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1



STEP BY STEP

petestep® – On quiet steps

Ray Hunt and Dick Bertram have a safe place in the “Hall of Fame” of boatbuilding. When in 1960 Dick Bertram's “Moppie” won the infamous Miami Nassau Ocean Power Boat Race in a new record time, the new V-Shape hull design by design autodidact Ray Hunt heralded a new era in the construction of rough water powerboats. The assertion that the development of the planing hull has been going in the wrong direction for over 50 years almost sounds like blasphemy and in any case not like typical Swedish understatement.

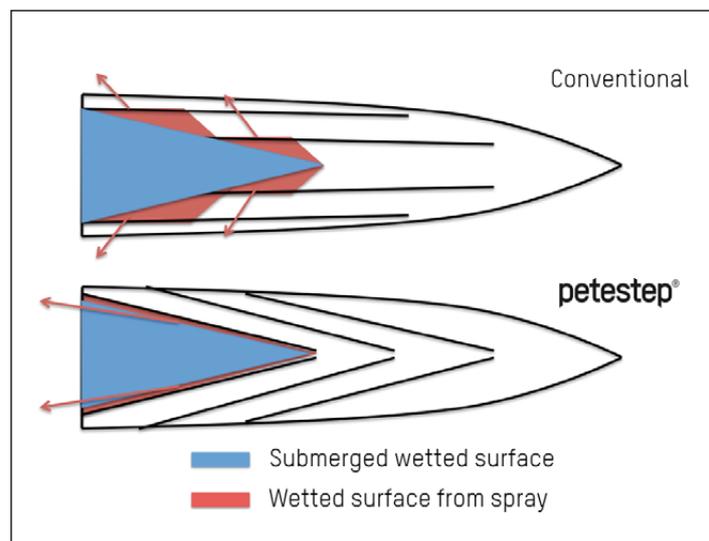
Text: Christian Schneider / Photos: Schneider / Petestep AB / Graphics: Petestep AB

Idea

But this is exactly what the employees of a small Stockholm design office claim in their video presentation. The Swedes, who are usually not accused of exaggerating and boasting, have been calling into question the “laws” of boatbuilding chiselled in wood, metal and GRP since 2017 with the “Petstep-Hull”. The idea was inspired by the Swedish businessman and enthusiastic motorboat driver Peter (Pete) Bjersten, who - noticed how much water is displaced and thrown out by the usual glide stringers, which

serve to stabilize the boat and repel spray. “Wasted energy...” he thought and thought about a better solution that would recycle this energy and turn it into a force that lifts and accelerates the boat.

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- 1 The new Silver Tiger is the second model of the shipyard with the new Petestep hull.
- 2 Sharp curve, stable position - even U-Turns from high speed the Silver Tigers complete with serenity.
- 3 The racy Swedish HOC 33 P was one of the first projects to be realized. (Photo: Petestep AB)



2



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The solution looks simple at first glance, but Petestep engineers worked on it for several years to determine the optimal course of the new hull steps. In the patented Petestep hull, the conventional glide stringers running parallel to the keel direction are replaced by a series of deflectors that rise from zero at the same angle as the waterline of the respective boat in gliding motion from the lowest point of the V-frame to the kink of the keel in a slightly concave shape to a height of approx. 45 millimetres. This is intended to reduce the drag in the water in three ways:

Theorie

First: Shape, size and direction of the deflectors should not lead away spray and water to the side as before, but downwards

astern and should lead away to the rear via steps in the rear edge. This should lift the boat slightly and create a thrust effect. Second: The frictional resistance should be reduced due to the smaller wetted area, because the boat only touches the water with the lower point of the keel V when gliding.

Thirdly: Since Petestep hulls do not have horizontal, flat surfaces that hit the water when they are deployed and thereby destroy energy, Petestep hulls should generate much less noise from waves, which considerably increases ride comfort. In addition, the spray that is discharged under the hull should provide a damping effect and reduced friction when the hull is inserted.

