

TUHH

INCREASING SAFETY FOR ELECTRIC MOBILITY

FISHING FOR EXPERIENCE

ON THE ALSTER

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INTRODUCTION

Together with Meridian Yachtclub, Toplicht, and Fraunhofer CML, our team developed a solution to improve safety for electric trainer boats on the Alster. With combustion engines banned from 2025, electric drives are the future—but their unprotected propellers pose serious risks. Existing guards don't fit these motors, and when adapted, they often reduce efficiency and handling.

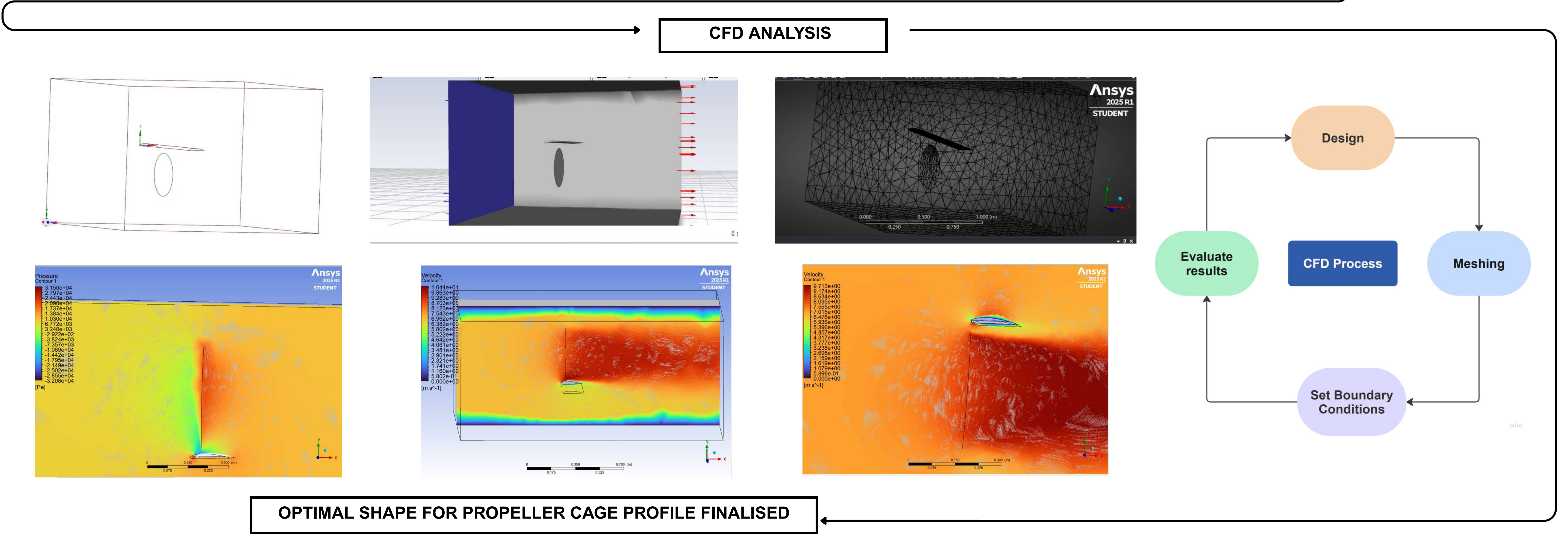
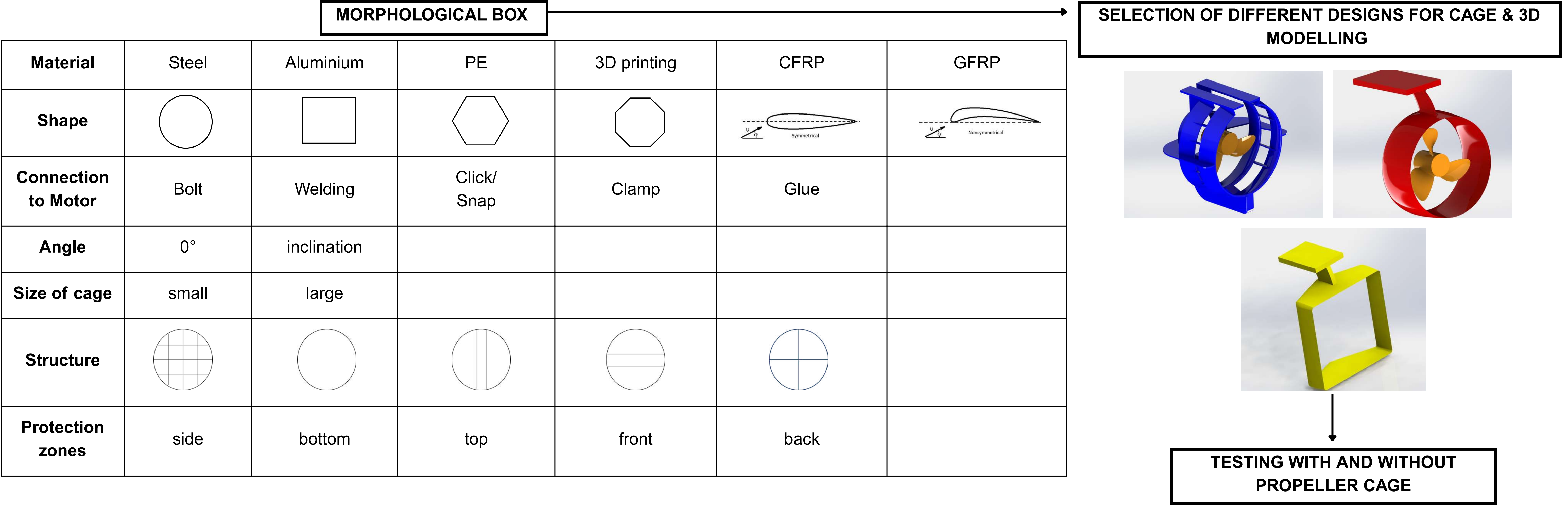
We worked on designing and testing a new propeller protection system—combining CFD simulations, 3D-printed prototypes, and real driving trials on the water. The aim: a design that prevents injuries while also improving flow conditions and performance.

