

Development innovation and the new Mazda MX-5 Miata

Mazda renovates Class-A surfacing for the new model, greatly improving quality



MAZDA MOTOR CORPORATION



Siemens PLM Software

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▶ Business challenges

Create a fun and modern style, with dramatically improved textures, while maintaining the signature qualities of the MX-5

▶ Keys to success

Imageware's suitability for Mazda's Class-A surface requirements

Use of Imageware for product/design development of new MX-5 model

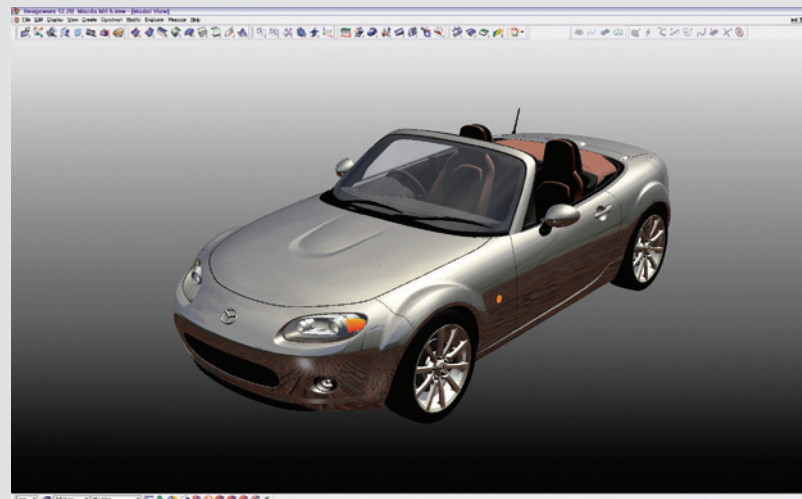
▶ Results

The Mazda MX-5 Miata won 2005-2006 Japan Car of the Year

Higher quality Class-A surfaces enabled faster downstream 3D design and dramatically improved textures of mass-produced automobile

Modern design with the signature MX-5 style

In 1967, Mazda launched Japanese sales of the Cosmo Sport, the world's first commercial automobile using a compact, high-output rotary engine. Since then, it has created a long line of distinctive sports cars using the rotary engine. Its current advertising slogan, "Zoom-Zoom," aims to capture a passionate feeling of driving enjoyment. The company has continued a tradition of innovation in order to keep offering cars that are fun to drive.



The Mazda MX-5 Miata, loved the world over, has undergone a model change that combines a stylish design with Mazda's distinctive fun and excitement

In 2005, 16 years after Mazda introduced its first lightweight, open-top roadster, the company launched worldwide sales of a new MX-5 model – its third generation of roadsters. "I would describe the true essence of the new MX-5 Miata as akin to the unity between a master horseman and his mount," says Takao Kijima, lead developer of the new MX-5. "This car is a lot of fun. Driving it is like a conversation, with the driver and car both checking each other's movements. My goal is for as many people as possible to experience the feeling of fun that this car gives."

Mazda's MX-5 has maintained a tradition of packaging the performance of a lightweight sports car in a simple, warm design. The design team for the new MX-5 was given the task of revamping the car's design with fun and modern styling, while maintaining the proportions, oval motif and other traditional features of the MX-5. Another design aim was a major improvement over the textures of past Miatas. The car's high-quality materials, as well as the beauty of its painstakingly crafted curved surfaces, give it a luxury feel.

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Communicating sophisticated design intent

At Mazda, beautiful curved surfaces are produced through the combined skills of master clay modelers and digital modelers, who express exterior surfaces digitally. The new MX-5 development program was the first in which Imageware (an NX[®] software industrial design and styling solution from Siemens PLM Software) was officially selected to create the digital modelers' Class-A surfaces. Prior to this program, Mazda had used its own software developed in-house to create Class-A surfaces. In the late 1990s, the company had begun to feel the limitations of this software, and began to look into other options. As with other automakers, Mazda is accelerating its move to digital product development through the Mazda Digital Innovation (MDI) initiative. In the case of design development, however, Mazda retained clay modeling for design-critical parts, because clay models have the ability to accurately express high levels of shape detail.

