SIEMENS
Ingenuity for life

Consumer products and retail

Black Diamond Equipment

Boundary-free product design

Product

NX

Business initiatives

New product development

Business challenges

Create a better freeride boot

Keys to success

Integrated industrial design and product design functionality

International design collaboration

Results

Competitors' expertise reached and exceeded

Three boot product families provide excellent market coverage

Phenomenal reception by skiers and industry experts

A newcomer to the ski boot business used NX to create a freeride boot that outperforms products from companies with 50+ years of experience

Boots for the boundary-free skier

Black Diamond Equipment Ltd. makes equipment for climbing and skiing. Black Diamond's equipment regularly wins awards for its innovation and quality. "This is partly the result of dedication, desire and diligence on the part of an incredible team of people," says the company's web site. "It's also the result of each of us being climbers and skiers ourselves. We're a company of users – it's who we are. We're the greatest dreamers about what could be, and the harshest of critics about what exists."

Several years ago, Black Diamond decided to apply its expertise to a new area – freeride ski boots. These boots are used in a certain niche of skiing known as "boundary-free" skiing. Boundary-free skiers strap their skis to a backpack, hike up a mountain (far from a conventional ski resort), and then ski down private, pristine slopes. Boundary-free skiers need the comfort and functionality of hiking boots for the climb up as well as the fit and performance of alpine ski boots for the ride down. The boots available at the time were so unsatisfactory that some skiers opted to use two pairs, carrying one pair in their pack so they'd have the right boot available when they needed it.

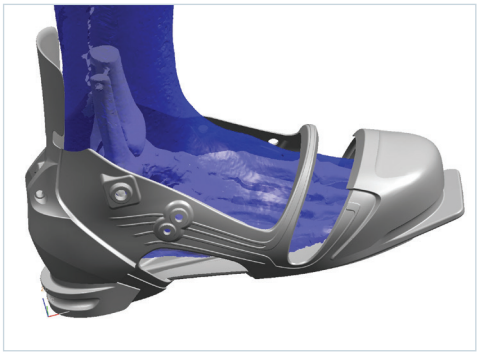
Black Diamond's goal was to combine the two sets of performance criteria in one great-looking boot. "The other freeride boots out there are made by European competitors with 50+ years of boot-making experience," explains David Narajowski, director of advanced projects at Black Diamond. "Our challenge was not just to catch up to where they were, but to go beyond and create something much better."

Integrated concept and product design

Black Diamond is a long-time user of CAD and has used its original design software, I-deas™, from Siemens PLM Software, to develop many of its successful products. At the time the boot project started, however, the company had decided to standardize on the NX™ digital product

"Climbing hardware, lighting, skis, now boots – what'll it be next? We have the talent, we have THE technology – bring it on!"

David Narajowski
Director, Advanced Projects
Black Diamond
Equipment Ltd.



development system, also from Siemens, an advanced design solution that still allows the company to leverage its legacy I-deas data. "Black Diamond's design engineering centers worldwide have moved from I-deas and other CAD systems to standardize on NX," Narajowski says. He notes, "Between I-deas and NX, there was a period of time when we tried a mid-range CAD program. But there is no way we could have developed a freeride boot in a mid-range system."

One of the main NX advantages, according to Narajowski, is that it provides both the freeform modeling capability needed to capture the company's design expertise (through the NX Shape Studio application, offered as part of the NX Mach III industrial design solution) as well as the powerful product design tools needed to turn an idea into a manufacturable product. "This is a perfect combination for BD's hands-on, chopshop-inspired, fail-fast-to-succeed-sooner approach to design," says Narajowski. "Working with NX Shape Studio, we can directly manipulate surface geometry to do things like capture anatomical nuances of the foot. And this functionality is integrated with NX product design tools such as WAVE that let us go from one original conceptual model to three different product families with 10 sizes each."

Jake Hall, Black Diamond's lead industrial designer on the project, explains the need for such tight integration this way: "One of the great challenges of designing ski boots is that there is very little separation between performance and aesthetics. Fit, performance and aesthetics are one and the same. This means that engineering, industrial design and manufacturability must be tied together seamlessly in order to create a successful product. Any apparent seams between the two disciplines would result in poor design.

"Fully integrated engineering and industrial design means that we needed both surfaces and solids as native parametric features within a model," Hall continues. "NX, and particularly the powerful surfacing features in Shape Studio, provided the hybrid capabilities of surfaces and solids that the project required."

The tight integration between the NX conceptual design and product design environments was key to optimizing the performance of the boot, a task that involved a lot of actual skiing and hiking in prototypes. "If someone came back and complained of pressure here or a pinch there, we could grab those surface points in Shape Studio and easily make a change," Narajowski notes. "But those changes are not made in a vacuum. It's not like we throw the design over the wall from industrial design (ID) to engineering and hope the design intent isn't lost. We're also using NX tools and the same geometry we create in NX Shape Studio to analyze the boot's performance and to design injection molded parts. That is the real strength of NX for us."

Solutions/Services

NX
www.siemens.com/nx

Customer's primary business

Black Diamond Equipment Ltd. is an employee-owned manufacturer of equipment for rock climbing, alpinism and freeride skiing.
www.bdel.com

Customer location

Salt Lake City, Utah
United States

"NX, and particularly the powerful surfacing features in Shape Studio, provided the hybrid capabilities of surfaces and solids that the project required."

Jake Hall
Industrial Designer
Black Diamond
Equipment Ltd.

International collaboration

Engineers at the Black Diamond headquarters in Utah worked with their colleagues at the Black Diamond office in China on the design of the boot. The ability to share the workload in an efficient and accurate manner is another important benefit of NX on a project such as the freeride boot, according to Narajowski. "NX allowed us to break up the model and have more than one person working on it at a time," he explains. "There would be an ID person working on outside surfaces, for example, while someone else was working on the foot shape or on the cutter for the buckles. People could work on their own parts, and then we could pull them in and automatically update the 'super part.'"

Nearly all of the freeride boot project was done using Siemens software. The integrated nature of the NX solution made it possible for the design team to go through the many iterations they needed to catch up to and surpass the competition. "Without having all that existing experience, we had to try a lot of iterations. We wouldn't have been able to go through the iterations fast enough without tools like NX," Narajowski adds.

The boot has been previewed to the industry, to rave reviews, and sales will begin in time for the next ski season. "As the largest, most expensive, complex development project we've ever undertaken, it's hard to contain my enthusiasm about these boots," says Peter Metcalf, CEO of Black Diamond. "They represent the best of BD today, exemplifying our design philosophy in terms of innovative product. BD boots will fully meet the demands of today's freeride skier. We set out to build a better boot for the skier who wants one boot to rip all terrain and our design team has delivered."

Siemens PLM Software

Americas +1 314 264 8499
Europe +44 (0) 1276 413200
Asia-Pacific +852 2230 3308

www.siemens.com/plm

13835-A4 5/18 A