AntiRoll stabilising system for superyachts

After two years of development DMS brings its stabiliser to market

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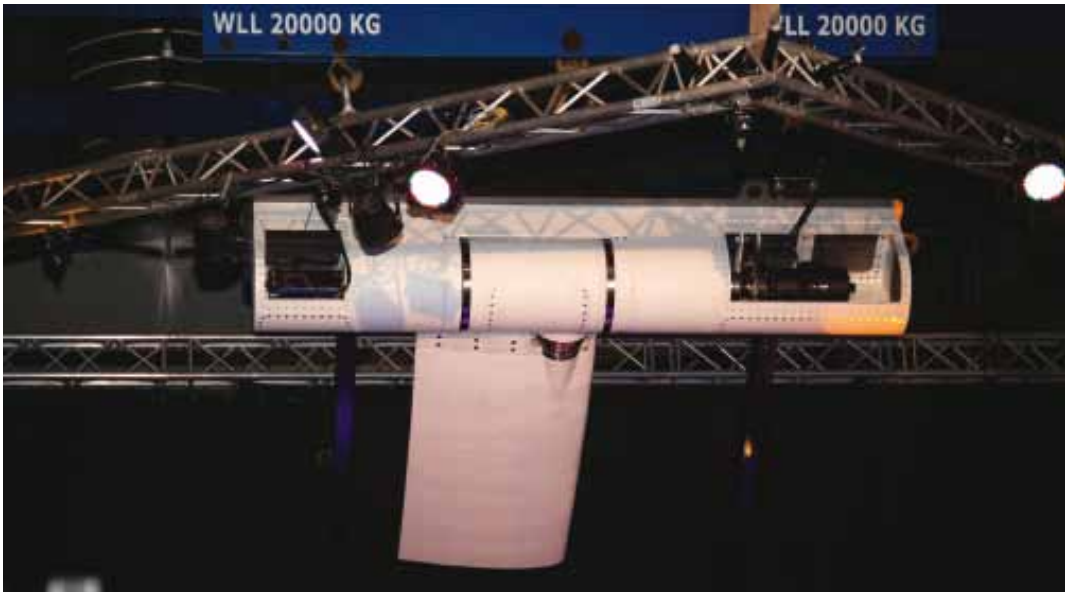

The AntiRoll system displayed at its launch party

Arnold van Aken of DMS

FOR BOAT DESIGNERS and builders everywhere, the search for comfort and stability is an unrelenting quest. A key player in that search for stability at sea and anchor is Arnold van Aken. His moment of glory capped two years of hush-hush research that began with him tinkering with barbecue skewers and Lego bricks, and ended with a heart-felt promotion of his roll damping system to a senior member of Feadship at METS in 2013. When he was done, the Feadship man told van Aken, 'that's exactly what we need!'.

Less than a year later, in September 2014, Dynamic Marine Systems BV (DMS), the engineering company of van Aken and his partner Patrick Noor, unveiled its AntiRoll stabilising system for superyachts. Breaking new ground, it features a curved, retractable, high-aspect steel fin that both rotates and flaps up and down much like the pectoral fins of a whale.

The first AntiRoll system is set for a 37m Van der Valk Continental III Trawler. The second, says DMS, is a candidate for a 50m Feadship that is due for a refit in early 2015. "It is our thinking that in about five years' time, half of all new-built superyachts may well come equipped with the AntiRoll system," says van Aken.

A new chapter

The system is for yachts of 30m and longer. Its development opens a brave new chapter for a company that in recent years made its mark in small yacht damping with the electrically-driven, non-hydraulic RotorSwing for yachts up to 30m. The company won a 2013 DAME design award nomination for the RotorSwing and is marketing the AntiRoll system for both sailing and motor yachts of between 30m-80m.

It has elicited warm endorsements, notably from the Maritime Research Institute Netherlands (MARIN), which has been experimenting with roll damping solutions since the early 1990s. The AntiRoll system is based on work at MARIN, the independent Dutch centre for applied scientific research (TNO) and Delft University of Technology. DMS says towing and model tests, as well as experts, have confirmed the AntiRoll system delivers better performance, both in terms of stabilisation and low resistance through the water. It says the latter makes AntiRoll 'greener' than competing systems. The manufacturer has patented the system that Reint Dallinga, senior project manager and seakeeping knowledge coordinator at MARIN, describes as 'unique'. He delivered a paper on test results of both conventional and flapping stabiliser fins to the 2014 HISWA International Symposium on Yacht Design and Yacht Construction.

Novel fin design

AntiRoll introduces a radically different fin, one that 'flaps' 35° up and down off a small horizontal cylinder on the hull. When not in use, the fin folds up, flush against the hull. For sailing yachts, DMS recommends recessing the cylindrical housing halfway into the hull to reduce drag. On motoryachts, says DMS, the AntiRoll's high-aspect

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ratio fin cuts the drag by between 50 and 75% while at sea. That generates not just stability, but also fuel savings.