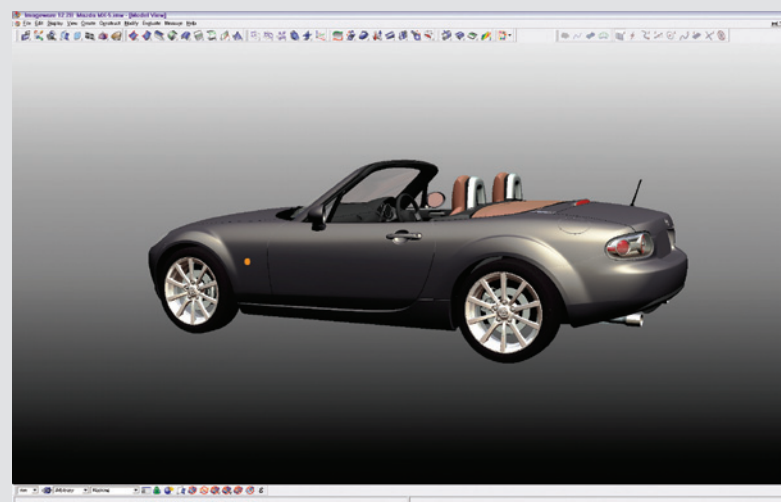
The company's requirement list for the new Class-A surface-modeling software included the ability to reference scanned data from clay models. These high-quality clay surfaces accurately express design intent – down to subtle surface nuances – with 0.3 mm tolerance. The company felt that software meeting these stringent requirements would enable it to reduce lead-times by 30 percent through faster Class-A surface creation, as well as dramatically improve Class-A surface quality.

The benchmarking process led Mazda to select Imageware as its new Class-A surface software in 1999. Mazda then began in-depth training of Imageware pioneers. The company began using Imageware on trial runs in the development of its Verisa (sales launched in 2004) and other cars, while testing its extended features. During this time, it developed methods for optimum surface creation, and prepared detailed process manuals on surface creation. After these preparations, it formally adopted Imageware for the development of its newest roadster.

Benefits of new Class-A surfacing process

Mazda's new Class-A surfacing process had huge benefits. Surface modeling and mathematical quality were both dramatically improved compared to the in-house program the company was using previously. (Improved modeling quality makes it possible to directly edit surfaces visually.) The company also confirmed that Class-A surface-creation time was reduced, and there were no errors in the surface-creation methods or processes. As a result of this experience, the company believes that it will achieve its target 30 percent overall reduction in Class-A surface modeling time in the near future.

The same benefits of the newly introduced software were seen in downstream processes as well. Mazda transferred the high-quality Class-A surfaces created using Imageware directly to NX I-deas[®] software for use in downstream 3D



Solutions/Services

Imageware

NX I-deas

Client's primary business

Mazda is one of Japan's top automakers, known for the production of unique sports cars and the world's only mass-produced rotary engine for passenger vehicles.

www.mazda.com

Client location

Hiroshima
Japan

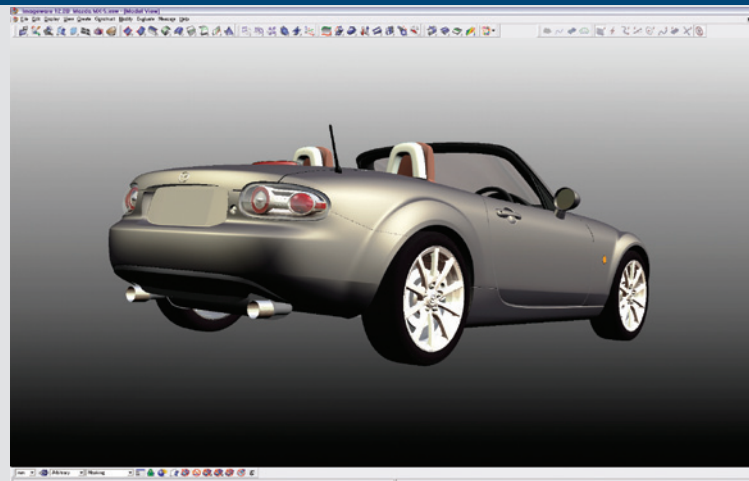
"I don't think it would have been possible to create the Class-A surfaces Mazda required without Imageware. Using Imageware had many benefits, both for my process and downstream processes. It plays a major role in improving quality and streamlining development."

Isamu Sekiguchi
Senior Specialist
Digital Design Group
Design Modeling Studio
Design Division
Mazda Corporation

design. The transfers required no conversion. The improved mathematical quality of the Class-A surfaces sped design and Class-B surface modeling. Using surfaces created using the company's in-house software in downstream processes required a great deal of prep work, such as data conversion and cleanup of converted surfaces, but almost no prep work was needed with the new software, because surfaces were seamlessly available to mechanical design applications.

In its next phase of Imageware deployment, Mazda plans to carry out further styling innovations using this software, and to completely eliminate physical models, which are fabricated to check ultimate surface modeling quality.

The most visible result of Mazda's Imageware implementation is a fun car immediately recognizable as the Mazda brand. Mazda launched sales of the new MX-5 Miata in 2005 to international acclaim, winning awards in more than 30 countries worldwide, including 2005-2006 Japan Car of the Year. These awards recognized the driving enjoyment and stylish design created by the superb performance only possible with a true sports car, and the brand message "Zoom Zoom" that embodies the vision of the Mazda brand.



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