strongest support for concurrent engineering (through its seamless integration between design and downstream applications).

"Our division's business goals focus on profitability, cycle-time reductions, and customer satisfaction. Concurrent engineering and integrated product development, based on I-DEAS, are enabling us to achieve those goals."

- Dennis Jadin, Manager Advanced Engine Concepts, Navistar Engine and Foundry Division

I-deas™

Get There Faster™

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✔ The division pulled the plug on CADAM after one year. Many drawings were translated to I-DEAS 2D format; others are available for translation on an as-needed basis.

✔ Navistar now works exclusively with solid models, using them to drive all downstream applications. I-DEAS models are used by: foundry engineering, design analysis and simulation, rapid prototyping suppliers, prototype tooling suppliers, manufacturing system partners, production component suppliers, and customers.

✔ Because they can leverage the I-DEAS database, engineers now have a more active role in the design process. They can perform up-front analyses with I-DEAS analysis tools as well as ANSYS, ADAMS, MagmaSoft, and numerous CFD packages. Not having to recreate CADAM drawings for analysis saves days and sometimes weeks.

✔ Data exchange with customers and suppliers now takes place via 3D models. Navistar installed direct translators for converting I-DEAS models to Unigraphics and PDGS to ensure compatibility with OEM accounts. The division also uses IGES and STL formats for data transfer.

✔ To get rapid prototypes even more rapidly, Navistar created a customized RFQ for rapid prototyping services that is launched from within I-DEAS. It lets the user select the part to be prototyped, the type of RP technology to be used, quantity, and special instructions.

RESULTS

✔ Navistar's excellent job of leveraging its solids' database has been key to the cycle time reductions. For example, a new air induction system for a 1999 model year engine was developed using the integrated product development approach. A first prototype was available for testing in eight weeks, compared to 26 weeks previously.

✔ Overall, the time needed to design an engine and build a running prototype is now nine months compared to one year previously.

✔ Rapid prototyping dropped short-run prototyping lead times by 50%.

✔ Cost/engine and hours/engine metrics have been significantly reduced.

✔ Navistar won two new large contracts, in large part due to the ability to exceed customers' needs provided by the new concurrent engineering/integrated product development approach.

PLANS

Navistar plans to implement an enterprise-wide product data management system to provide real-time access to pre-released work-in-process product data, making it available throughout the entire development process.

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