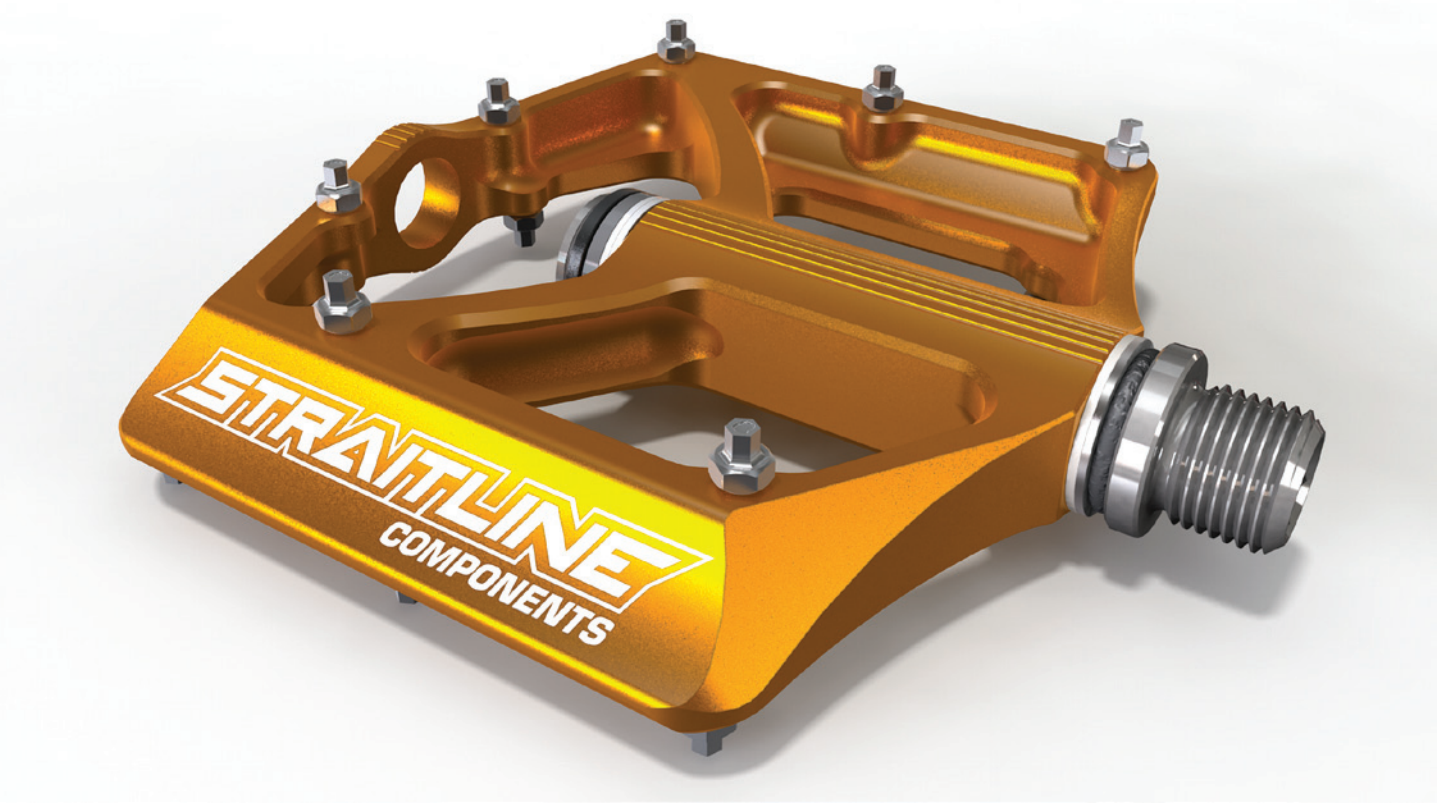
STRAITLINE PRECISION INDUSTRIES INC.

Getting gnarly on extreme bicycle component design with SolidWorks



Dennis and DJ Paulson are mountain bike riders who wanted to go faster, higher, and longer than possible with conventional bicycle components. So the brothers, who co-own the Straitline Precision Industries machining business in Victoria, British Columbia, started making their own gear and offered it to their friends. Their extra-rugged, custom-designed bicycle components became so popular with friends and extreme riders that the brothers launched the Straitline Components brand.

Today, Straitline Components has become the choice of professional stunt, BMX, dirt, and slope-style mountain bike riders. For example, one of the company's products—a hydraulic brake line detangler, which allows handlebars to spin without tangling brake lines—was featured on the "Edge Factor" TV show in an episode entitled "Gnarly Metal." Using this custom-designed component, professional rider Mike Montgomery won the Jumpship Dirt jump competition.

