Company

Mazda Motor Corporation

Location

Aki District, Hiroshima Prefecture

Software

Autodesk® Alias®

Intuitive CAD makes designs even more expressive. Create cars of the future with designs that move your soul

Expanding the Range of Autodesk Product Usage, and Pursuing Car Design into the 21st Century

> The divergence when fine tuning physical models, while going back and forth between digital and physical clay models, has been greatly reduced. I think the greatest benefit of using Autodesk® Alias is that you can spend more time perfecting the design.
>
> **- Mr. Hiroshi Kureha**
> General Manager, Design Modeling Studio
> Design Division, Mazda Motor Corporation

Hiroshi Kureha, General Manager,
Design Modeling Studio, Design Division

Hideki Nakamura, Digital Design Group,
Design Modeling Studio, Design Division

Ryuji Kumagai, Digital Design Group,
Design Modeling Studio, Design Division

The Mazda3, named World Car Design of the Year, is the first Mazda car developed using Alias for Class A

Based in Hiroshima, Mazda is an automobile manufacturer that produces cars with a sense of beauty that is unique to Japan. In January 2020, the company celebrated its 100th anniversary since its founding. Among the many Japanese automobile manufacturers, Mazda has been producing excellent cars that grabbed the hearts of car-lovers, such as the Cosmo Sport, Roadster, and RX-7 that were equipped with the world's first mass-produced rotary engine, and more cars with many other unique "driving" aesthetics.

Entering the 21st century, Mazda's passion for car manufacturing seems to be growing deeper instead of staying put. This is clearly reflected in the company's KODO design launched in 2008.

KODO = 'Soul of Motion'. The KODO design is based on a design philosophy that creates an emotional relationship between the driver and the car, as if the driver were communicating with their beloved horse. Modeling is all about breathing life into it, rather than seeing it as an 'iron block'. A more intuitive CAD was needed to realize this philosophy, so Mazda decided to use Autodesk Alias in 'Class A' as well, instead of just in the conceptualization stage. 'Class A' is the process of creating the final automobile design data and requires not only embodying the beauty of the shape as data to be used in the mold, but also to adequately satisfy the manufacturing requirements.

Mr. Ryuji Kumagai, who has been involved in various Mazda car design projects, from design concepts to mass production as a vehicle model lead, looks back on the time when Autodesk Alias was introduced to the Class A process:

"A decade after establishing the KODO design, we wanted Mazda3 to represent a new generation of cars, and the challenge was to further enhance the KODO Design language. What we modelers must pursue to create is a model with a sense of vitality. The modeling work naturally became more difficult as it evolved. This led to an increased reliance on intuitive work and sensibility. So, we introduced Autodesk Alias to Class A as a modeling tool that enables us to fully control even the tiny nuances of highlights and reflection lines. We have been using Alias for a long time in our concept design creation, and after much consideration, we determined that it would also work well for Class A. Specifically, we felt that the intuitive operation of the precise control of the highlights and real-time evaluation and visualization tools and communications within the design team are far superior to the CAD that we had been using."

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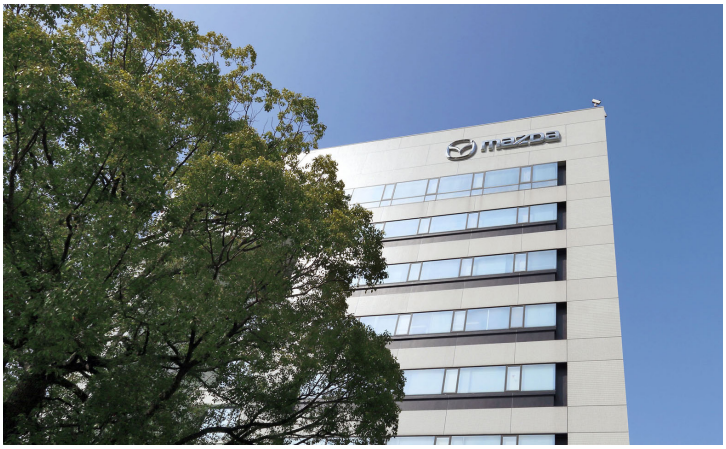
Mr Kumagai uses Autodesk Alias for his design work.



Mazda Headquarters

The clay model is the representation of the concept which was created by a designer, and the clay model is tweaked numerous times to make it closer to the ideal form. Clay modelers are very important to Mazda. It wasn't difficult to choose Autodesk Alias, not only in the conceptualization stage, but also in the Class A process, since it is highly interactive with clay models. With clay models, we pay particular attention to whether the body of the car shows off the reflected light beautifully or not. We can design the surface by fine-tuning the highlights and reflected lights with Autodesk Alias, so we can reproduce the clay model completely digitally. In this way, while going back and forth between the digital model and the clay model, we can refine the model into a shape that anyone would think is beautiful.

