Bombardier
Transportation GmbH

Customer Success Story

Autodesk® Alias® Surface

"Autodesk training sessions empower us to design flexibly and effectively."

—Michael Sohn
Head of the Design Team
Bombardier Transportation GmbH

Of Trains and Training

The members of Bombardier's design team use Autodesk Alias to help them turn their ideas into reality

Michael Sohn, Bombardier, next to the nose of the regional and suburban train TALENT 2, developed for Deutsche Bahn AG (Photo: Autodesk)

Michael Sohn is the man who gives many subway, suburban and passenger trains their unique appearance. He is in charge of the industrial design workshop at Bombardier Transportation's facility in Hennigsdorf, Germany, where he and his team develop the designs for rapid-transit and passenger trains around the globe. Bombardier is one of the world's leading providers of innovative transportation solutions, ranging from passenger aircraft and business jets to rail transportation, complete with all the associated systems and services. The international group is headquartered in Canada. Bombardier Transportation is the global leader in rail transportation technology and boasts one of the most comprehensive product portfolios in the sector. The company has an installed base of more than 100,000 rail vehicles worldwide.

Autodesk®

The nose of a train is its unique distinguishing feature – designing it is a highly challenging and demanding task.

3D rendering of the regional and suburban train TALENT 2, created with Autodesk Alias Surface (Image: Bombardier)

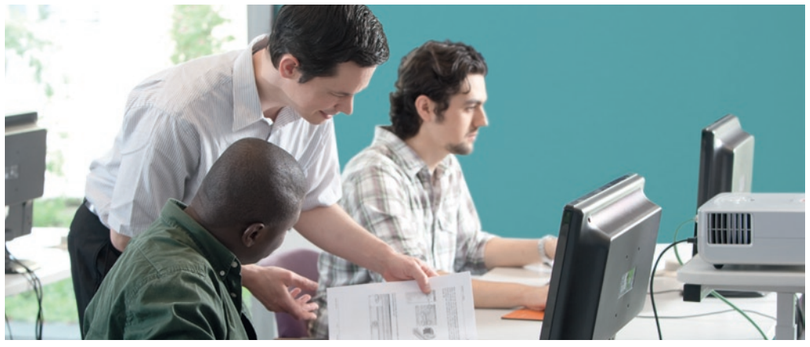
> "The training sessions are always showing us new ways to achieve better solutions."
>
> —Michael Sohn
> Head of the Design Team
> Bombardier Transportation GmbH

Designing the nose of a train, invariably its most distinctive feature, is a highly challenging and demanding task. It is only since procuring Alias that the team has been in a position to model complex free-form surfaces and pass them on unaltered to the company's design and production departments. Michael Sohn explains why training is so important: "Once we had decided in favor of Alias, we first had to develop an understanding of the philosophy behind the program. Autodesk Software is so powerful and can do so much that you simply have to be trained to use the product effectively." After the initial introductory training, it quickly became clear that further individual training sessions would also be needed if the designers were to master the intricacies of the software – regular update training sessions have been held ever since. For these, the trainer travels to the workshop, where she is happy to concentrate on those topics that are of particular interest to the department. Usually she's bombarded with questions about modeling and rendering.

It's all in the nose

The fact that many trains owe the way they look to Michael Sohn makes the industrial designer really quite proud. After all, new developments have to meet some tough criteria. Given a service life of 25 to 30 years, the design can't simply follow short-term trends, yet every train has to be unique. In this sense, the nose of a rapid-transit train provides its distinguishing feature, its unmistakable "face". Michael Sohn and his development team use Autodesk Alias to help them turn their ideas into reality. They use the 3D solution to model and render all the parts of a train, both inside and out. "We use Autodesk Alias to produce Class A surface models which our engineers can then process further using their own design software. One of the reasons we chose Autodesk Alias was because it could be integrated into our workflow without any media conversion," says Michael Sohn. "We are a very small team, so we don't differentiate between modelers and designers – everyone can do both. Autodesk Alias supports this very well."

In order to use the software productively, Michael Sohn makes sure that he and his colleagues take part in regular training. This is where Bombardier turns to the Autodesk Authorized Training Center (ATC®) design + training, where the company has found a highly-experienced trainer in Jeannette Dressel.



Autodesk Authorized Training Center (Photo: Autodesk)

Designers handle as many as four million polygons when rendering the complete interior of a rail wagon.

Detailed 3D representation of the interior design of the train TALENT 2 by order of a private operator (Image: Bombardier)

Form follows function

Although the nose, with its free-form surfaces, is the most demanding design element of a train, the aim is always to optimize the other components too, particularly where energy efficiency and sustainability are at stake. Trains already offer a great advantage as an ecological mode of transport – the challenge for designers is to take this a step further. One goal is to use new, modern materials that will make trains generally more lightweight. And shapes that enhance aerodynamic performance are likewise a priority, since reduced air resistance and less weight mean less energy.

The role of the software is to help industrial designers quickly achieve the best possible results quickly, which they can than present to both their engineers and to their customers. Of course, the ATC Instructor not only handles individual questions during her regular update sessions, she also introduces the designers to any new program functions. Every training session generates at least one inspirational moment. During a recent training session, the team faced the question of how to get to grips with the huge quantities of data that result from modeling trains, without the need for time-consuming rendering work. The trainer made suggestions on how certain surfaces could be modeled more simply, or how to work most effectively with mixed data. Michael Sohn describes another before-and-after scenario: "Before the training session, we were using instances to render an interior with 30 passenger seats. But that produced so much data the computer couldn't cope with anything else. During the session, we learned different ways to represent the 30 passenger seats without the computer freezing for hours. You only learn that sort of thing with proper training."

The designers will handle as many as four million polygons when rendering the complete interior of two rail wagons. Rendering an exterior view of a train in a photo-realistic station setting – for example including a total of eight wagons, the bogies below and the current collector above – can produce quantities of RAM data in the order of 3 GB. And that's with empty wagons, i.e. without the interiors being rendered at all. According to Michael Sohn, they would pretty much need an entire computer center of their own to produce a complete representation of both the outside and the inside.

Evolve concept models and create Class A surfaces using Autodesk® Alias® Surface software, part of the Autodesk solution for Digital Prototyping. Alias Surface speeds development time and reduces rework.

More detailed information available on:
www.autodesk.com/aliassurface

Every training session generates at least one inspirational moment, not least because the courses are specifically tailored to the individual requirements of the team.

Autodesk training

Autodesk Alias training sessions help the team use the software effectively. Michael Sohn estimates that they achieve a 30 – 40 percent productivity increase after every update session. When others in the company question the need for training, the team leader simply has this to say: “The developers work more effectively after every session and make better use of their working day because certain things have been clarified and they’re getting more out of the software. In that respect, training gains us more than it costs.” He is particularly pleased at how the training has encouraged greater flexibility. Autodesk Alias offers several different ways of achieving a desired result; training makes the designers aware of the alternatives and encourages them to take advantage of the program’s flexibility.

Bombardier’s designers can view their trains on a computer screen – or travel on them around the globe. Whether they’re using the metro in Munich or Singapore, taking the suburban railway in Berlin or Frankfurt, riding on a regional double deck train or speeding across Sweden, it’s highly probable they’ll be sitting in one of their own designs.

Exterior design Metro train Singapore (Image: Bombardier)

“Every update training session gives us a deeper insight into the power of Autodesk Alias and teaches us how to make better use of the software.”

—Michael Sohn
Head of the Design Team
Bombardier Transportation GmbH

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