Straitline's rise from machine shop to bicycle part manufacturer presented challenges and required a different development approach than the AutoCAD® 2D tools used on early designs. "Our breakthrough product was a durable pedal that uses polymer bushings to provide a more stable platform for landing," DJ Paulson recalls. "While that product was very successful, we realized that we would need a 3D development platform to expand our product offering and take our operation to the next level."

"Our background is machining parts, so we understood how a 3D parametric CAD system and integrated simulation capabilities could help us," Dennis Paulson adds. "We need to work with expensive materials, such as titanium, and refine our strength and weight ratios without relying on cost-prohibitive prototyping. Almost all our machining customers use SolidWorks®, and we'd had such a good experience machining their parts—because the geometry is a lot cleaner on SolidWorks models—that we decided to move to SolidWorks."

SolidWorks design and simulation solutions have helped Straitline Precision Industries grow from a machine shop to the bicycle part manufacturer of choice for professional stunt, BMX, dirt, and slope-style mountain bike riders.

Challenge:

Push the limits of bicycle component design to support the increased loads and wear associated with extreme sports like stunt, downhill, and slope-style mountain biking.

Solution:

Implement SolidWorks design and simulation tools to more cost-effectively develop and test new concepts using virtual prototyping.

Results:

- Tripled product offering
- Cut physical prototyping in half
- Enhanced marketing with 3D imagery
- Showcased on "Edge Factor" TV show

SOLIDWORKS

"We switched to SolidWorks because we had witnessed the migration from 2D to 3D among our customers," DJ Paulson notes. "Everyone we spoke with said SolidWorks was the easiest-to-use 3D package and represented the best combination of power and value. We did a trial with Autodesk Inventor® just to make sure, but in the end, we agreed with what our customers told us. SolidWorks is the best solution to help us advance product development."

Expanding product line

Before Straitline implemented SolidWorks software, the company offered five basic products. Using SolidWorks design and simulation solutions, the bike part manufacturer embarked upon an intensive R&D program that has tripled its product offering to 15. "SolidWorks has not only enabled us to put a lot more ideas on the drawing board but also has helped us weed out the bad ideas and refine the workable, innovative concepts," Dennis Paulson stresses.

"There are many product ideas that we hadn't pursued because we couldn't figure out how to make them cost-effectively," DJ Paulson adds. "With integrated SolidWorks design and simulation tools, we can optimize our designs and evaluate performance on the computer."

Testing concepts on the computer saves time and money

Since moving to SolidWorks, Straitline has cut in half the time and cost associated with physical prototyping. Instead of machining actual parts for visualization and testing, the Paulson brothers can accomplish those functions in a virtual design environment.

"What makes us different from other component manufacturers is that we assume that everyone who uses our parts—from extreme to casual riders—will do their best to destroy them," DJ Paulson points out. "Our aim is to make the most rugged, dependable parts on the market. With SolidWorks simulation tools, we can identify areas of high stress and potential failure before we cut metal, which allows us to improve design performance quickly and inexpensively."

"We used to make a lot of prototypes for testing," Dennis Paulson says. "Testing is still crucial, but now we test the final prototype and have fewer performance issues, saving time and money."

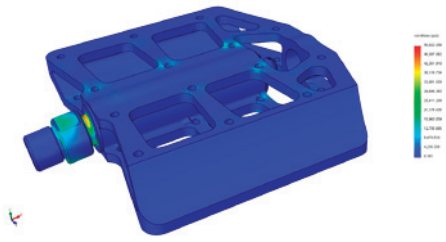
Showcasing achievements

Working in the SolidWorks 3D environment also allows Straitline to use 3D design imagery to market and showcase the technology behinds its products. On the "Edge Factor" TV show, Straitline was able to show an animation of a fluid dynamics simulation that was conducted to ensure that seals on the hydraulic brake line detangler were leakproof.

"SolidWorks Simulation capabilities allowed us to put the hydraulic brake line detangler through its paces—all on the computer screen—ensuring that the product was safe and effective before Mike Montgomery attempted his first stunt, jump, or ride," Dennis Paulson says.

"WITH SOLIDWORKS SIMULATION TOOLS, WE CAN IDENTIFY AREAS OF HIGH STRESS AND POTENTIAL FAILURE BEFORE WE CUT METAL, WHICH ALLOWS US TO IMPROVE DESIGN PERFORMANCE QUICKLY AND INEXPENSIVELY."

DJ Paulson
Co-Owner



The ability to simulate design performance allows Straitline Precision Industries to optimize parts and cost-effectively produce the most rugged, dependable parts on the market.

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