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Being more efficient than conventional fins with more compact hydraulic actuators, Vector fins are ideally suited to 50-70ft craft like the Princess 56

Sleipner Vector fins

Are curved stabilisers the shape of the future?

It may not be possible to square the circle but you can bend a straight line – often to good effect. Sleipner appears to have done just that by taking a perfectly good stabiliser fin and bending it into a banana-shaped curve.

Sleipner's new Vector zero-speed fin stabilisers may look a little odd on first acquaintance but they make use of the basic laws of hydrodynamics to improve the performance of a conventional straight fin by up to 50%.

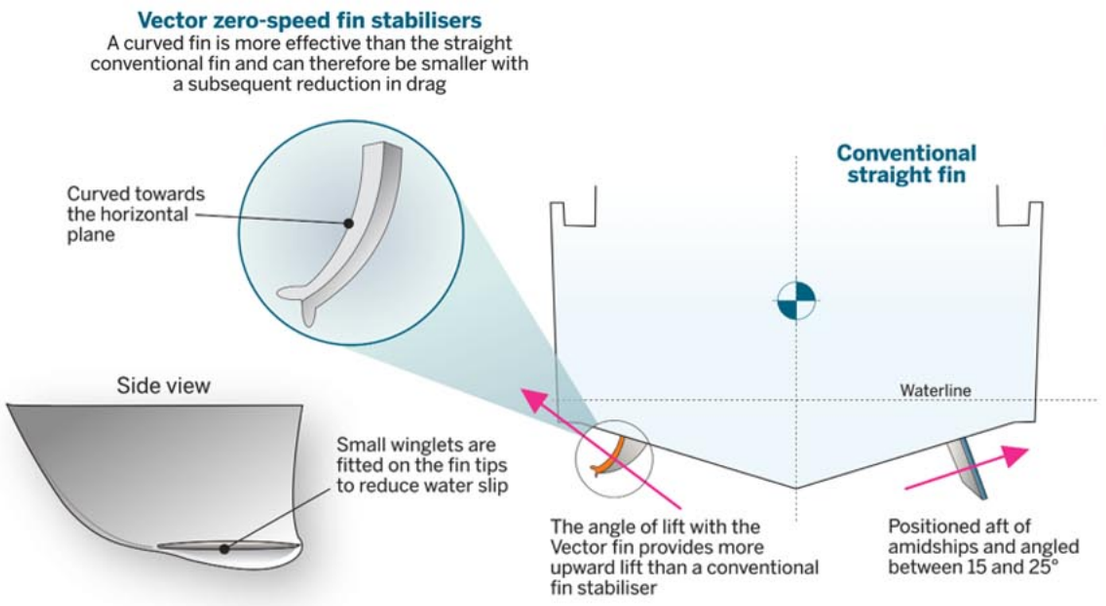
If its claims are justified, the Vector fin could revolutionise the market for fin stabilisers, particularly in the 50-70ft market. It may also blur the lines between the accepted pros and cons of fins versus gyros due to the system's rapid response and impressive efficiency. Sleipner also claims that they offer less drag than normal fins.

FIN FACTS

According to Sleipner, the Vector fin reduces roll by a massive 50% over a straight fin of similar size and power – a bold claim but a plausible one when you see how it is achieved. Conventional fins protrude below the waterline aft of amidships. Depending on hull shape and position they tend to sit at an angle of between 15° and 25° to the vertical axis about which the boat pivots. When the boat rolls to starboard the actuators quickly rotate the starboard fin so the trailing edge is lower than the leading one. As a result higher pressure is created on the lower side of the fin and lower pressure on the upper side. In effect the upper side of the fin is sucked upwards countering the rolling motion to starboard. The port one does the exact opposite pushing the port side down at the same time and vice versa.

