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Long Ocean Voyage Set for Vessel That Runs on Wave Power

By JOHN GEOGHEGAN

On Sunday, a boat will sail from Honolulu on a planned voyage of 3,780 nautical miles, powered just by the wave action of the sea.

The craft, the Suntory Mermaid II, is promoted as the first oceangoing, wave-powered boat. If it completes its maiden voyage from the Hawaii Yacht Club to the Kii Channel off the east coast of Japan, it will show that an environmentally friendly wave-powered boat not only works in the laboratory, but can also navigate in real-world conditions.

And the journey would set a record for the longest trip by a wave-powered vessel.

Dr. Yutaka Terao of the department of naval architecture and ocean engineering at the Tokai University School of Marine Science and Technology is responsible for engineering the propulsion system for the Mermaid.

“Fossil fuel will run out one day,” Dr. Terao said. “So I have studied wave propulsion as a promising way to save energy.”

He has been doing so for more than 20 years.

The Mermaid propulsion mechanism is mounted under the bow and not the stern, and it is designed to pull the boat, rather than push it forward, regardless of weather, wave height or direction.

The mechanism consists of two side-by-side horizontal fins that move up and down with the motion of the waves to create a dolphinlike tail kick that propels the boat.

“A wave-powered boat can transform wave energy into a propulsive power that moves the craft forward,” Dr. Terao said.

He conducted his first large-scale test of a “wave devouring boat” in partnership with Dr. Hiroshi Isshiki of the Hitachi Zosen Corporation in 1988.

The test was on Suruga Bay, near Mount Fuji, and used a single 12 1/2 -foot fin mounted on the bow of the Tokai University teaching vessel. The test was considered a success when three-foot waves propelled the 20-ton boat at 2 knots.

The test did not bring interest from shipbuilders. To improve efficiency, Dr. Terao arrived at the two-fin configuration.

According to an English patent application, wave-powered boats have been in development since at least 1895. In 1935, Popular Science reported that an 18-inch model of a wave-powered boat traveled five miles per hour in a test off Long Beach, Calif.

Until now, tests of wave-powered boats have been small scale or in simulated conditions. This is the first time a three-ton wave-powered boat has been tested over thousands of miles.

“I am not aware of any attempts by a wave-powered boat over such a distance,” said R. W. Yeung, a professor of naval architecture and ocean engineering at the University of California, Berkeley. “They could be successful, but it’s a risky undertaking. It depends a lot on weather conditions.”

The Guinness Book of World Records lists the captain of the Mermaid, Ken-ichi Horie, 69, as holding two records for piloting environmentally sensitive boats. In 1993, Captain Horie set a 4,660-nautical-mile record in a human-powered pedal boat. The record, in 1996, was for the fastest Pacific crossing in a solar-powered boat, 148 days.

Captain Horie has run successful sea trials of the Mermaid. Progress of the coming voyage can be tracked at www.suntory-mermaid2.com.

Mr. Horie will have access to a sail and a motor if the wave-powered mechanism fails. In case of an emergency, the motor can also be used to recharge the batteries on the boat.

The Mermaid may set a distance record, but it will not break any speed records. Traveling at an average three knots per hour, the trip from Hawaii to Japan should take two and a half months, meaning the Mermaid is not expected to arrive at its destination before the end of May.