

NX • PLM Components

## Formation Design

Diverse client roster is no problem for Formation Design

### Industry

Multi-industry

### Business challenges

Be able to take on a diverse range of projects, such as:

Industrial design for a material handling vehicle

Improving the operator ergonomics, usability and appearance of a heavy pneumatic tool

Designing and positioning a motorcycle boot for urban sport riders

### Keys to success

Work with an integrated conceptual design and advanced mechanical CAD tool

Work with client's CAD data to ensure seamless communication and continuity

Develop overall design intent and verify its form, fit and finish with surface analysis tools

Deliver manufacturability data to clients in an immediately usable format

**Formation Design tackles projects ranging from the small (high-volume consumer goods) to the large (industrial vehicles) – and everything in-between**

### Thinking of the client

From conceptual design through the creation of production surfaces, Formation Design Group strives to offer world-class product design to its clients while minimizing development costs. Formation Design Group Inc. is an industrial design (ID) firm that handles everything from small hand-held devices to large vehicles. When the firm was founded, the partners could have bought software specific for ID but they realized there were drawbacks to this approach. It would require extra effort on Formation's part – and consequently longer cycle times and higher costs – to ensure that the forms they created would accurately fit clients' requirements and could be manufactured without losing design intent. And when those forms were delivered to clients, additional effort would be needed on that end to convert shape data into usable CAD geometry for downstream applications such as analysis, documentation and manufacturing.

The firm decided to go another route, implementing Siemens PLM Software's NX™ product development technology as its design solution. This integrated industrial design and mechanical engineering environment spares Formation from the need to translate files internally as they



move from the initial concepts to more detailed phases of the design. It also gives the company certain functionality, such as the ease of modifying parameterized surfaces, that isn't found in traditional ID software. More importantly, it lets Formation deliver extra value to clients in the form of CAD data that is immediately ready for downstream applications.

"Our clients are interested in developing innovative new products and bringing them to market in the most efficient and seamless fashion. This goes well beyond

## Results

Integrated approach delivers designs up to 50 percent faster than traditional ID software

Customer can quickly move to downstream applications

Design intent is ensured

*"In this economic climate – one in which companies are pushing hard to get the most for their money – our use of NX is an important asset. It lets us deliver a design that our clients can immediately take to the next step."*

Robert Henshaw  
Partner, Industrial Design  
Formation Design Group

the creation of concept renderings and animations," says Robert Henshaw, partner, Industrial Design at Formation. "We provide the high-quality concept visualizations necessary to communicate and evaluate design concepts but that's just the beginning. Clients want data they can immediately use in their next steps.

Everyone is looking for a seamless, faster means of ensuring the design intent presented in the initial renderings makes it to market." So far, even with its diverse roster of clients, Formation has found NX ideal for its needs. Here are a few examples.

### The redesign of a material handling vehicle

One of Formation's clients is Crown Equipment Corporation, a leading manufacturer of pallet trucks and other material handling vehicles. Crown asked Formation to update one of its trucks with an emphasis on aesthetics, usability and operator comfort. Formation began the design by using Crown's NX data of the existing vehicle. Although the firm's task was to redesign the truck's exterior, the designers were capable of moving interior components around as needed to obtain the best exterior configuration. "Good industrial design isn't just covering something that's already there," says Phil Palermo, partner, Industrial Design at Formation. "Projects like this involve looking for opportunities

to rearrange components to achieve an optimal configuration. That's something we can do because we are working with solids and surfaces in an integrated tool, that supports everything from early conceptual design to advanced mechanical and assemblies work.

"Because we were modeling the truck's exterior around the actual production assembly, we knew that our concepts were viable," says Palermo. "That's different from coming up with concepts in a standalone ID program where you have to go back and validate them. When we met with the client, we were showing them options that could be manufactured without additional validation." Client meetings were further enhanced by the use of photorealistic images, also created directly by using NX.

Once the concept was approved, Formation worked closely with the companies that would manufacture the truck's covers, sharing design data in Parasolid® and IGES formats. When Formation delivered the final product (a native NX file) to Crown, the partners knew their client was getting highly accurate geometry that could be manufactured with no loss of design intent. "In the past, many of the forms we'd create were difficult to communicate and have manufactured



accurately,” explains Palermo. “We avoided that for Crown by delivering complex shapes we knew fit the vehicle perfectly and could be produced precisely.”

### Making heavy tools easier to operate

Another client, Ingersoll-Rand’s Equipment Division, wanted Formation to update one of its pneumatic tool lines to look as new and fresh as other items in its product family. The client also wanted Formation to improve the ergonomics of this heavy device (about 25 pounds). After carrying out creative brainstorming and creating a series of 2D concept sketches, the design team built a number of foam models to evaluate the feel of different handle designs. Once they had handles they liked, they began to combine the 2D shapes and handle configurations using NX as a surface model representative of the tool’s outer shape.

One challenge with this project was the tool’s finish – it would be cast in aluminum and polished to a mirror-bright shine. Surfaces had to be perfect. “If there was an imperfect surface or transition, it would be apparent,” explains Russell Kroll, partner, Interactive Design at Formation. There were a number of potential trouble spots, particularly where the complex curves of the handles met the more prismatic shape of the tool’s body. “NX’s surface analysis tools were invaluable in getting the design right,” says Palermo. “We went back and forth between designing surfaces and analyzing them to make sure we had them perfect.”

