

*"We needed to develop a
virtual testing capability
to gain speed
and boost performance."*



One of Devinci Cycles' latest concepts, rendered in SolidWorks.
See how SolidWorks Simulation helped them improve performance on page 2.



SOLIDWORKS **SIMULATION** ALLOWS NONEXPERTS TO FULLY EVALUATE A DESIGN'S PERFORMANCE BEFORE EVER BUILDING A PHYSICAL PROTOTYPE

SolidWorks® Simulation helps you answer the fundamental question, “Do I have the right design?” Engineered specifically for ease of use, the software will quickly become a standard, integrated part of your design process. From the outset, you’ll be able to simulate real forces and actual product conditions as you design—and make any necessary modifications right on the spot. As a result, you’ll significantly cut down on prototypes, development cycles, and testing costs.

SolidWorks Simulation offers these key features:

- ▶ Vibration, optimization, mechanism, and nonlinear dynamics simulation
 - ▶ Comprehensive material testing capabilities
 - ▶ Flow simulation to optimize designs for liquids and gases
 - ▶ The ability to simulate virtually any real-world condition or force
-

This is the story of what SolidWorks Simulation can do for you, as told through the eyes of three SolidWorks customers.



Devinci Cycles



Nuvera Fuel Cells, Inc.



Dräger Medical

DEVINCI CYCLES

Specialty bicycle development



*"We wanted to find ways
to reduce the weight and
improve the performance
of our bicycle frames."*

SOLIDWORKS SIMULATION ENABLES PRODUCT DESIGNERS TO RUN COMPREHENSIVE ANALYSIS

Devinci Cycles is the top producer of mountain and road bikes in Canada. As an industry leader in high-end cycles, their design team was in search of ways to make lighter, stronger frames.

R&D Department Head Bruno Gauthier explains, "We needed to develop a virtual testing capability—using finite element analysis tools—to gain speed and boost performance." They gained these capabilities with SolidWorks® and SolidWorks Simulation.

Devinci Cycles' designers now use SolidWorks Simulation to run core analysis on materials, assemblies, mechanisms, forced vibrations, thermal conditions, and drop tests before ever conducting physical testing. By using SolidWorks Simulation throughout the design process, they've improved performance and optimized the

strength-to-weight ratio of their cycles—as well as ensured greater safety and avoided costly warranty issues.

"We have deployed the SolidWorks virtual bench test on road, mountain, and hybrid bikes. Our product development process has become faster and more efficient, and the quality of our bikes continues to improve," Gauthier says.

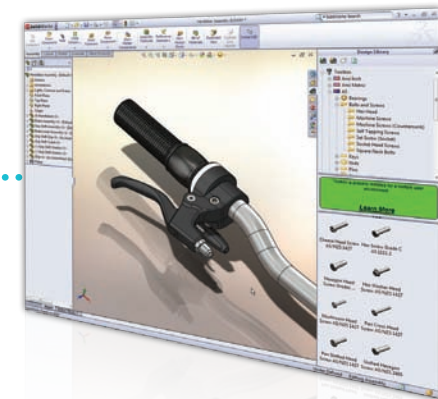
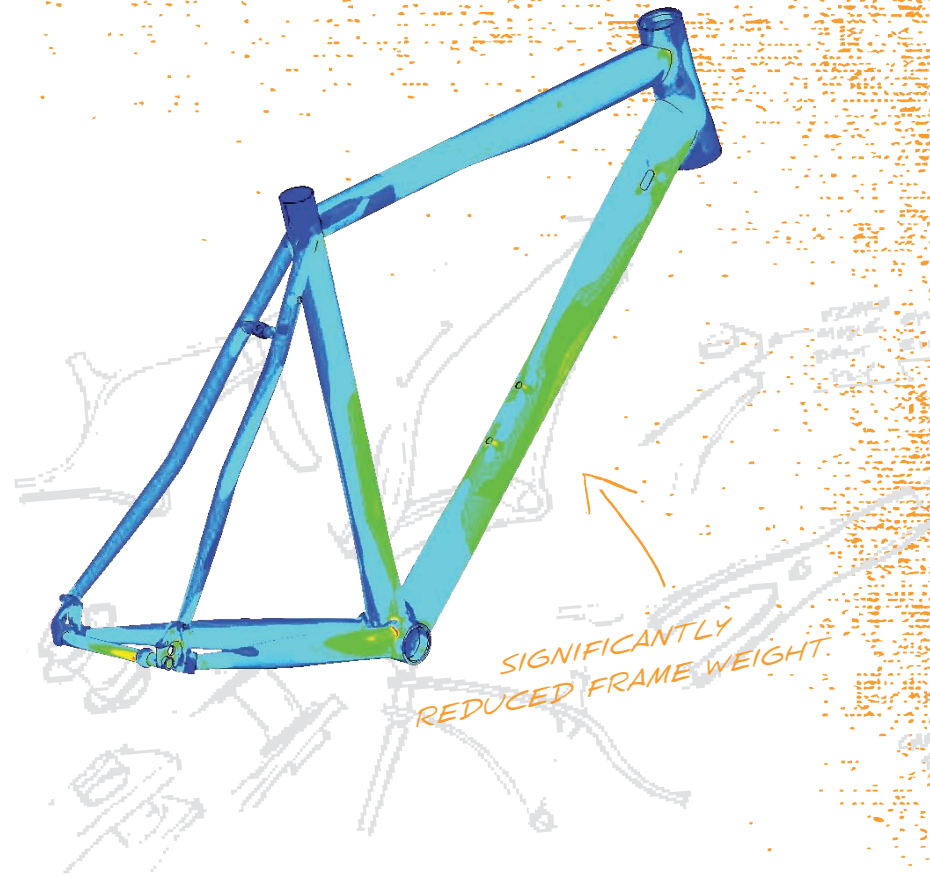
The company's latest innovation—the BIXI Public Bike System in Montréal—even won Gold for Best Product/Energy Sustainability in the prestigious 2009 Edison Best New Products Awards.

