hullvane

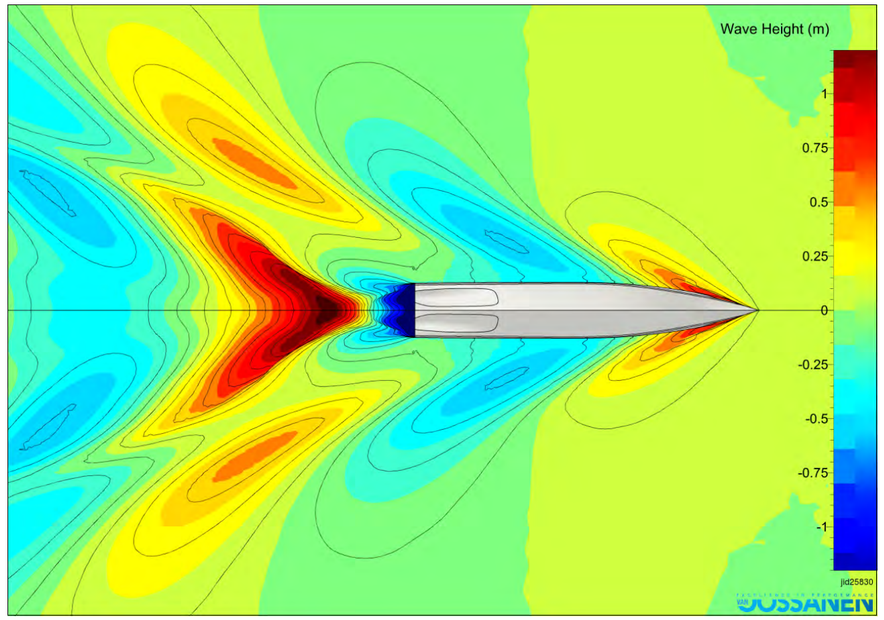
Hull Vane® case study | **Visarend 42m OPV (Stan Patrol 4207)**

# design and optimisation

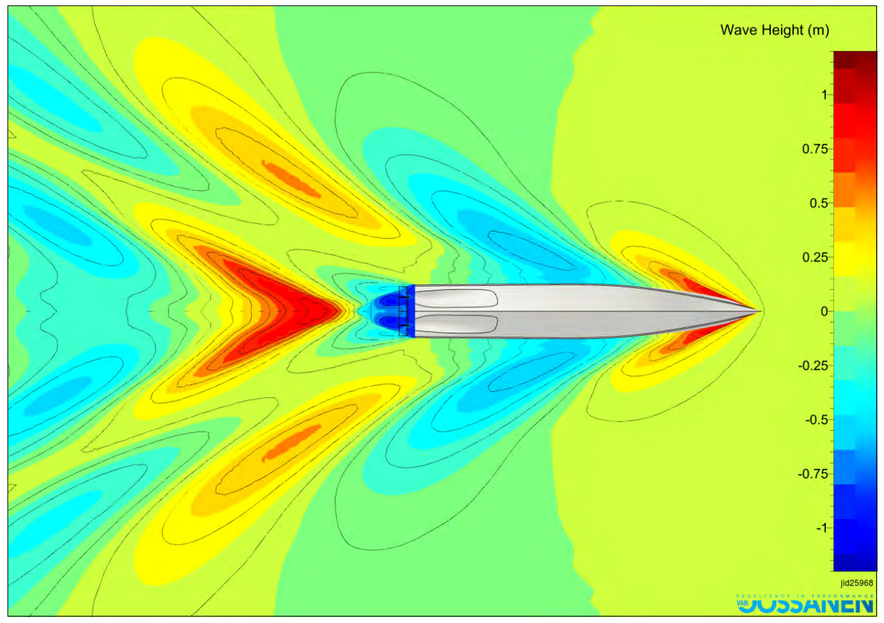
In 2019, a feasibility study was done for a Hull Vane® application on the Dutch Coastguard's Offshore Patrol Vessel Visarend.

An analysis of the operational profile showed that the peak of the annual fuel consumption was at speeds between 15 and 20 knots. Through an automatic optimisation using Computational Fluid Dynamics (CFD), the Hull Vane® was optimised for a ship speed of 17 knots.

The aim of the optimisation was to reduce as much as possible the annual $CO_2$ emissions. Finally, a T-series Hull Vane® was designed and produced.