Was there any objection on-site when Autodesk Alias was adopted for the Class A process?

According to Mr. Kumagai: "The engineers and the factories that handle the molds were pleased with how easy it is to visualize. It is also useful as a communication tool to align the thoughts of the members outside the design department. We don't have any issues exchanging data with the CAD used by the engineering teams, and now we also use Autodesk Alias for all Class A design projects. It was well received by all the staff at the manufacturing site, saying how easy it is to understand when the chief designer explains the design concept on a large screen. Even when giving a presentation for the executive reviews, on-the-spot requests for changes can be responded immediately. This process used to be time-consuming, because we used to take that issue back, fix it, and then review it again. All members can now share and bring a fresh perspective to the concept, making it easier to review designs much faster." (Mr. Kumagai)

After going through this process, the new Mazda3 debuted in November 2018. Mazda3 won the World Car Design of the Year award in April, 2020. This was Mazda's second award following the 2016 Roadster.

"One of the benefits of switching to Autodesk Alias is that it's much faster to create the shapes you want to express. The speed is now twice as fast. With the CAD we previously used, the whole process was so complex and time-consuming, since we needed to predict and create a model, set up a different verification environment to determine the quality of the modeling, and convert data to another CAD. That requires experience and know-how, but Autodesk Alias can achieve all of these at the same time, so this seemingly laborious process can be completed all at once. With the time we have, we are increasing the number of modeling proposals and facilitating more communications with engineers and factories. Considering these other benefits, our speed may have more than doubled." (Mr. Kumagai)

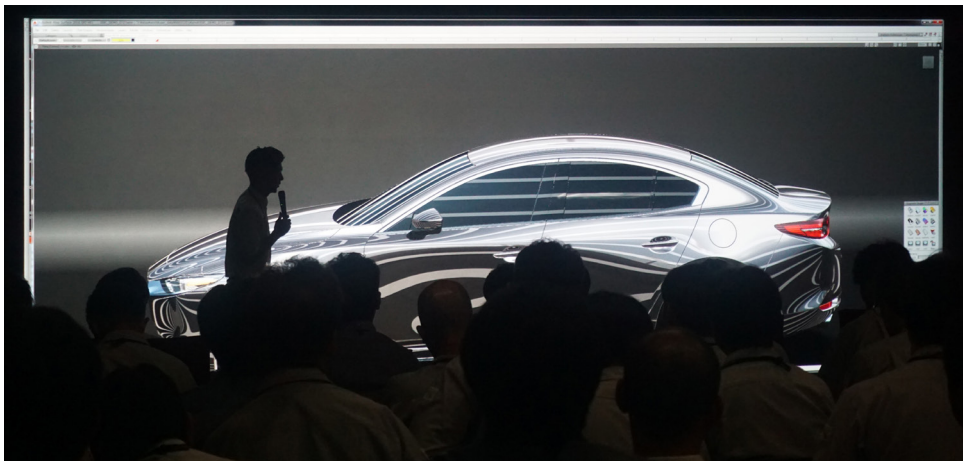
Regarding the benefits of using Autodesk Alias from the conceptualization stage to the Class A process, Hideki Nakamura, who has been involved in Mazda's car design for over 30 years, said as follows:

"In the past, we used to have separate teams depending on the development stage, such as the team responsible for conceptualization and the team responsible for Class A, but it was difficult to connect with the original idea from stage to stage. I feel that it is now easier to convey our thoughts since we changed our process to allow one vehicle model lead to begin from the conceptualization through to giving shape to thoughts using Autodesk Alias."

In fact, at Mazda, the members involved in the design go to the production site and check the pressed iron plate to make sure that the design concept is accurately conveyed. On the other hand, teams at the production site request to put up the concept images rendered in Autodesk Alias on the wall of the factory. By sharing and communicating concept images in this way, the design intention is fully conveyed in every detail, and it is directly reflected in the actual finish product of each car. The high level of motivation of all the members involved in both the design and production is Mazda's noteworthy strength.

"Mazda is the only automobile manufacturer in the world that uses 'soul', which is shapeless, as a slogan. The soul is not something we can easily unify the team with a philosophy. However, that is why we believe that it is possible to create designs that move hearts." (General Manager, Hiroshi Kureha)

Mazda's craftsmanship on building cars is based on extremely flexible ideas. For the next 100 years, they will continue to evolve while responding to further technological innovations.



Conveying the design concept to the production site members using a large screen.

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