Under way the movement can be kept relatively small but at anchor the movement has to be larger and faster to create the necessary pressure purely by paddling. However, because the fins are set at an angle they also create a certain amount of lateral pressure, pushing the boat from side to side as well as countering the roll. This action is exaggerated by their position aft of amidships. They have to be sited here

MY TAKE: The design logic of this new fin makes perfect sense and if the effect is as impressive as Sleipner claims this could transform the take-up of zero-speed stabilisers in the all important sub-70ft category **Hugo**



The concept is both simple and plausible. The closer a fin is to the horizontal plane the more effective it is

with planing and semi-displacement boats because this is the section of the hull that has the greatest contact with the water under way and where the waves have the greatest effect at anchor.

The flip side is that this exacerbates the yaw effect – the swimming motion which waggles the bow from side to side. The further aft the fins are located the greater this effect. Though yaw in itself is often hard to discern under way it reduces efficiency and can be felt to a greater degree at anchor.

VECT FACTOR

The Vector fin, as its name indicates, works by vectoring the angle of its thrust thanks to its curved shape. Because a greater proportion of the curved fin is closer to the horizontal than a conventional straight fin, it produces more of the crucial vertical thrust and less of the unwanted lateral thrust. As less hydrodynamic force is transmitted laterally and more vertically, less yaw is produced with a subsequent increase in hull efficiency and stability at anchor.

On the basis that the curved Vector fin is more effective than the straight fin it can also be smaller with a subsequent reduction in drag. To maximise thrust small winglets are fitted on the fin tips to reduce water slip (when water slips from the high to low pressure side of the fin, often referred to as tip vortex). The same concept is employed on most modern aircraft wings to reduce disturbance of the air flow and increase fuel efficiency. Sleipner claims this benefits Vector fins by reducing drag at speeds above 20 knots.

Vector fins can also be mounted closer to the vertical axis due to their greater lift efficiency, which further reduces the yawing effect.

ON BOARD

Needless to say the Vector system needs plenty of power to be effective. Sleipner claims that on the Princess 56 test boat the fins can rotate through their 76° arc in less than a second. In order to do this the hydraulic system produces 3,000ft/lbs (4,000nm) of torque at the actuator. To deal with the high levels of stress involved the fins are one-piece vacuum-infused in the same way as modern aircraft wings. The fin actuators are also very compact and quiet, so they can be fitted more easily beneath the floor of most mid cabins

They are designed to be fitted either during the build process or as a retrofit option. Although exact prices for the complete Vector system have not yet been announced, we have been advised that a system fitted to a 55ft boat will cost around £72,000 including VAT. At this price it should prove an appealing extra for the 50-70ft market.

Contact www.osmotech.co.uk

The new curved stabilisers generate more thrust and less drag than straight fins

30 SECOND BRIEFING: STABILISERS

- **Outriggers**

Outriggers have been in use by the inhabitants of the South Pacific islands for years, on their fast but otherwise unstable canoes. The same principle is used by modern trimarans such as the superyacht *Adastra*.

- **Bilge keels**

The twin bilge keel was first used on battleships during the early 20th Century. These provide limited hydrodynamic resistance to rolling and are still used extensively on some sailing boats, partly because of their shallow draught and ability to take to the mud at low tide.

- **Anti-roll tanks**

In the 1950s some large warships were fitted with full-beam ballast tanks split by a baffle system. The baffles would slow the rate of water transfer from the weather side of the ship providing resistance to rolling.

- **Steam stabilisers**

In 1934 a Dutch liner introduced the most unusual ship stabiliser system. Two vertical tubes were mounted on each side of the ship's hull with the bottom of the tubes open to the sea. As the ship rolled the relevant tube would fill with water and then compressed steam would be released, pushing the water down like a small water jet.

- **Flopper stoppers**

A cheap and simple system still used to good effect today on some displacement trawler yachts. These consist of dish or delta wing-shaped counter weights suspended off a long boom on each beam. These are designed to sit or 'fly' beneath the water and resist being pulled upwards.

- **Gyroscopic stabilisers**

Gyros were first fitted to a passenger ship in 1932. There were three of them, 13ft in diameter weighing 108 tonnes each. A similar concept, but on a much smaller scale, is used by Seakeeper and Mitsubishi today.

- **Fin stabilisers**

Automated fins followed one year later in 1933 on a Japanese cruise liner. Remarkably, these were controlled by a gyroscopic roll sensor, producing much the same effect as modern fin systems.