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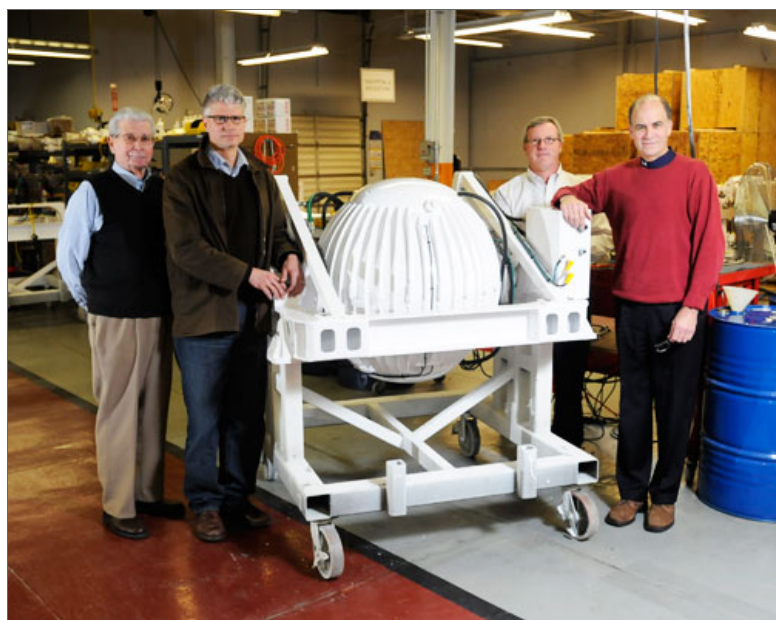
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Published March 6, 2012

Seakeeper's spin doctors

A former machine shop in Mohnton makes complex gyroscopes that tame wave motion on boats.



In Seakeeper Inc.'s Mohnton plant with a gyro stabilizer made there are, from left, Bill Moser, longtime JOMA Machine owner; Bob Moser, Seakeeper vice president of manufacturing; Thomas J. Goeke, chief operating officer; and John D. Adams, co-founder. Seakeeper recently acquired JOMA.

By *Ford Turner*
Reading Eagle

Inside some century-old brick buildings tucked off to the side of hilly Mohnton borough, a genie is being released from its bottle every working day. It is the power to tame the waves. The people closest to it, the ones who make the device that negates much of the rolling motion when boats put to sea, use words like magical and genius to describe the concept behind their product. It is a dazzlingly sophisticated new version of an old gadget, the gyroscope.

Its heart is a spindle-mounted metal flywheel that weighs more than 500 pounds and spins so fast that its outer edge moves at about 600 mph.



In Seakeeper Inc.'s Mohnton plant with a gyro stabilizer made there are, from left, Bill Moser, longtime JOMA Machine owner; Bob Moser, Seakeeper vice president of

TEST

Enormous force is generated within the spinning flywheel. As with a gyroscope, it will fight a force that attempts to tilt it — like the rocking of waves.

The device goes inside the hull of a boat. It is called a gyro stabilizer. The full retail price for the most popular version is \$89,000.

Seakeeper Inc. of Maryland, founded by Shepard W. McKenney and John D. Adams, has made Mohnton the only manufacturing site for its devices. They are installed in yachts and similar-sized boats all over the world, in places like Dubai and China and Turkey and Brazil.

The prototype was finished in 2007. More than 300 gyros were produced last year.

The potential market seems vast.

The questions faced inside the former machine shop in Mohnton are welcome ones.

"How do you make more?" asked Bob Moser, a Gov. Mifflin High School graduate and Seakeeper vice president of manufacturing. "How do you use your people the best you can to make these for a multitude of boats?"

The evolution of JOMA Machine

The challenges seem less formidable when Moser looks back.

So much has happened.

His father, Wilhelm "Bill" Moser, came to Berks County from his native Switzerland in 1963. He had a degree in mechanical engineering and had been hired by a Temple machine shop.

His wife came soon afterward. They never left.

"I thought it would be a couple of years," Bill Moser said. "Bob was born. We had a daughter. They went to school and made friends."

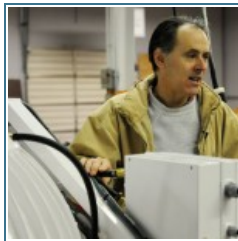
Bill Moser became a lifelong student of precision machining. In the late 1960s, he joined the ownership of JOMA Machine, a contract machine shop in Bern Township. Eventually, JOMA moved to Shillington and, in 1998, to Mohnton.

JOMA acquired a reputation for precise work. It could hone metal objects to tolerances as thin as one-twentieth the width of a human hair.

