Hobie Designs

SURF PIONEER HOBIE DESIGNS TURNS TO SOLIDWORKS, NEXTENGINE, AND RAPIDTECH TO CREATE A BETTER PADDLE

- Stand-up paddling, or "SUP," is an increasingly popular blend of kayaking and surfing.
- Hobie Designs needed help executing ideas for a SUP paddle that would improve performance and comfort.
- RapidTech helped Hobie by scanning a hand-carved paddle knob with a NextEngine Desktop 3D Scanner, refining the design in SolidWorks 3D CAD software, and turning over the final design to Hobie's mold-maker.
- Pro SUP racers are winning with the new design, and customers are loving it.

In the Hawaiian islands they call it *Hoe he'e nalu*. On the mainland, it's *stand-up paddling*, a fun, comparatively easy blend of surfing and kayaking that delivers a great core workout. Unlike surfing, you can "SUP" on any surface from the Banzai Pipeline to a glassy lagoon.

Hobie Designs, the corporate descendant of Southern California's first surf shop, carries an extensive line of SUP boards optimized for flatwater, recreational riding, and competition. The Hobie SUP racing team regularly brings home trophies from exotic locations around the globe.

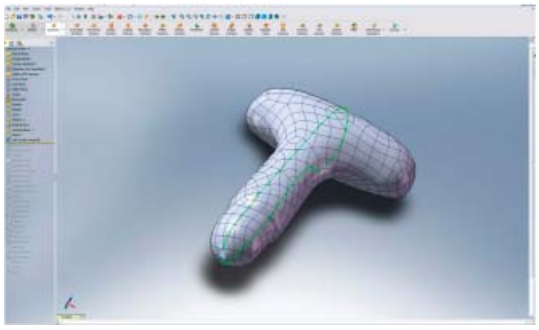
After introducing the world's highest-performing SUP boards, Jeff and Hobie Alter Jr., sons of legendary company founder Hobart Alter, went to work on their first SUP paddle. As lifelong competitive surfers, Hobie Cat sailors, and more recently SUPpers, the brothers have an intimate understanding of how great equipment must look, feel, and perform.

SolidWorks NEXTENGINE RapidTech NATIONAL CENTER FOR RAPID TECHNOLOGIES

"The 3D scanning, CAD, and prototyping process helped us deliver this new concept as fast as we could conceive it, and now customers get to reap the rewards."

Jeff Alter
President, Hobie Designs.

The NextEngine 3D Desktop Scanner captures data from every perspective.



The file is imported into SolidWorks software.

Challenge: A better paddle design

"We tried every SUP paddle on the market," says Jeff Alter. "Some were good, some were bad, but none was even close to perfect. The trickiest part is easily the knob, which is crucial for performance. We wanted our knob design to start with the best qualities of what already existed and then reflect our innovations."

While they were brimming with ideas, the Alters needed help converting these ideas into reality. Since they are designers, not manufacturers, the brothers enlisted RapidTech, a National Science Foundation-funded digital manufacturing center of excellence in Mission Viejo, Calif.

Strategy: Digitizing a hand-carved prototype

First, the Alters carved a few knobs out of fiberglass and Bondo. They knew they could improve on paddle comfort and leverage. With that understanding, the shaping process was largely intuitive based on decades of competition and recreation on the water.

When they settled on a design that felt close, they handed it over to RapidTech and charged the organization with digitizing the design for easier refinement, prototyping, and ultimately manufacturing. RapidTech tackled the job with a NextEngine 3D Desktop Scanner and SolidWorks® 3D CAD software.

Step one was precisely capturing the surfaces of the hand-carved knob and converting it into a digital model that could be manipulated on a computer. RapidTech used NextEngine to capture 10 digital point clouds from 10 different angles.

At this point, earlier-generation 3D scanners would require the designer to laboriously stitch all the images together in a coherent 3D whole. NextEngine software, however, infers the relationship between multiple facets and instantly knits them together in a cohesive model. In instances where it matters, full color is locked to geometry.

