DASSAULT SYSTEMES

LIFE SCIENCES CASE STUDY

OTTO BOCK HEALTHCARE PRODUCTS GMBH

ottobock.

Challenge:
The medical technology company Ottobock wanted to perfect its designs to make its prosthetic products look as natural as possible.

Solution:
The company chose Dassault Systèmes' **3D**EXPERIENCE platform, including CATIA Imagine & Shape to help optimize surface design of its prostheses.

Benefits:
CATIA Imagine and Shape's intuitive and leading-edge surfacing capabilities enabled Ottobock to precisely model its advanced prosthetic hand - the Michelangelo - within a very short timeframe.

CLOSE TO NATURE

The complex movements of the human body seem every day to most people, but for medical technology company Ottobock reproducing those natural actions in its prostheses is an enormous challenge. Ottobock's vision has not changed since the company was founded in 1919: to improve the mobility of people with disabilities through innovative products. The company's focus has always been people, their individuality, and their requirements in terms of functionality, quality and design. This is the driving force behind the company's innovation spirit.

"It is important that the person identifies with his prosthesis and feels that it is a natural part of his body," Michael Kornfeind, Head of Mechanical R&D 2 at the Vienna branch of Otto Bock Healthcare Products GmbH said. "The prosthesis must be as natural as possible and in accordance with the way the person moves."

"Our aim to make it look as natural as possible is also a major challenge for our designers because nature is way ahead of technical development," Kornfeind said. "As of today, there is no artificial material available with the same stretch characteristics as the human skin. On one hand, the shell of the artificial hand has to be designed with wrinkles so that mobility is not impeded by the soft plastic used. On the other hand, the shape of the glove that is pulled over should not only be as natural as possible, but should also be attractive and the wrinkles serve to strengthen the glove accordingly," he explained.

PROSTHESIS AS A NATURAL PART OF THE BODY

Today's prostheses are complex mechatronics systems, which automatically detect, for example, in the case of a leg, if the wearer is sitting down or going up stairs. A complex microprocessor adjusts the prosthesis so that the movement is carried out safely and naturally.

The wrist of Ottobock's most advanced prosthetic hand called "Michelangelo" has a neutral position in which the hand can swing. So the feeling of having a stiff prosthesis is significantly mitigated. The prosthesis glove - the visible exterior of the hand that covers the technical features of the prosthesis – even has colored fibers that mimic the human hand's vein structure.

In order to adapt the Michelangelo prosthesis so that it mimics the human hand as much as possible, some additional developments and re-modelling were done to the hand sleeve. "The CAD system used at Ottobock Group had reached its limits, however, when we first attempted to remodel it," Kornfeind said. He recalled the outstanding capabilities of Dassault Systèmes' design application CATIA, part of the **3D**EXPERIENCE platform® in the area of surface modeling. He also took the advice of EBM, a Dassault Systemès partner and specialist for Dassault Systèmes solutions that recommended the **3D**EXPERIENCE platform and its freeform surface module CATIA Imagine & Shape. After installing the application at Ottobock, EBM organized a two-day training session with a Dassault Systèmes' specialist and one from EBM to instruct users on how to model complex freeform surfaces.

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– Michael Kornfeind
Head of Mechanical R&D 2
Otto Bock Healthcare Products GmbH

FREEDOM FOR NATURAL MODELLING

"The ideation or creative process plays a more subordinate role in the shaping of our products," Kornfeind explained. "Nature ultimately dictates the form. Our challenge is, on one hand, to take into account the technical requirements, and on the other hand, to get as close as possible to the natural shape. CATIA Imagine & Shape's very sophisticated functions enable us to automatically take into account surface curve continuity, thus building a good foundation to create a natural look. Moreover, the surfaces are very stable, allowing the user to fully concentrate on modeling and not fearing that the stability of the model will suffer if he makes a small change in one place. "

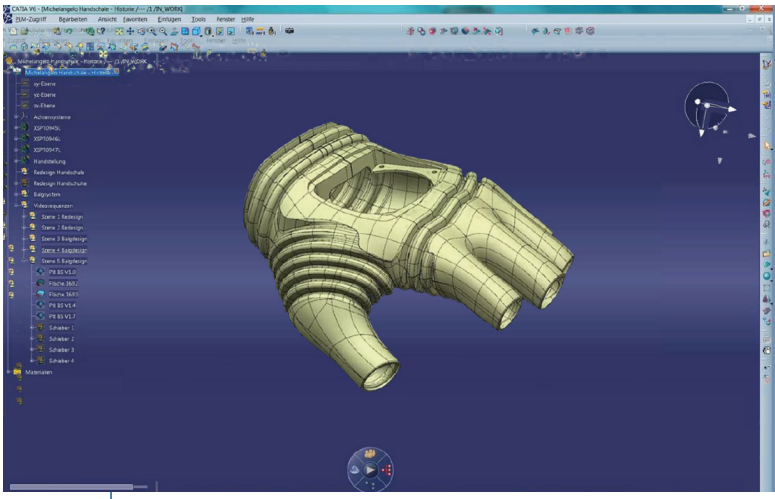
CATIA Imagine & Shape has been used extensively in revising the Michelangelo hand, helping to design a more lifelike exterior while improving the performance of the technology inside." CATIA Imagine & Shape was immediately accepted by our users," Kornfeind continued, "because the software is very intuitive it enables our designers to be creative and at the same time close to nature. The ability to directly manipulate surfaces is very important. "

The solution ensures that there are clean transitions and continuity with neighboring curves and surfaces." CATIA Imagine & Shape allows us to be more precise when modeling, because we can directly manipulate the surfaces at the control points and move them, which is the most intuitive way to edit surfaces."

EFFICIENT MODELING IN THREE WEEKS

Ottobock modeling specialists were extremely efficient thanks to CATIA Imagine & Shape. Previously, when using their CAD system, they were unable to achieve the desired result after working for two months on the geometry of the Michelangelo's new hand shell. "However, we then used CATIA Imagine & Shape and the model was completed in just three weeks," Kornfeind said

"CATIA Imagine & Shape is our strategic tool for surface modeling and we use it for all products where form is essential. We expect a lot from this solution in the future," Kornfeind said. "We try to use nature as a design model as much as possible. We have not achieved the perfect design yet. However, Dassault Systèmes' application CATIA Imagine & Shape helps us to design our protheses to be as natural as possible."



Top image: The advanced prosthetic hand - the Michelangelo

Bottom image: Creative and flexible modeling of Michelangelo prosthesis in CATIA Imagine & Shape

Focus on Otto Bock Group
Medical technology company delivering mobility solutions for the disabled.

Products: Prosthetics, Orthotics, Mobility Solutions and MedicalCare

Revenue: EUR 1.018 million (2014)

Employees: more than 7.500

Headquarters: Duderstadt, Germany

For more information
www.ottobock.com

Focus on EBM
EBM provides consulting, implementation services and training for Dassault Systèmes' **3D**EXPERIENCE platform applications CATIA, ENOVIA, DELMIA, SIMULIA and **3D**VIA. Its specialists possess more than 20 years of experience in analyzing the customers' requirements and designing solutions tailored to their needs. They conduct projects in compliance with industry standards, optimizing the benefit for the customer.

For more information
www.ebm.at

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