Wave height <u>without</u> Hull Vane® at 17 knots




Wave height <u>with</u> Hull Vane® at 17 knots

# results seatrials

- 11 to 24% reduction in shaft power, dependent on the speed
- ~ 100.000 liter diesel per year less consumed
- > 300 tons of $CO_2$ emissions per year abated
- Top speed increased from 20.5 knots to 22.7 knots

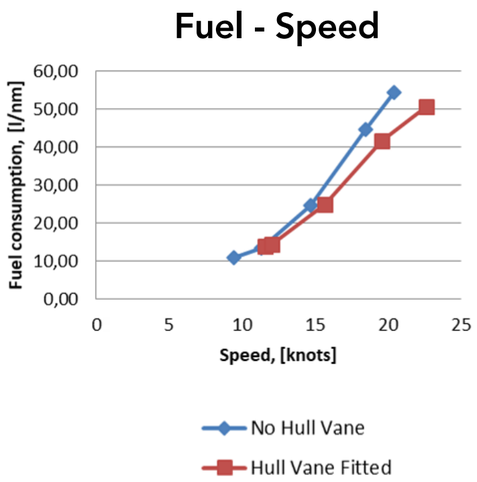

Full power (20.5 knots), <u>without</u> Hull Vane®

Full power (22.7 knots), <u>with</u> Hull Vane®

# overall results

## SPEED:

- Before installation: 20.5 knots
- After installation: 22.7 knots

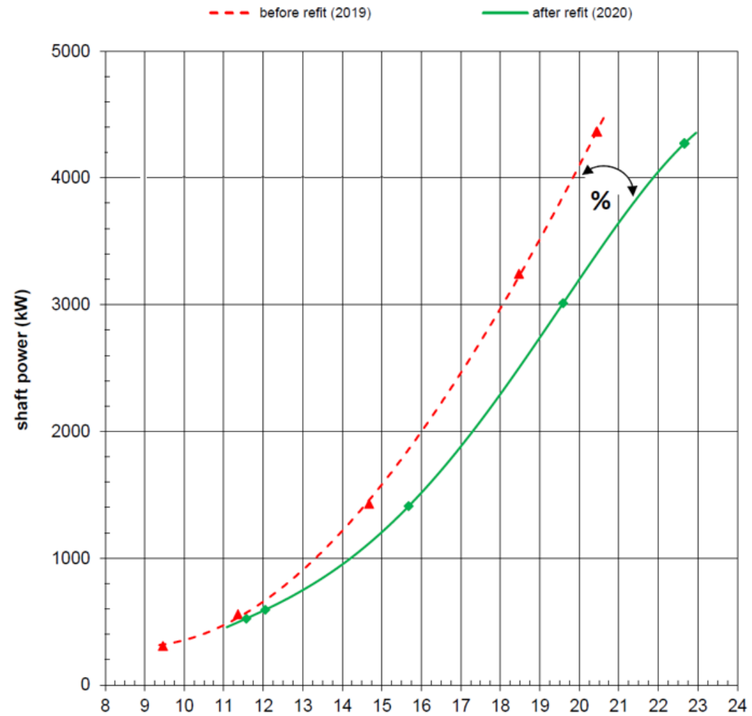






***Shaft power measurements*** *carried out by Belkoned, a company specialised in independent sea trial performance verification*

