

SITUATION

It currently takes automobile manufacturer Nissan Shatai Co., Ltd. about 19 months to go from styling freeze to mass production. Management wants to reduce that to 12 months and has established a number of objectives to help achieve that goal. One objective, "Zero Design Changes," aims to eliminate the time-consuming redesign work that occurs when problems are discovered in physical prototypes. The company plans to use computers to simulate both vehicle performance and manufacturing operations, with the aim of finding and fixing problems while a design exists only in software. The other objective, "Zero Prototypes," aims to eliminate physical models. Rather than building three prototypes to review the design and to review manufacturing considerations as the company does now, Nissan Shatai intends to conduct all reviews using virtual vehicles. When it became clear that wireframe CAD did not support these objectives, Nissan Shatai decided to upgrade to a 3D CAD system.



OBJECTIVES

- ✓ Reduce development cycle for vehicles from 19 months to 12.
- ✓ Improve product quality.
- ✓ Reduce development costs by 50%.

PROCESS VISION

Establish a 3D data-based, fully integrated design and engineering environment to eliminate the need for design changes and physical prototypes.

ACTIONS

- ✓ Nissan Shatai chose I-DEAS®, an integrated CAD/CAM/CAE system, to replace its existing 3D wireframe system. The company had been using SDRC's analysis software since 1988, and the experiences with the

Nissan Shatai "Zeros" in on Success

"I-DEAS is our core tool, and we are implementing 3D modeling one hundred percent, from design through production. This is how we aim to achieve 'Zero Design Changes' and 'Zero Prototypes,' and ultimately how we will build cars faster and with better quality."

- Kanji Nakajima
General Manager
Design Department
Nissan Shatai Co., Ltd.



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company had been very positive. Another reason the company selected I-DEAS was because it would simplify data transfer with the parent company, Nissan Motor Co., Ltd., which also uses I-DEAS.

- ✓ Concurrent with the selection of I-DEAS, Nissan Shatai established a Process Innovation Office consisting of representatives from the design, information systems, development management, manufacturing engineering, and test divisions. This organization determined how the 3D CAD system would be implemented within the company, who would use it, and how they would be trained.
- ✓ Through on-site classes, Nissan Shatai trained about 300 engineers in the use of I-DEAS, and currently has about 200 design engineers using I-DEAS regularly on Hewlett-Packard workstations.
- ✓ The first project done in I-DEAS was a new car called the Wingroad. Portions of this vehicle, including its floor and back door, were modeled in 3D. Those involved in the product's development met regularly in the "Zero Room," and reviewed the 3D model images via large-screen projections. The "Zero Room" was equipped with two large-screen projectors to project the I-DEAS models of the vehicle components.
- ✓ 3D models were also passed to analysts who used them as the basis for their finite-element models.
- ✓ The company is currently involved in a new project in which the entire car is being modeled in I-DEAS.

RESULTS

- ✓ Having the ability to clearly visualize a design allowed team members to give valuable input earlier in the design process, minimizing design changes later. In fact, on the development of the Wingroad, which was introduced in May 1999, Nissan Shatai achieved a 30% reduction in design changes compared to previous projects, even though the use of 3D modeling was limited to only portions of the car.
- ✓ Development costs for the Wingroad were reduced; the quality of the car was improved; and it was very well received in the marketplace.
- ✓ The goal for the current project is to reduce design change by 80% and cut the number of prototypes from three to two.

PLANS

Nissan Shatai plans to continue its process innovation in which 3D models are created at the start of the development process for every car component. Since outside suppliers provide many of the components, Nissan Shatai intends to involve them in this effort as well.

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