Triumph with I-DEAS® Freeform
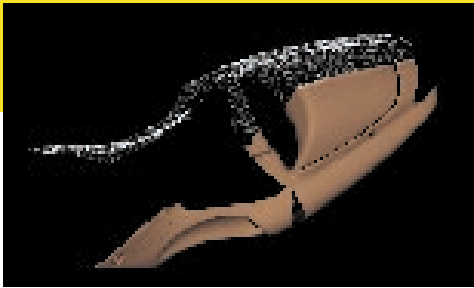
> "With I-DEAS Freeform, we are able to go through more design iterations in less time. This enables us to reduce the overall design process by 50%."
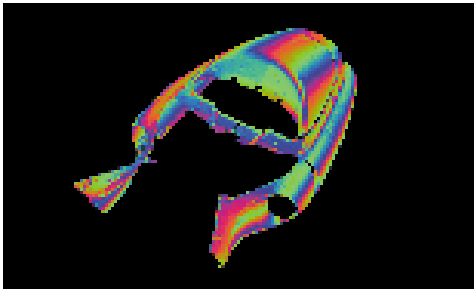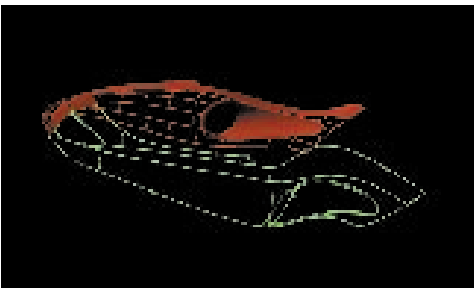
Chris Chatburn
Design Engineer
Triumph Motorcycles, Ltd.
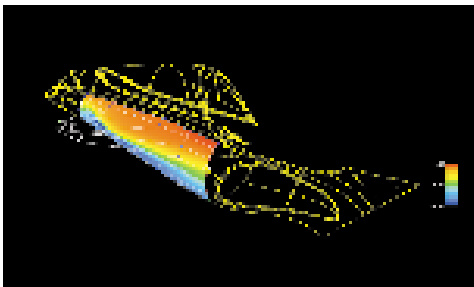
I·DEΛS®
f r e e f o r m

Freeform shapes begin with a concept design.

Reflectance plot highlights desired features.

Patch networks are quickly created.

Dynamic Editing Tools

Product

▶ I-DEAS Freeform Modeler

Application

▶ High-quality freeform surface modeling
▶ Product and tooling inspection

Results

▶ 50% reduction in overall design process
▶ Automated inspection processes for quicker and complete analysis

Situation

In England, the legendary Triumph Motorcycles, Ltd., produces more than 20,000 high-performance motorcycles per year. By implementing the latest design and production techniques, Triumph consistently delivers high-quality products in a limited timeframe.

In December 1997, Triumph turned to SDRC's authorized United Kingdom distributor—Professional Engineering—to develop Class 1 surfaces using I-DEAS Freeform Modeler. Now, I-DEAS Freeform Modeler has become Triumph's tool of choice for developing Class 1 exterior surfaces and component parts.

I-DEAS Freeform Modeler enables Triumph to rapidly produce high-quality products through a completely automated digital design environment. "When Triumph approached us, they were searching for a more automated method for developing efficient, aesthetic, production quality surfaces," comments Giles Gaskell, director of Professional Engineering. "Previously, Triumph developed entire motorcycles in their CAD system. However, they found that it was difficult and time consuming to create freeform surfaces in a solid modeling application. Additionally, they required advanced capabilities to truly capture the aesthetic and aerodynamic intent of their designs. After several successful projects, Triumph elected to bring the technology in-house."

In the surfacing world at Triumph, aesthetic, freeform shapes frequently begin with a concept design. Prior to surface development, a reflectance plot is applied to the data to quickly determine the desired features and lay out the surface patch network. Using this network, the product skin is created.

I-DEAS Freeform Modeler suite of dynamic editing tools provides a real-time environment in which curvature continuous, production quality surfaces can be perfected. "With I-DEAS Freeform Modeler, we are able to go through more design iterations in less time. This allows us to capture the desired aesthetic style in the final product surfaces," states Chris Chatburn, Triumph design engineer.

To develop the solid model for final production, the completed surfaces are seamlessly brought into a Triumph's resident system. Subsequently, I-DEAS Freeform Modeler is used to close the loop in first article and routine inspections of the production parts. "With I-DEAS Freeform Modeler, we are able to efficiently model the desired shapes and features," explains Chatburn. "Then we compare the manufac- tured product—including surface contours and critical features—to our CAD database to verify that it meets our stringent design criteria." I-DEAS Freeform Modeler's inspection capabilities allow Triumph to apply close inspection of styled parts that are either manufactured within a Triumph facility or by authorized suppliers throughout the world. Design engineers can rapidly capture complete representa- tions of parts and tooling using a FaroArm Sterling equipped with a 3D laser scanner. The scanned, physical data is then compared to the master model.
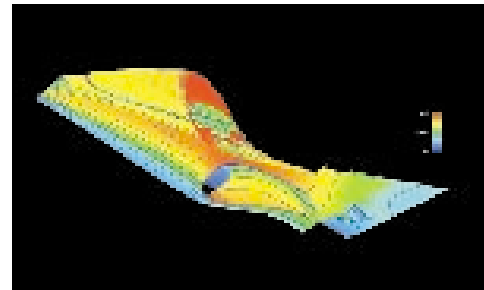
Curvative plots identify local shape imperfections.

Multiple tube lights guage surface smoothness.

Class 1 Surface Model

"The color plot capabilities within I-DEAS Freeform Modeler help us to completely evaluate tolerance deviations in surfaces and critical details. Once the inspection analysis is captured, the electronic 3D report can be shared with design and manufacturing engineers, management, mold makers and suppliers," Chatburn said. Additionally, Triumph's design engineers develop production quality surfaces in significantly less time than with traditional modelers. "The advanced surfacing and inspection analysis capabilities reduced the overall design process by 50 percent. Likewise, our communication has been dramatically streamlined with the automated inspection analysis and reports. This is why I-DEAS Freeform Modeler is our product of choice for developing high-quality production surfaces," states Chatburn.

Today, the Triumph design team efficiently develops Class 1 surfaces for motorcycle parts such as gas tanks, seats, body side panels, engine ports, yokes and grab rails.

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