All in all, the Swedish company estimates that the efficiency increases compared to a conventionally designed V hull are in the order of about five percent for each of these points, which, when added together, should result in up to 15 percent better overall efficiency.

"But low fuel consumption is not the biggest difference..." explains naval architect and Petestep CEO Jonas Danielson during the presentation of the new Silver Tiger, one of the first boats to be equipped with the new hull. "The first thing that is noticed is the significantly softer behaviour of the hull in the wave and the fact that the boats with Petestep hull are significantly quieter. "You'll also be surprised by the boat's great lateral stability," he promises before the first test run. The measured data from the test runs with comparable boats confirm this. The engineers were able to determine up to 57 percent lower G forces, which had an effect on the crew when sailing in the wave, during comparative runs. On average, the peaks of the acceleration forces in the wave are reduced by 30 percent, says Danielson. But energy efficiency is not neglected either: Up to 35 percent less energy is to be required to drive the boat, which can lead to significantly lower fuel consumption and enable the use of smaller, cheaper engines.

Practice

Beside the Silver Raptor, the Tiger is already the second model of the renowned Finnish series manufacturer, which is equipped with the new hull. The robust Daycruiser, which is alternatively available as a Bowrider, has a length of 6.06 metres, a width of 2.36 metres and an dry-weight of 1150 kilograms without engine



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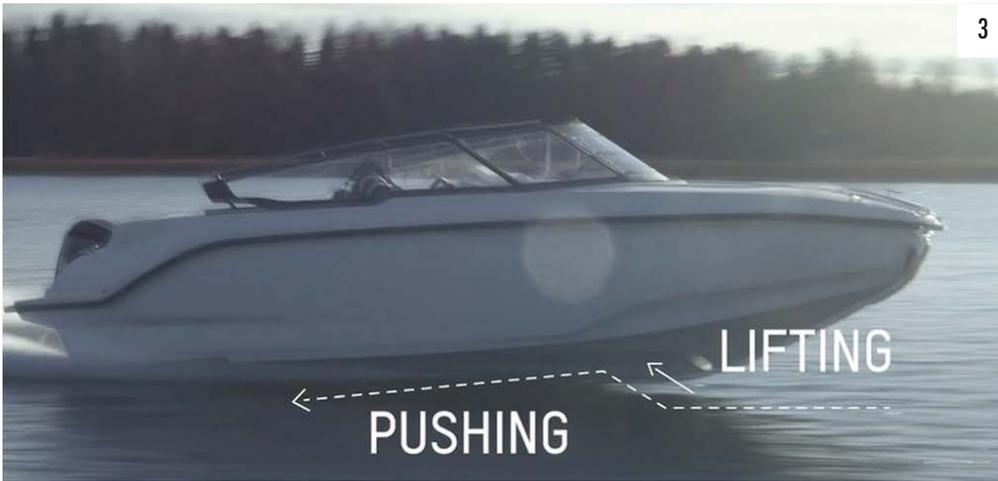


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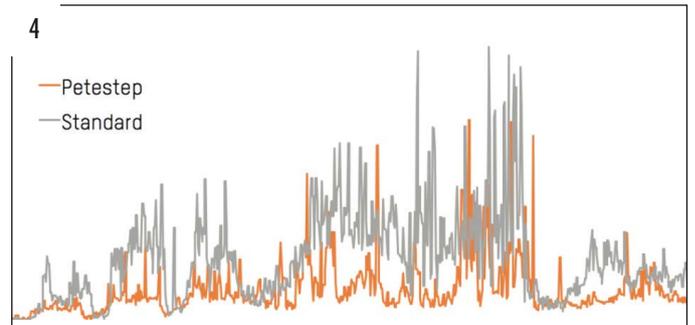


the water and moves forward and backward exactly where it should. Turning on the plate, short stopping, with short thrust ahead crisply just get the curve in front of the jetty... all no issue - good kitten, simply drives like a good boat.