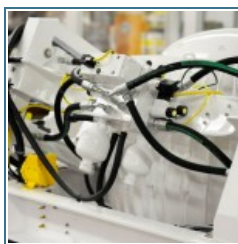
Its customers included AMP and AT&T. It assembled a team of managers and machinists dedicated to precision.

They included Bill's son, Bob.

manufacturing; Thomas J. Goeke, chief operating officer; and John D. Adams, co-founder. Seakeeper recently acquired JOMA.



Kent Fadeley, Seakeeper Inc. research and development engineer, explains how the internal gyro works, by keeping itself parallel to the horizon and exerting the force into the boat's frame, smoothing the ride.



Hydraulics and coolants help transfer the heat created from the internal mechanism housed in a helium vacuum.



Base frames for the gyro stabilizers.



An internal testing facility in Seakeeper's R&D area can simulate cold, high heat and repeated wave motions.

The younger Moser had joined the Marines at age 20. He manned 155 mm howitzers as the U.S. swept into Kuwait during Operation Desert Storm in 1991. He returned home and took a job at JOMA.

In 1995, he took over sales. Eventually, the Mosers, father and son, became sole co-owners.

The company grew at a rate of about 15 percent a year for a decade. A watershed moment came about six years ago, when JOMA was asked to make a heavy, fast-spinning metal flywheel and the enclosure that went around it.

The parts were for Seakeeper's proposed new gyro. Bill Moser recalled the thrill of the first time he saw the gyro blueprints.

"I just said, 'This is it,' " he said.

Revisiting an old idea

With Seakeeper, McKenney and Adams set out to update a long-dormant concept.

Inventor Elmer A. Sperry created the first gyroscopic stabilizers prior to World War I. They counteracted wave motion in large Navy and civilian vessels. But his concept eventually fell into disuse.

McKenney and Adams realized no one had updated Sperry's concept with 21st century technology.

They formed Seakeeper in California, Md., in 2002. The pair worked toward a design that would be far smaller than Sperry's.

A central question, Adams said, was how to get the size, weight and power to where it is practical for small boats.

One answer was the use of a vacuum.

A flywheel spinning in a vacuum, without friction caused by air, would spin much faster, generating more of the gyro's motion-resisting force, known as angular momentum.

The device they ultimately designed looked like a large, ribbed, metal beach ball, with the flywheel on its spindle inside.

It required precise machining. Seakeeper visited several machine shops and chose JOMA.

"We liked the people so much," McKenney said. "We felt that they were the ones that had the capability, and the relationship just grew."

The genie unleashed

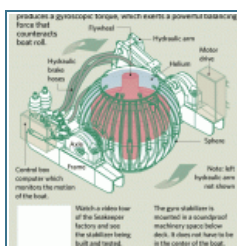
The updated concept became a success.

Rolling was greatly reduced in boats with the Seakeeper gyro.

Jim Cullum, a Mohnton resident who is machining manager at Seakeeper, had been with JOMA for more than 20 years when it made the first Seakeeper gyro. He also was a lifelong fisherman and had owned three different boats.



Machinist Bob Maurer moves a machined flywheel onto a pallet at Seakeeper Inc. in Mohnton.



When he went out on a gyro-equipped boat, the difference was huge.

"People go out on these boats, and they aren't going to want to be on a boat without one," Cullum said.

Bob Moser and his father said they saw passion and ingenuity in the company and its concept.

"Everybody who was in touch with it had a sense that this product was special and that we could dedicate ourselves to it," Bob Moser said.

JOMA became Seakeeper's first and only manufacturing plant.

It produced about 25 gyros in 2008 and approximately doubled production in each of the following two years — in the teeth of a drastic economic downturn.

Some of JOMA's employees had to learn new skills. Their plant no longer just ground and machined metal parts; it had to create key parts, then assemble, test and ship a complex device with hundreds of components.

The stories of the two companies had become intertwined. In April, JOMA was acquired by Seakeeper.

No jobs were lost.

Small company, big idea

Now, Seakeeper has about 60 employees, with 45 in Mohnton at the manufacturing plant and the rest at the Maryland headquarters.

Bob Moser is deeply involved from his executive position in manufacturing, and his father continues to work in mechanical engineering for Seakeeper.

Thomas J. Goeke joined the company as chief operating officer late last year.

In his previous job, Goeke had responsibility for 20 sites with thousands of employees. The lure of the gyro was part of the reason Goeke, who started his career in toolmaking and engineering, joined Seakeeper.

"It's a sexy business," Goeke said.