- ▶ Decreased number of prototypes from three to one
- ▶ Cut time-to-market from 18 to 10 months
- ▶ Reduced frame weight by an average of 25%
- ▶ Increased frame stiffness by an average of 30%
- ▶ Maximized time spent on concept development

▶ KEY BENEFIT

SIMULATE REAL-WORLD CONDITIONS RIGHT ON YOUR SCREEN

SolidWorks Simulation allows nonexperts to recreate virtually any condition a product will face during its life cycle and identify ways to make it stronger. You'll be able to accurately predict how components will interact and fatigue over time, how repeating loads will impact materials, and how a design will hold up in a drop test. Used as a standard part of your design process, these tools will help you create products faster and more cost-efficiently than ever before.



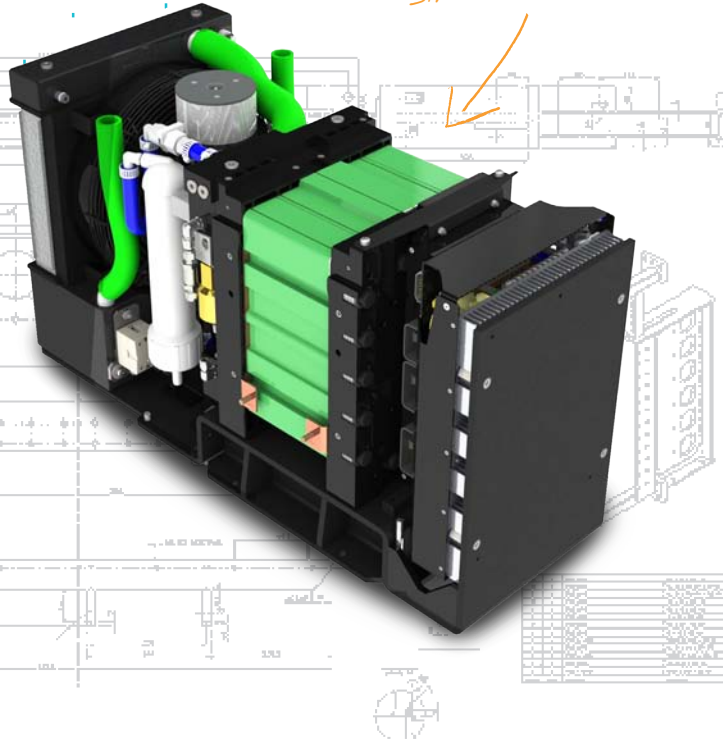
NUVERA FUEL CELLS, INC.

Hydrogen fuel cell technology and development

*"We are saving time and
controlling costs
at practically every step of the
development process."*

SOLIDWORKS SIMULATION ELIMINATES THE NEED FOR MULTIPLE PROTOTYPES

OPTIMIZED PERFORMANCE
THROUGH MULTIPHYSICS
SIMULATION



Nuvera Fuel Cells, Inc. is on the cutting edge in the development of hydrogen fuel cell technology used to power cars and industrial vehicles like forklifts. The company invests huge resources to ensure the water-to-natural gas conversion process behind their fuel cell technology is as efficient as possible. Historically, this meant a large share of their time and R&D budget had to be spent building physical prototypes.

To maintain their lead in a fiercely competitive, rapidly growing industry, Product Design Manager Anthony Macaluso knew the company needed to become faster. "To support our ambitious product development effort, we need to validate and manufacture innovative products quickly and cost-effectively." That led them to SolidWorks® Simulation.

By using SolidWorks Simulation throughout the design cycle—from large-assembly mold and sheet metal design to vibration, stress, and fluid flow simulation—Nuvera is now optimizing performance long before new products go to physical prototype.

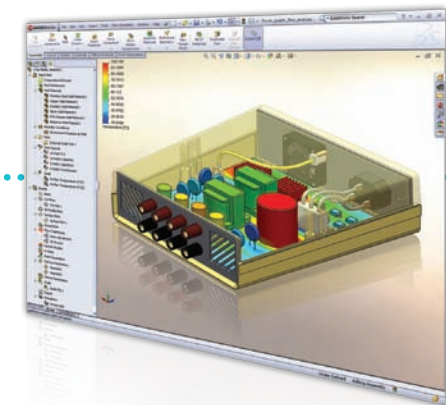
They're also shortening the development time of hydrogen generators and fuel cell batteries and decreasing the average production of physical prototypes from three to one. "At this point," Macaluso says, "we cannot imagine doing the work we do without SolidWorks."