Another advantage of NX on this project was the ability to work closely with the design and engineering team at Ingersoll-Rand, a group which also uses NX. At various stages in the development of the tool, Formation sent Ingersoll-Rand native NX data that they evaluated for fit against the assembly model of the tool’s interior components. “This was valuable because it let us know about a potential air flow problem

early on,” says Palermo. “We were able to revise the outer surfaces using NX and avoid costly rework later.”

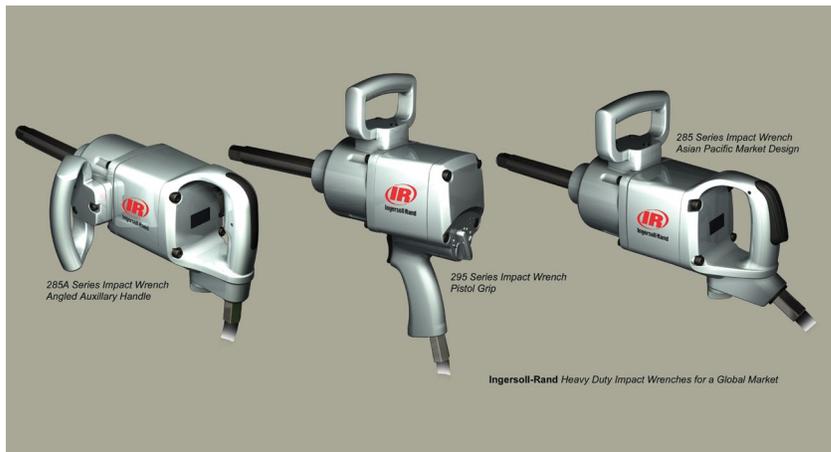
### Improved motorcycle boot illustrates superior design process

NX is also Formation’s tool of choice when starting a project from scratch. A good example is when the firm took on the task of creating a better motorcycle boot for sport bike enthusiasts. Conversations with bikers revealed problems with existing products. Filled with logos and graphics, typical racing boots are often gaudy and too “over the top” to wear anywhere but on the bike. Another problem is that the boots are often too stiff for walking. Bikers also wanted easier on and off and more feel for the vibrations of the bike through the boot.

This was a complicated design project but by performing conceptual design in 3D, Formation Design was able to quickly and accurately give shape to its ideas and

“With NX, you stay in one application and you can do the creative part of the work as well as the detailed documentation. Nothing suffers. NX does an excellent job with both.”

Phil Palermo  
Partner, Industrial Design  
Formation Design Group



## Solutions/Services

NX  
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## Customer's primary business

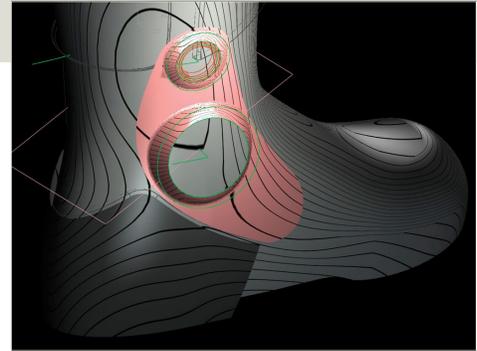
Formation Design Group is a product design and development group, leveraging creativity, technology and experience to create compelling solutions for clients.  
[www.formationdesign.com](http://www.formationdesign.com)

## Customer location

Atlanta, Georgia  
United States

**"NX allows you to work with geometry in an interactive, updatable and parametric way to massage and refine the design as you go – this is an iterative process which goes far beyond the simple creation of concept renderings or traditional geometric documentation."**

Russell Kroll  
Partner, Interactive Design  
Formation Design Group



ensure design intent for this complex footwear. The design team began the process with a scanned model of a human foot that they imported into the NX environment. Using that as an underlying layer, they carried out creative brainstorm sessions and created 2D concept sketches of the boot's exterior, working on Wacom graphics tablets using Corel Painter software. From about a dozen potential design directions, they chose one design to refine using the CAD modeling process. Then, using both the sketch and the foot model as guides using NX, they created the geometry needed for production. The design continued to be refined as the work moved into the NX environment. "The magic of working with NX is that you have the design intent (the sketch) and the actual (scanned) foot behind the geometry," says Kroll. "NX allows you to work with the geometry in an interactive, updatable and parametric way to massage and refine the design as you go. This is an iterative process which goes far beyond the simple creation of concept renderings or traditional geometric documentation," he says. When working with NX, it is possible

to fine-tune a design without losing work that has already been done. In contrast to traditional ID systems, no rebuilding is necessary.

For Formation Design, the use of NX is far superior to traditional ID programs. "We use NX as a way of interacting with the geometry as we're building it," says Palermo. "We think that's a unique advantage of NX. With typical industrial design applications, you're making images. In NX, you have ability to create an image or nice rendering but you also have real solid production data, not just surfaces and splines."

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