



June 2008 Edition

CNC MACHINING

Solutions by Seatorque

Using the latest technology, Peter Stolper builds a better boat driveshaft

Is it hard to argue with tradition?

"Not really," quips marine manufacturer and former America's Cup racer Peter Stolper. "Especially when that tradition is an old technology that's had no real development for 200 years."

Peter and his wife Jana recently founded a company to solve a problem that has plagued boatbuilders since the first propeller shaft was tentatively poked through a hull.

To transfer power from an inboard marine engine to a propeller outside in the water, it takes a driveshaft — and a watertight hole in the boat for it to pass through.

"Packing rope and whale grease was the original technology," notes Peter.

"And with the exception of a few newer materials," adds Jana, "that's still usually the way it's done: a drippy old stuffing box squeezing a hard-to-turn shaft."

An idea rises to surface

The Stolpers had a better idea. Armed with a completely sealed driveline design, Peter and Jana launched Seatorque Control Systems in 2005. Their 10,000-sq-ft operation in the marine manufacturing mecca of Southern Florida produces watertight, enclosed shaft systems that run through low-friction thrust bearings. The power-robbing stuffing boxes are gone.

Seatorque markets the innovative bolt-on packages to a growing list of boatbuilders all over the world. After winning multiple international design awards in 2006, the product attracted lots of industry attention. Now, Seatorque's engineers and machinists can barely keep up with demand.



Completed propeller-end housing and thrust housing parts fill a pallet at Seatorque Control Systems.



The 10,000sqft Seatorque shop is built around Haas CNC machines.

The Stolpers first began making the driveline systems to supply their own boat-building business. Seatorque was their Mechanical Manufacturing Division.

"We did it with manual machines, which was traditional for the industry," remembers Jana. "When we transitioned Seatorque into a standalone manufacturer for other OEM builders, we needed to greatly increase production. We added CNC."

The Seatorque shop is built around Haas CNC machines featuring a TL-3 Toolroom Lathe, a TM-2 Toolroom Mill, and an SL-20 turning center with an automatic bar feeder.

"It's a good package," Jana notes, "and since we're just getting our feet wet in CNC, Haas has given us a lot of personal attention."

"I studied engineering in the days when 30 percent of your time was devoted to machining," says Peter. "We had to know how to make things, rather than just design them. So stepping into CNC has been another learning experience for us."

'What used to take five days to do manually, we do in five hours on this equipment, so the math was easy.' Peter Stolper

"My whole approach is, 'If you don't know anything about something, jump right in.' So we took a Haas school, and a training session with MasterCam, and started writing programs straight away. It really didn't take long to figure out how to make parts in the most effective way.

"We're now using the Haas machines for just about everything," says Peter.

The operation uses 4140 steel billets for couplers, 6061 aluminum billets and bronze castings for the thrust and propeller housings, and precision-ground 22-percent-chrome stainless bar stock for the drive shafts.

Significant savings of time

"What used to take five days to do manually, we do in five hours on this equipment," Peter adds. "So the math is easy."

The volume work in aluminum and bronze is done with standard tooling and flood coolant, holding tolerances down to 0.0005".

"The chrome stainless doesn't require anything too exotic," explains Peter. "But we're moving to the most effective tooling and through-spindle coolant for almost all of our production."

Haas Toolroom series machines are considered transitional machines that can be used in either CNC or traditional manual modes, but Seatorque opts to use the uncomplicated equipment for full-on CNC production only.

"There's efficiency in simplicity," says Jana. "They're simple to set up and use, and we bought only Haas CNC machines so we'd have the same controls throughout."

The shop custom-sizes their driveline packages to fit a range of vessels from 37ft to 200-ft long.

"We started under the misconception that that we would be supplying mostly small systems in the beginning," says Peter. "It's turned out to be exactly the opposite — we find ourselves at the top of the market. The larger shafts are exceeding our current CNC capacity, so as we continue to expand into the rest of this building complex, we plan to get larger Haas hollow-spindle machines."

Boat manufacturers are discovering that Seatorque's driveline delivers more propulsion power with less vibration, leakage, and maintenance than any other system.



Jana and Peter Stolper. Peter Stolper was born in South Africa and raised in the United Kingdom. He first came to the United States in 1982 as a member of the British America's Cup team, the British Victory Syndicate. Though trained as a mechanical engineer, he served as the team's electronics engineer. Peter is a recognized fluid dynamics expert, and holds multiple U.S. and global patents for hull technology and driveline design.



But Peter recalls philosophically, "I originally designed this system just to get around the headache of aligning the driveshaft. As a boatbuilder, you spend all that time aligning to within four-thousandths of the transmission shaft, and as soon as you put the boat in the water, everything moves. I became convinced that all the people who manufactured traditional marine-shaft components had obviously never tried to build a boat with them."

"It's the same in a lot of industries," says Jana. "People overlook the obvious, and stick with tradition."

But Seatorque's revolutionary driveline concept is as simple as it is elegant.

When asked why hasn't anyone considered something like this before, Peter quips, "Because it's just too simple."