- ▶ Shortened development cycles by 25%
- ▶ Cut development costs by 33%
- ▶ Reduced costs related to scrap by 20%

▶ KEY BENEFIT

SOLIDWORKS SIMULATION LETS YOU SPEND LESS TIME PROTOTYPING AND MORE TIME INNOVATING

Being able to virtually test your models early in the development process can lead to more impressive and successful final products. Because SolidWorks Simulation gives you the freedom to be more innovative with your design, you won't have to waste time or money building prototypes that may not work. That means you can test more ideas and speed up your time-to-market—differentiating both your product and your company in the process.



A middle-aged man with a grey beard and glasses, wearing a black long-sleeved shirt, is pointing his right index finger towards a whiteboard. He has a focused expression. The background is slightly blurred, showing what appears to be an office or laboratory setting with warm lighting.

*"I would have bet my mortgage that the
pressure fall calculated
by SolidWorks Flow Simulation
could not be correct, but..."*

SOLIDWORKS FLOW SIMULATION PREDICTS THE PRECISE BEHAVIOR OF ANY LIQUID OR GAS

As a world leader in anesthesia and critical-care equipment, Dräger Medical designs products for use in actual life-and-death situations. Because neither their customers nor their business can afford any mistakes, the company had always conducted exhaustive testing using physical prototypes; however, the cost of these prototypes was cutting sharply into their margins.

With an ambitious goal of slashing their product development time in half, Dräger implemented SolidWorks® Flow Simulation. Since the software integrates seamlessly with SolidWorks, designers were able to test assemblies early in the design phase.

They first used the software to analyze gas flow into an anesthesia unit ventilation system. Since this system determines how much oxygen a patient is getting, it was

absolutely critical that the calculations be correct. Development Engineer Karsten Hoffman was skeptical at first. “I would have bet my mortgage that the pressure fall of only 0.2 mbar for 60 liters calculated by SolidWorks Flow Simulation could not be correct, but when we built the prototype, it was clear that it was.”

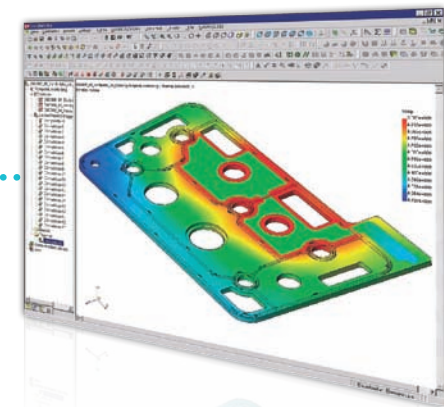
On another redesign initiative, the company took a project that had cost them \$26,000, multiple prototypes, and three months to test—and using SolidWorks Simulation, they achieved the same results in just two afternoons.

- ▶ Reduced design cycle by 50%
- ▶ Slashed analysis time from three months to two days
- ▶ Cut total prototypes from eight to two
- ▶ Enabled designers to run analysis early in the design phase

▶ KEY BENEFIT

OPTIMIZE YOUR DESIGNS FOR ANY LIQUIDS OR GASES

SolidWorks Flow Simulation lets you instantly determine how a design will react to fluid flow and simulate how gas, heat, air, and steam will move through pipes and nozzles. For engines and motors, the software reveals how fluids will react internally and externally. Based on these tests—along with pressure and thermal simulations—you’ll be able to optimize your designs for the flow of any fluid.





SEE WHAT SOLIDWORKS SIMULATION CAN DO FOR YOUR BUSINESS

You've seen the impressive results SolidWorks® Simulation has yielded for companies in three completely different industries. Now learn how this intuitive software can help your firm make more cost-efficient, better-performing designs. Talk to your local SolidWorks Value-Added Reseller or visit www.solidworks.com to learn more about all the features of SolidWorks Simulation.

SIMULATION PRODUCT FEATURES	SOLIDWORKS PREMIUM	SOLIDWORKS SIMULATION PROFESSIONAL	SOLIDWORKS SIMULATION PREMIUM	SOLIDWORKS FLOW SIMULATION
Assembly and Mechanism Simulation	●	●	●	
Predict Product Failure	●	●	●	
Event-Based Motion		●	●	
Compare and Optimize Design		●	●	●
Simulate Natural Frequencies		●	●	
Predict Buckling or Collapse		●	●	
Simulate Heating or Cooling		●	●	●
Simulate Drop Test		●	●	
Simulate Fatigue		●	●	
Simulate Plastic and Rubber Components			●	
Simulate Composites			●	
Simulate Forced Vibrations			●	
Nonlinear Dynamics			●	
Fluid Flow Simulation				●

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LET'S GO
DESIGN

