DEFEATING DRAG vane ATTEMPT

Heesen Yachts and Van Oossanen Naval Architects team up to foil physics again.

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Van Oossanen has tested its Hull Vane theory in tanks and in actual practice on freighters. Heesen Yachts is building the first yacht using this patented design that is predicted to reduce drag by 18 percent.

Yachts may be all about relaxation, but Dutch companies Heesen Yachts and Van Oossanen Naval Architects are modernizing yacht design by putting physics to work. Following Van Oossanen's 2011 Fast Displacement Hull Form development, which Heesen snapped up for a 213-footer now well along in build, at the 2012 Monaco Yacht Show, the duo released the specifics on a 139-footer with a patented foil assist that Van Oossanen says will reduce resistance by 24 percent at maximum speeds and achieve an average 18 percent reduction of drag across the speed range.

Van Oossanen calls the device a Hull Vane. It is a foil positioned well aft below the hull of a ship or yacht in a specific location by means of struts or sponsons. The device delivers a thrust force and changes the pressure distribution on the hull, thereby reducing resistance. The Hull Vane extends laterally across the beam and it does not affect the maximum draft as the position is not lower than that of the propellers. It also does not extend outside of the footprint of the yacht hull.

Van Oossanen began working on the solution for commercial ship application but when realizing through tank testing and real life trials that the foil was more effective the faster the ships moved (on a Froude number basis), the application for yachts seemed logical. For cargo ships, the fuel savings ranges from four to fifteen percent by being able to maintain passage-making speed at lower rpm.

Computer studies for a number of displacement motor yachts predict a fuel savings of up to 25 percent. This led Heesen Yachts to sign a licensing agreement for the application of the Hull Vane to their displacement motor yachts, beginning with the 42M, a 139-footer with a 29-foot, six-inch beam. It is scalable, however, and Piet van Oossanen says he has carried out a study on its effect on the world's largest container ships on behalf of Maersk and Hyundai.

Equally as important as the fuel efficiency is the Hull Vane's positive effect on motion. When the bow pitches upward on a wave, the foil produces an opposing upwards force at the stern, and vice versa when the bow pitches downwards into a wave trough. The result is a much more comfortable motion in heavy waves, asserts Piet van Oossanen. "The Hull Vane decreases the pitch and roll amplitudes of the hull by about fifteen percent because of the extra damping provided—not enough to affect

the size of the stabilizer fins to a significant degree, however," he says.

At a design displacement of 350 tons, Heesen's 42M will achieve 15.9 knots demanding 2 x 1,080 kW (1,448 hp) from the pair of MTU 12V 2000 engines. At the cruising speed of 12 knots, the power requirement is only 2 x 240 kW or a total of 643 hp, a remarkable figure. The fuel consumption figures are correspondingly low and the yacht will have a range of 4,000 nm.

The exterior lines are by Frank Laupman of Omega Architects. Laupman's bow design combines a lower hull profile and a "knuckle" halfway up the bow adding dimension in the living area without distorting the length-to-beam ratio—another important item for hull efficiency.

This innovative Heesen already has an owner and is due for delivery in 2014.

Owners of Hull #1 have two master suites; one positioned on the upper deck aft includes a gymnasium. The second is located on the main deck forward and has a balcony on the starboard side, a studio and a large walk-in closet. Big windows appearing as continuous glass further the guests' proximity to the ocean.