After confirming the model was complete, RapidTech imported the file into SolidWorks software. Because NextEngine is a SolidWorks strategic R&D Partner, the NextEngine scan data was treated as a native 3D model in SolidWorks.

Refining the design in 3D CAD

Ben Dolan, RapidTech's manager of manufacturing technology, used SolidWorks to convert the solid body into a surface body for easy manipulation. He took the Alters' favorite part of the knob, the upper-left quadrant, cropped it, mirrored it, and filled in the rest using the scanned model as the foundation. After extruding a tube that would mate with the paddle shaft, Dolan rendered the knob in glossy candy apple red to expose any remaining surface imperfections. With the surface perfected, he rendered it in a carbon fiber texture for a sneak preview of what the manufactured part would look like.

The SolidWorks part model was exported as a STL file and printed as a plaster model with a Z Corporation 3D printer. Dolan sanded it to a fine finish, then gave it to the Alters, who considered the concept prototype, sent it back for refinements, and repeated the cycle two more times.

Scanning in progress.

Eventually, the brothers confirmed they had found a design deserving of more field testing. The design was different from existing SUP paddle knobs. It was flexed for greater leverage so that athletes can keep their wrists in a strength position. And it had a divot-like dent for the fatty part of the thumb, providing more surface contact for comfort and power transfer.

Next, RapidTech used the 3D data to print and then cast some hard resin models. Using these fully functioning prototypes, the Alters confirmed the designs at twilight in the same Pacific waters where a half a century ago their father christened his breakthrough foam-and-fiberglass surfboards. RapidTech sent the final approved CAD data to Hobie's moldmaker for production tooling.

Results: A winning design

A few days later, Hobie pro racer Byron Kurt grabbed the first paddle off the line and used it to win the Ta Hoe Nalu Stand Up Paddle Classic at Lake Tahoe. He also won a grueling 11-city, Tour de France-style SUP stage race in the Netherlands.

"This development process was fantastic for us," says Jeff Alter. "The carved knob reflected our initial notion, but we needed RapidTech to scan it to a digital file, let us evolve the design, and help ensure all surfaces and features were smooth, sleek, and symmetrical. RapidTech was fast, accurate, and affordable."

Actual work time, according to the RapidTech invoice: 30 minutes of scanning and 7.5 hours of CAD modeling, which includes four different handle iterations.

"It was really easy to get this work done quickly," says Dolan. "NextEngine and SolidWorks are both powerful tools that are surprisingly easy to use, and they work well together. The scanner is very reliable, and the scanning setup can be wickedly fast. In this case, I just teed it up on the AutoDrive part positioner and started shooting. Since SolidWorks is parametric, every tweak to the model was relatively simple, and dependent dimensions and features all changed automatically. I've used and taught a number of CAD programs in the past, but I always come back to SolidWorks because it lets me and my students focus on the design, not on learning software."

The Hobie SUP paddle is now on the market in pure race, performance, and all-around models fabricated in different grades of carbon fiber and high-performance plastic. "Consumers love the ergonomic handle, the ovalized shaft for comfort and control, and the angled blade," says Alter. "When they pick up the paddle, customers can tell we love the sport and live the sport. You can see them light up and relax at the same time. The 3D scanning, CAD, and prototyping process helped us deliver this new concept as fast as we could conceive it, and now customers get to reap the rewards."

For more information….

www.hobie.com
www.solidworks.com
www.nextengine.com
www.rapidtech.org

SolidWorks

Dassault Systèmes SolidWorks Corp.
300 Baker Avenue
Concord, MA 01742 USA
Phone: 1 800 693 9000
Outside the US: +1 978 371 5011
Email: info@solidworks.com
www.solidworks.com

HOBIE

Hobie Designs Inc.
32921 Calle Perfecto #B
San Juan Capistrano,
California 92675

www.hobie.com