## SHAFT POWER MEASUREMENTS:

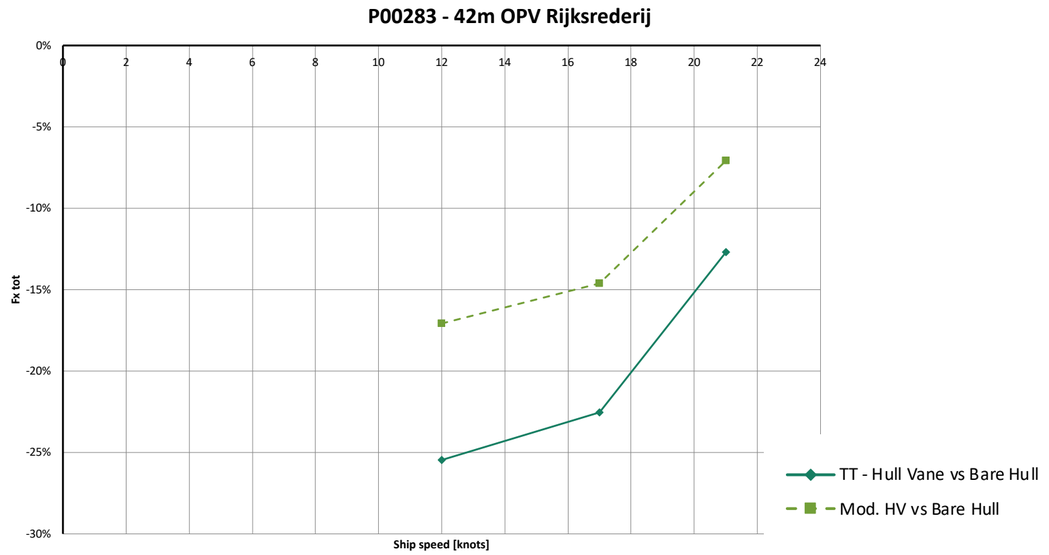


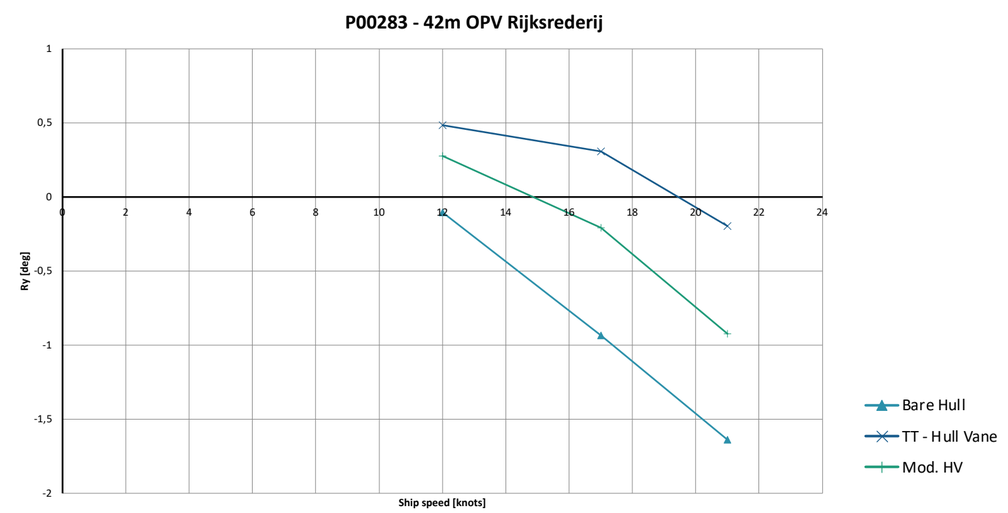

| Speed [knots] | Before [kW] | After [kW] | Reduction [%] |
|---|---|---|---|
| 12 | 657 | 586 | 11 |
| 14 | 1.216 | 951 | 22 |
| 16 | 1.997 | 1.515 | 24 |
| 18 | 2.968 | 2.292 | 23 |
| 20 | 4.098 | 3.197 | 22 |

# user feedback and adaptation

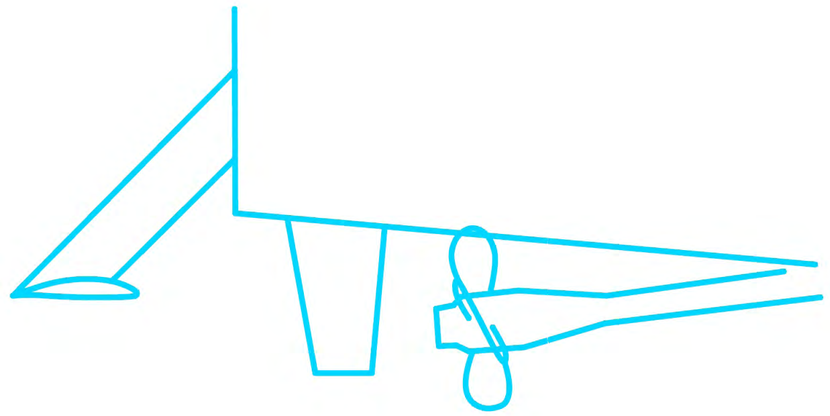
Following the feedback from the crew, the Hull Vane® was modified slightly by reducing the length of the struts and by tilting the wing profile slightly forward. The reason was that the crew of the vessel wanted to change the sailing characteristics specifically for their mission. After the modification, the crew was satisfied with both the performance and the sailing characteristics of the vessel with Hull Vane®. CFD analyses showed that the modifications kept around 70% of the energy saving effect intact. Sea trials also confirmed that the gain in top speed remained the same.

It depends of the sailing area, and the client's priorities, which Hull Vane® will be offered for other Damen Stan Patrol 4207's.

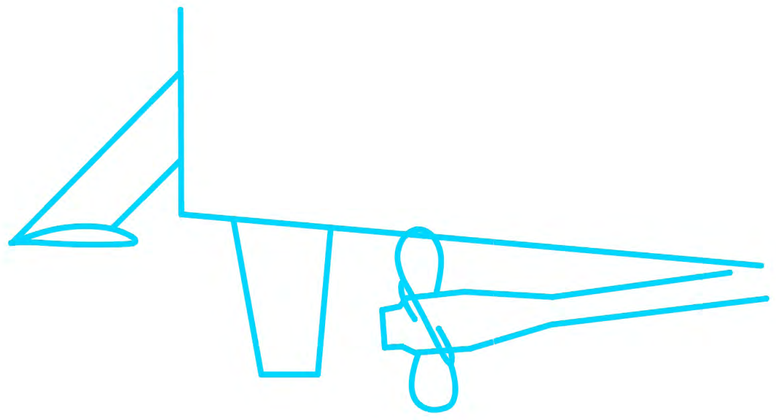


# user feedback and adaptation



Adopted position Hull Vane®



Adapted Hull Vane® based on user feedback

# video


Click here to watch the video

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