DMS says that, at zero speed, the system generates two to three times the lift capacity of conventional fins.

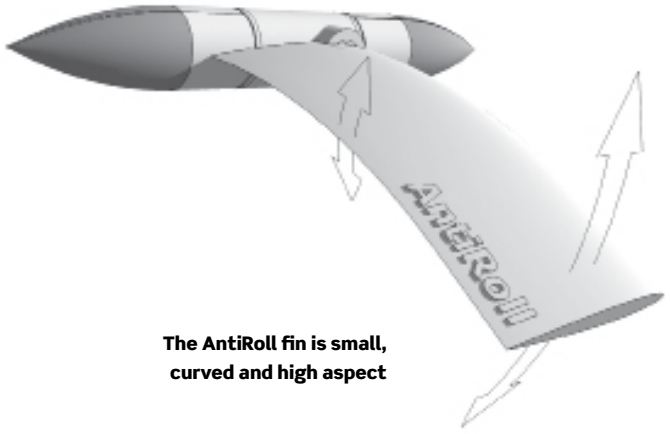
Stability is key

The search for onboard stability has long been something of a Holy Grail. Roll reduction has mainly been pursued by the yachting industry but solutions have found their way to cruise, research and even container vessels. Since 1970, scores of studies have focused on how to tame a yacht's roll motion. Today most yachts are built with active roll stabilisation. Tanks are effective and cheap, but require space and add weight. Gyroscopes are also bulky and heavy. Bilge keels tend to generate drag. In 2002, Dallinga reported in a publication that in a 1m swell at sea, active fins and anti-roll tanks are both effective, reducing roll by 65% and 63% respectively. But a fin's effectiveness fades away in higher waves and that 'in more demanding conditions the anti-roll tank offers the most effective solution'.

Joeri Kooltjes, production manager at Van der Valk Continental Yachts, has no qualms about being the first with the AntiRoll system. "The owner of the 37m trawler wants above all stability at anchor," he says. "A gyroscope would have weighed six tonnes. That, of course, would have worked well at anchor, but less so underway. Conversely, traditional fins work well at sea, but not in moored conditions."

It is precisely that conflict – the lack of optimal roll damping both at anchor and underway – that the AntiRoll system tackles. It is a 2-in-1 system that works optimally at both zero speed and cruising. In moored conditions, the AntiRoll fins flap up and down creating lift to offset a roll. When sailing, the fins rotate around their own axis. Low-aspect ratio fins suffer from a relatively low efficiency in both functions. DMS says its AntiRoll steadies a yacht without any compromise in either function.

The men behind the AntiRoll system – Arnold van Aken with Patrick Noor



The AntiRoll fin is small, curved and high aspect

Quotes for new builds

Van Aken says it also requires less power than conventional systems thanks to its small, curved high-aspect fin. "This is a system that the market is asking for," he says. The Continental Yachts 37m Trawler will be launched in April, 2015.

"The Van der Valk yard has issued several quotes for new builds equipped with the AntiRoll system," says Kooltjes.

The standard AntiRoll stabilising fins cover an area of only 2m² (21.5ft²). The system uses an innovative hybrid drive system with modest power requirements. "A combination of towing tests, model tests and experts have confirmed that the AntiRoll system will deliver better performance, both in terms of stabilisation and resistance through the water," says Nico Leupe, head of sales at DMS.

This low resistance through the water makes AntiRoll 'greener' than any other system. Traditional systems typically require significant power. "Being lighter and smaller, AntiRoll will require about half the power of traditional fin stabiliser systems," says Leupe.

DMS has also developed the AntiRoll system's software. The CAN bus communication system comes with a touch screen and graphical user interface.

Reaching out

The hardware – notably the steel fin and the cylindrical housing – are made from off-the-shelf material. Speaking to *SB* in early September over the noise of the AntiRoll's confetti-strewn launch, van Aken said his company is initially focusing on the Dutch superyacht sector which delivers some 20 craft annually. But it will soon also reach out to superyacht makers in Italy, Turkey, Germany and the United States.

The AntiRoll system had a colourful genesis. "We first started thinking out loud about a fin that somehow had to rotate but also move up and down," says Leupe.

"We tinkered with a rudimentary scale model. It was made of barbecue skewers and Lego blocks," he continues. That was in 2011. Since then, DMS has tapped scientific input from MARIN, Van Oossanen Naval architects and TNO, the non-profit Dutch Organization for Applied Scientific Research.

The AntiRoll system costs around €400,000 for a 40m yacht. That is double the cost of a conventional system, but cheaper than one with retractable fins. SB