Half of Seakeeper's gyros go into existing boats, and the other half go into new ones. Goeke divides the potential market into various categories based on boat size. The total number of boats in those categories, worldwide, is vast.

"We are in 1 percent of the market," Goeke said. "Realistically, we are only dabbling, at the moment."

The challenge, he said, is to ramp up production within a confined setting.

"We are in an existing business park with very complicated buildings that require enormous reconfiguration," he said. "There are limitations."

Anne Snyder was hired by JOMA in 1998. Now, she does purchasing and manages a Seakeeper computer system.

Bear, her part-Lab, part-pit bull mix, often is curled up beside her. He is mellow and quiet, as Seakeeper's section of Mohnton appears to be.

Appearances are deceiving, Snyder said.

A small company has come up with something big. It was her good fortune, she said, to work with people who have harnessed the mysterious power of the gyroscope.

Snyder said, "It is genius."

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Watch the video



About Seakeeper Inc.

The Maryland-based company last year purchased JOMA Machine in Mohnton and has made the former machine shop its only manufacturing facility for gyro stabilizers, which negate much of the rolling motion in yacht-sized boats.

Founded: 2002.

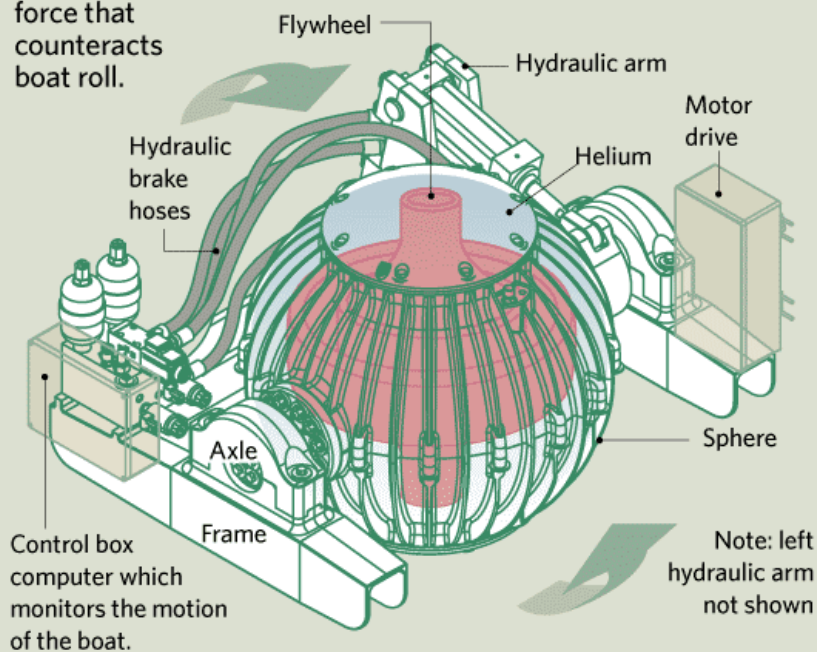
Location: California, Md.

Employees: About 60, including about 45 in Mohnton.

Main product: Gyro stabilizers.

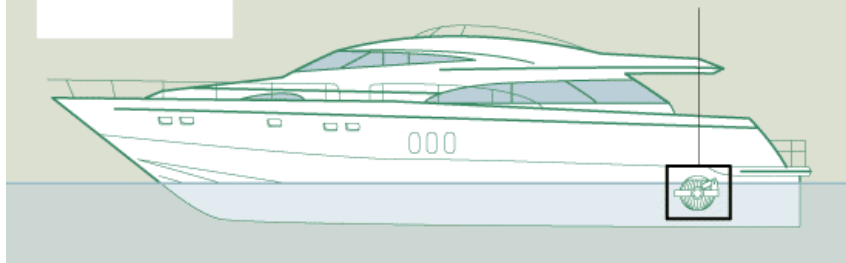
How the Seakeeper gyroscopic stabilizer works

The Seakeeper gyro stabilizer taps into the same kind of forces that are unleashed when a gyroscope spins. Seakeeper uses modern technology to take the old concept to a new level. Inside its product, a vacuum is created, virtually eliminating air friction. A heavy metal flywheel spins inside the enclosure at speeds of up to 8,000 rpm – so fast that the outer edge of the flywheel moves at 600 mph. The angular momentum of the flywheel produces a gyroscopic torque, which exerts a powerful balancing force that counteracts boat roll.



Watch a video tour of the Seakeeper factory and see the stabilizer being built and tested.

The gyro stabilizer is mounted in a soundproof machinery space below deck. It does not have to be in the center of the boat.



Source: Seakeeper

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