

# TREK BICYCLES, INC.

## Handcrafting bikes for Tour de France winners and trikes for tikes with SolidWorks Premium



*Trek designers use powerful SolidWorks software configuration, assembly, and surfacing capabilities to deploy more complex and innovative shapes and surfaces.*

Trek Bicycles, Inc., is the leading manufacturer of handcrafted bicycles for the professional racing and recreational markets. The company's bicycles range in price from about \$100 for a child's bike to over \$8,000 for a high-end racing bike. Within professional cycling circles, Trek bikes have a long-standing reputation for quality. And when Lance Armstrong began his streak of six consecutive Tour de France wins—all on Trek bikes—the company's products became even more prominent.

In order to meet the anticipated increase in demand due to the association of Trek Bicycles with Armstrong, management evaluated their product development environment in 2002, with an eye toward preparing for even greater volumes of new business, according to Steve Baumann, industrial design manager. "We had been using Pro/ENGINEER® software," Baumann explains. "But we wanted to upgrade to a CAD system that was more PC-compatible, affordable, and easy to use. Because our people fly all over the world to meet with racers, buyers, and dealers, we use a lot of laptops. In addition to flexibility in hardware, we wanted to utilize 3D design data in order to improve productivity and boost throughput."

After evaluating several 3D CAD packages, the company selected the SolidWorks® Premium (previously called SolidWorks Office) 3D CAD solution for several reasons. First, it is the easiest to use, and represents the best value for the price. The system supports integrated opportunities for reusing design data, and also includes complex modeling and surfacing capabilities. Furthermore, it has the greatest momentum of all Windows®-based 3D CAD systems. "SolidWorks software has the most solid business experience in actual production settings," notes Baumann. "Because we wanted to use 3D data at more points in our development process, we chose the system with the most momentum, knowing that it would produce additional opportunities for integration."

### Results:

- Doubled throughput of new products (100 percent increase)
- Reduced design cycles by 50 percent
- Improved product quality
- Enhanced design communication

## Enhancing designs with customized configurations, complex shapes, and surfaces

With SolidWorks Premium, the designers at Trek Bicycles can now use bicycle-configuration design tables to improve efficiency; utilize interference-detection capabilities to minimize rework; and employ advanced modeling and surfacing techniques to enhance their designs. "How good a bicycle feels is related to finding the optimum location for the centerline," says Christopher Carlson, senior industrial designer. "With SolidWorks software, we set up a master sketch with different tube dimensions in a design table. From this diagram, our designers can quickly work to create the different angles and configurations required to produce all the different sizes for each model."

"The combination of assembly and surfacing capabilities allows us to build complex shapes and surfaces into the assembly in context," he adds. "About 60 percent of a bicycle uses existing components. For us, the challenge is to blend these components with more complex shapes and surfaces to create a seamless, beautifully flowing line. SolidWorks software enables us to establish clearances for existing components, while adding more shape and sculpture to the overall design."

## Doubling throughput and improving quality with integrated capabilities

By implementing the SolidWorks Premium CAD system, Trek Bicycles is achieving its goal of employing 3D design data at additional points in the development process. This, in turn, has doubled the industrial design group's throughput and improved quality across the board. "We are doing twice as many projects now," Baumann explains. "By integrating everyone internally and externally (including vendors) on the SolidWorks software platform, we are able to support a 100 percent increase in the number of new products that go out the door."

The company uses integrated SolidWorks Simulation analysis software to optimize parts for strength and weight. SolidWorks eDrawings® enables fast communication of design information internally and with outside vendors. PhotoWorks™ and animation capabilities facilitate the creation of photorealistic renderings and animations for marketing purposes. Integrated SURFCAM® and PowerMILL applications support high-speed CNC machining and fabricating operations.

## Performing design iteration with speed and ease spurs innovation

In addition to helping Trek Bicycles double its new product throughput, SolidWorks software allows the company's designers to conduct more design iterations on a product design before releasing it to production. Increased design iterations also support Trek Bicycles' commitment to innovation, Carlson contends, because they provide more opportunities for tapping creativity.

"The speed and ease of iterations in SolidWorks software result in greater innovation," Carlson says. "You never get something completely right the first time. If you only have one shot at something before producing a prototype, you are going to take a conservative, safe approach. Because we can work so quickly in SolidWorks Premium, we are able to take more chances and push the limits of design, which generally results in more innovative solutions."

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Christopher Carlson  
Senior Industrial Designer



By providing integrated design, analysis, manufacturing, and communication tools, SolidWorks software has enabled Trek Bicycles to double its design throughput while improving quality and increasing innovation.



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