

Case Study: FreeForm® Modeling Plus™ System Transforms an Impossible Design Project into Reality

Customer: Black & Decker – Hardware and Home Improvement and Baldwin Hardware Corporation, a division of Black & Decker

Black & Decker is a global marketer and manufacturer of quality products used in and around the home and for commercial applications. It is the world's largest producer of power tools and accessories. Its household products business is the U.S. leader and the company is among global competitors in the small household appliance industry. In 2003, Black and Decker purchased Baldwin Hardware Corporation—a company committed to delivering innovative and exclusive products defined by “Timeless Craftsmanship®”.

The Goal

In an era where what is old is new, Black & Decker - HHI and Baldwin set out to create an exclusive line of door hardware that would evoke the artistic beauty and elegance epitomized in France during the 18th century. Their goal was to bring “old world craftsmanship”, including the imperfections inherent in handcrafted design, into the modern machine-age of perfection, precision, and fast time-to-market. When they realized that it would be impossible to produce the products they envisioned using their traditional CAD tools alone, they turned to the FreeForm Modeling Plus system to help them bring the “Chateau” and “Craftsman” lines of [Baldwin Archetypes](#) to market.

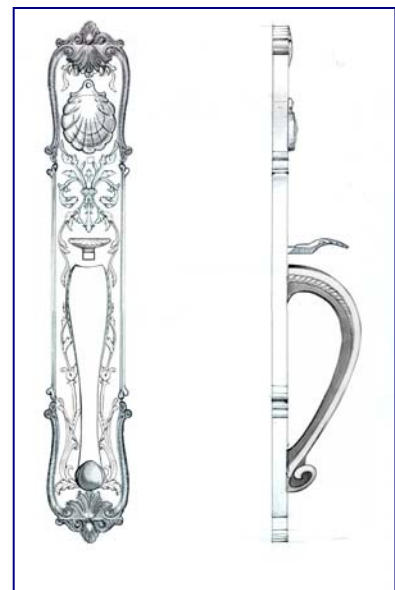


“Chateau” entry handle set.

The Challenge of Making a Design Reality

The project began with the collaboration between Jay Czerwinski, Manager of Industrial Design, his team, and the Marketing team. The Marketing team provided the over-arching design direction—the time and place of the 17th and 18th centuries in Europe resulting in styles of Rococo and King Louis XIVth-XVIth of France. Designers were asked to develop designs of door hardware that might have been created in that era had the technology of today been available. They were expressly asked not to design replicas, but rather to come up with new designs that evoked the essence of the past. The design team completed hundreds of 2D sketches, from which the Marketing team chose dozens of designs to use for their initial market research.

Working from the sketches, Black and Decker – HHI’s typical process at this point would have been to create simple NURBS models of the designs using Alias® Studio, and then generate computer renderings with enough shading and lighting to be



Sketch of entry handle set.

useful to the Marketing team to continue their market research to select less than a half dozen potential final designs.

When Jay saw the detailed, complex shapes of the leaves and vines in the designs that had been selected from the sketches; he realized that they could not make these models & computer renderings using their existing tools within a reasonable amount of time. The technical difficulties of using traditional CAD tools to model highly detailed, organic shapes with old world craftsmanship, combined with the need for flexibility to modify the designs to accommodate different internal locking mechanisms, threatened to bring the project to a standstill.



“Chateau” entry handle set detail.

The FreeForm Modeling Plus Solution

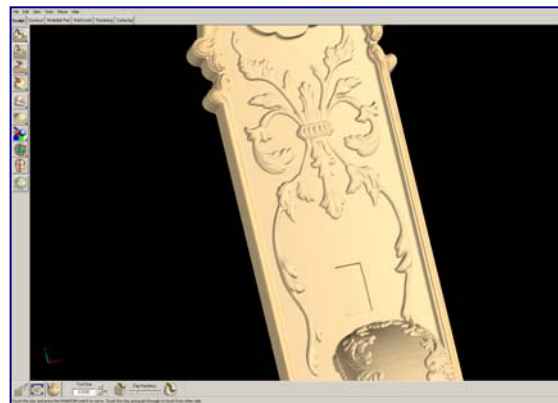
To keep the project on track, Jay’s team used Photoshop® to paint flat-plan views instead of creating computer renderings. The Marketing team used these paintings to continue their market research while Jay talked with SensAble about how he could use the FreeForm modeling system to solve the challenges he was facing on the project.

Convinced that the FreeForm Modeling Plus system would enable them to quickly create complex, organic forms and sculptural details, and deliver the artistic look of “old world craftsmanship” they needed; and, that the SensAble team would support them as they integrated the FreeForm system into their production workflows, Jay recommended the FreeForm system be added to their suite of tools.



Designer Yos Singtoroj working on the FreeForm modeling system.

Once the Marketing team had chosen the potential final product designs, the basic forms were modeled in Pro/E and Alias. Then, designer Yos Singtoroj imported the CAD models into the FreeForm system. Yos accelerated his initial modeling time by importing the PhotoShop paintings into the FreeForm system. He was then able to immediately flesh out the 3D model and add sculptural details using the carving and emboss tools. Using the FreeForm Modeling Plus system, Yos developed a unique, artistic style that enabled him to add a hand-crafted look to the designs—including imperfections that would show in the casting. Jay and Yos knew if these designs had been done using their traditional CAD tools, they would look too perfect, too straight and mechanical, too much of the machine age.



FreeForm digital clay model of handle set.



The final designs were then rendered in the FreeForm system using the integrated mental ray® rendering engine. The Marketing team used the renderings for the final phase of their market research to select the 1 final design of the flagship product in the Chateau product line. Upon selection of the final design, Yos created the final model and handed it off to engineering for confirmation. Then Jay, Yos, and a team of designers began the task of designing the complete product line—60 additional products that matched the Chateau flagship product. Additionally, they have created custom pieces of hardware in the Chateau design for selected customers.



FreeForm render.

As they worked with the FreeForm Modeling Plus system, they also found the digital modeled textures that can be created to be a significant time-saver and a boost to CAD productivity. For the Craftsman line of products, another of the Baldwin Archetypes designs, they needed a hammered metal texture that could be applied to the designs quickly and easily. They needed the texture to be consistent, but to still have the random variations found in “old world craftsmanship”. Using the FreeForm Modeling Plus system, Jason Veltz of the design team created a sheet of “hand-crafted”, hammered metal texture and used SensAble Technology’s surfacing tools in Freeform to export IGES files, which could be used by other CAD modelers using other software packages as needed.



The “Craftsman” line features a digitally modeled, hammered metal texture created using the FreeForm modeling system.

The Results

“The FreeForm system is a tool for the artist and for the corporate manufacturing world. This big mass production project—the development of the Chateau and Craftsman product lines—would have been impossible without the FreeForm Modeling Plus system,” said Jay Czerwinski, Manager, Industrial Design for Black & Decker – HHI. “The FreeForm system has enabled us to respond quickly to our engineers’ requests to adjust our designs to meet varying hardware requirements. We’ve also been able to deliver unique, custom hardware solutions for our customers. And, perhaps most critical to us on this project, the FreeForm Modeling Plus system provided us with a way to convey the artisanship of the old world while having all the advantages of working digitally.”

Today, the “[Chateau](#)” and “[Craftsman](#)” lines of [Baldwin Archetypes](#) are available through selected, elite showrooms.

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