Outside on a course against it's getting serious and the lever is "lying on the table". Punchy but not rabiat pushes the 150er Honda the Silver into the glide. Actually she "slips" out of the water. It takes three seconds from a standstill with two people

The V-frame on the mirror has a moderate rise of 19 degrees. The new Silver is powered by the manufacturer's so-called Z-range, which is completely made of GRP, with a Honda BF 150 with 150 hp, which has been approved by the shipyard for maximum power. A strong north-westerly wind in the lee protection of the

coast off the Swedish Karlshamn builds up only a small bumpy wave, while in some distance to the land cover there is even a short sea, which makes it possible to test the boat not only under "laboratory conditions". The first "exercises" during manoeuvring do not reveal any negative abnormalities. On the contrary: as promised, the boat is stable in





- 1 Good to see: The discharge of the spume to the rear astern.
- 2 The innovative hull design allows a smooth ride at high speeds.
- 3 The deflectors direct the spray backwards down under the fuselage and create a lift-and-push effect.
- 4 Comparison of measured values Standard hull / Petestep hull of the forces acting on the boat when it is being driven in the wave. (Graphic: Petestep AB)
- 5 The model illustrates the course and the rise of the deflectors from the keel to the rear edge.
- 6 The development of the Petestep hull was the subject of the master's thesis by shipbuilding engineer and Petestep CEO Jonas Danielson.

on board, as later measurements show. At 30 knots there is a nice cruising speed, the water rushes, the wind whistles and...? Nothing else! Apart from the sonorously humming Honda - no hitting, no rumbling, no rattling, no bobbing in the short wave or swinging around the longitudinal axis - the boat lies smoothly on the keel edge and planes with a quiet and calm ride over the water. It's hard to describe, but it feels somehow "different" - extremely "light-footed" and casual as this boat lies on the rudder, parries the wave and takes any manoeuvre with sporty verve and yet with great composure. Some trim on the engine, the speed still a little high and around with the wheel! The Tiger pulls with only little side inclination despite high travel her curve tightly and more closely up to the rabiat driven U-turn, which I allow myself after a few attempts, now in the firm confidence on the stable driving characteristics of the boat. Indeed, I am surprised! With each round this cat of prey makes more fun, goes on velvet paws into the glide and laces with cat-like elegance in smooth silky run there, almost in order to make it's name honour.

The Honda roars with over 6000 tours and the Silver burns towards open water. There is already some wave here. Very finely trimmed the aggregate, there are the 41 - 41.5 ...

come on, there's something else ... Yep - 42 knots cracked! We remember: There is no V8-Engine hanging, but an engine of the upper middle class with 150 HP at the rear! The boat feels safe and controllable in every situation and is a lot of fun.

Conclusion

Perhaps it is presumptuous to attribute the "blame" for the excellent sailing characteristics of this boat only to the new hull design - other designers and engineers have certainly done a good job here. Even a comparative evaluation would only be meaningful if we had two identical boats available, one with a conventional hull and one with a Petestep hull. Nevertheless: The new Silver "Petestep" tiger could impressively prove that the Petestep hull is more than just a step in the right direction. It fulfilled all promises and in some respects even exceeded expectations and set new standards. This includes the very quiet and soft ride in the wave, the very high driving stability, as well as the high performance with a moderate engine. Interested parties are therefore recommended to take a test drive. The boats are distributed in Germany by the company boat-solutions in Utting am Ammersee via a dealer network. Each Petestep hull is developed exactly for the intended purpose. The boats are simulated under different load conditions and speeds before construction and the final construction in order to enable a very high degree of optimisation. Since 2017 several boats of different sizes have been built with Petstep hulls. The company has patented this design principle and would like to cooperate with manufacturers and shipyards in the dissemination and further development. Enquiries are welcome.

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