

## Changing the way people think about bikes



Trek Bikes revolutionizes new cycling market by deploying innovative industrial design technologies on Trek Lime

### THE CHALLENGE

- Create a breakthrough, revolutionary concept in bicycle design
- Develop an untapped North American market of 160 million potential riders
- Extend the company's market leadership position in a new direction

### THE SOLUTION

- Deploy innovative industrial design technologies, including SolidWorks 3D CAD software powered by AMD Opteron 64 processors
- Provide industrial designers with the development tools they need to transform market research into a revolutionary concept
- Utilize advanced photorealistic rendering capabilities to facilitate concept reviews, prototyping, and testing

### THE IMPACT

- Accelerated product time-to-market
- Streamlined communications between industrial designers and engineers
- Reduced development costs
- Delivered an innovative, precedent-setting product

Trek Bikes has built its worldwide reputation for advanced technology, impeccable quality, and high performance on the legs of some of the world's most notable racing cyclists. The Wisconsin-based company is the leader in the design and manufacture of bicycles used by professionals and cycling enthusiasts, including high-end racing, road, and mountain bikes.

While these markets continue to draw Trek's primary focus, company management realized that the high-end segment of the market, which estimates show totals roughly 30 million potential consumers in North America, will not expand at a pace consistent with the company's growth goals.

For Trek to continue to grow and flourish, it had to break new ground, create revolutionary products, and develop untapped markets. Trek needed to create an innovative concept that essentially changes the way people think about bikes; that makes cycling a fun, exciting activity for a wider range of consumers; and that captures the rapturous feeling of riding a bike for the first time, distills that sense of nostalgia into a new product line, and precipitates a whole new market segment for bikes. In short, Trek needed to develop a bike that made people who had abandoned cycling want to ride again.

Through market research developed in concert with strategic partner and gear manufacturer Shimano, Trek estimates the potential North American market for this "everybike" to be more than 160 million people, more than five times the size of its traditional markets. Trek designers saw Shimano's recently-introduced Coasting Group, which includes automatic gear-shifting capabilities, as an important element for creating a cycling experience that is fun, easy, and comfortable. But because the project represented such a departure from Trek's traditional product development approach, the company decided to conduct additional market research with a representative group of potential customers who had not ridden a bike in the past two years.

As a result of documented shopping excursions, discussions, and concept testing with this core group, Trek researchers captured important

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impressions concerning what constitutes a simple, comfortable bike that just about anyone would want to ride just for the fun of it. The company then faced the task of translating these perceptions into an innovative, appealing, new bicycle design.

Trek's industrial design and engineering teams utilized SolidWorks® 3D CAD software powered by AMD™ Opteron 64-based design and engineering workstations to create Trek Lime, a completely new concept in bicycle design. Using these innovative technologies, Trek was able to integrate the industrial design concepts for Lime efficiently with downstream engineering and manufacturing requirements.

#### Transforming market research into a revolutionary concept

The typical Trek design effort includes input from cycling experts — people who ride frequently and have deep knowledge about how bicycle design can impact performance. But with Trek Lime, the ultimate rider is someone who does not ride regularly and is not interested in the inner workings of bicycle mechanics. According to Product Manager Chad Price, industrial designers on the Lime project had less detailed direction than on most Trek designs and had to draw more upon their own creativity to test different concepts in order to transform perceived feelings obtained through research into a design with strong emotional appeal.

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As a key technology provider at TREK, AMD not only supported the Lime effort through computers running fast, affordable,

and powerful AMD Opteron 64 processors but also provided special Wacom Cintiq 21-inch pressure-sensitive monitors that industrial designers utilized as drawing tablets and digital art tools to create Lime concepts. “Our industrial designers were able to sketch directly on the SolidWorks 3D solid models. This let them try different concepts quickly and easily,” says Michael Sagan, Trek Product Development Technology Lead. “Design intent is completely preserved by combining sketching and CAD modeling together. Working this way allows designers to be more creative.”

According to Senior Industrial Designer Hans Eckholm, data compatibility across applications and with downstream functions accelerated iterations on different design concepts and ultimately shortened time-to-market. “Being able to sketch over a SolidWorks model and then save concept illustrations as SolidWorks files was a big help,” Eckholm explains. “With SolidWorks, we can use eDrawings® files for internal reviews, send STL files to vendors to create rapid prototypes, and work with our engineering team to resolve any fit or clearance issues. For example, our engineering team was able to do tolerance stackups on the chain guard to determine its best location in the design.” AMD Opteron 64-based workstations provided the power to iterate on a significant number of concepts quickly, which helped the industrial design team develop prototype designs for market evaluation.

#### Delivering an innovative precedent-setting design

After iterating on design concepts and building an actual fleet of bicycle prototypes for test rides, Trek arrived at a revolutionary design concept for Lime that combines a clean, classic bicycle frame with Shimano's automatic gear shifter and the ability to customize the look of the bike using changeable accent color peels on high-profile parts.

“Our research revealed that our target audience responded well to color but felt intimidated by a lot of cabling and gadgetry,”



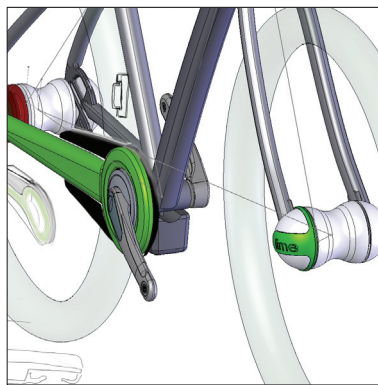
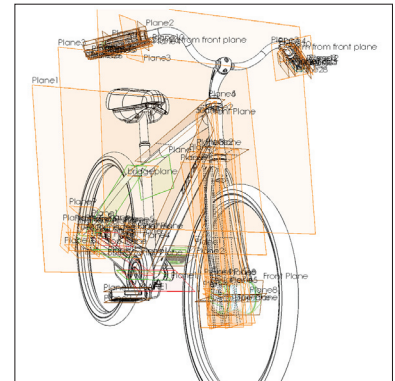


Price notes. "We wanted the bike to be as non-technical looking as possible, with all of the nuts, bolts, and protrusions hidden to create a sleek, stylistic line. A smooth, comfortable ride that did not require manual shifting was also important. But the really precedent-setting innovation is the idea for the Lime color peels, which allow you to customize and change the overall look of the bike.

"When people reminisce about favorite bikes from their childhood, the one thing they usually remember is color, such as 'I had a red bike that I really liked,'" Price adds. "With the Lime peel kit, you can choose from among six different colors to change the color accent of the grips, front hub, chain guard, and back hub. The bike is designed to be completely maintenance-free, and changing from one color peel to another is as easy as changing the sleeve on your IPOD.® The Lime product creates a precedent for fun, simplicity, and customization for the millions of new cyclists who will want to ride this bike."

Eckholm says that modern industrial design technologies, such as the SolidWorks 3D CAD system running on fast, powerful AMD Opteron 64-based workstations, allowed the Lime team to deliver an innovative, precedent-setting product and jumpstart a new market. "We went from nothing to something and from something to deliverable CAD data because of the power and compatibility of our SolidWorks 3D CAD and AMD Opteron processor-based tools," Eckholm stresses. "We needed these technologies to meet the Lime challenge and get the job done."

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#### About AMD

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