MOTIVATION

- Safety Risk: Existing electric boat propellers pose a risk of injury to people in the water due to lack of suitable protective guards.
- Design Limitation: Current propeller guards are not optimized for electric outboards and cause significant performance loss.
- Efficiency Challenge: Adding a protective cage increases drag, reducing thrust and speed, making it difficult to maintain efficient operation (e.g. 28 km/h target speed)



METHODOLOGY



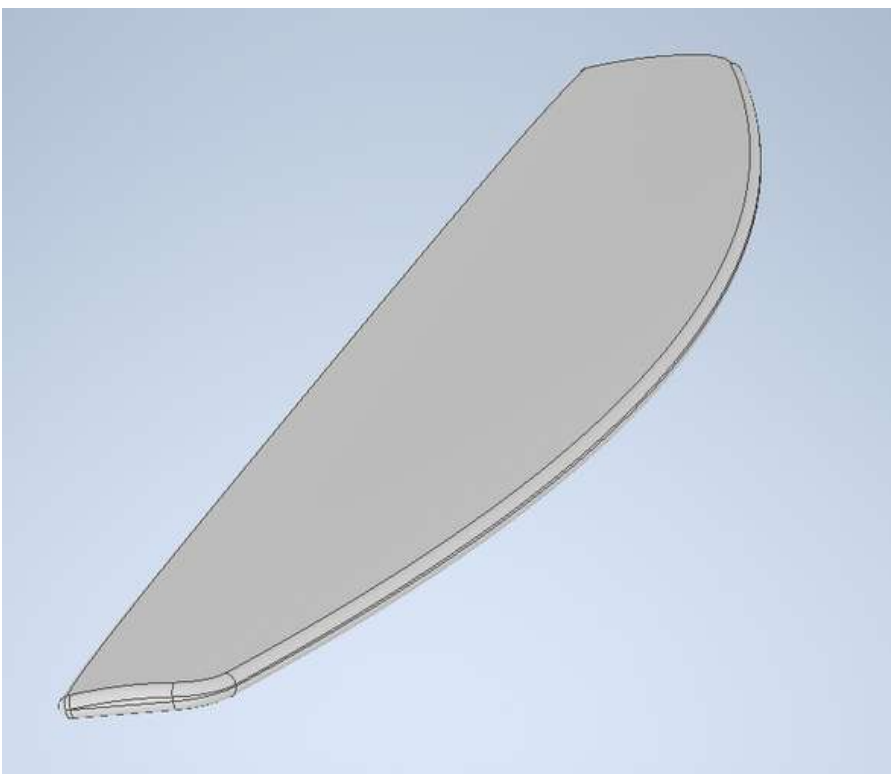
RESULTS

The pre - existing commercial cage available was tested - Produced too much Drag

Symmetric and asymmetric profiles were tested.

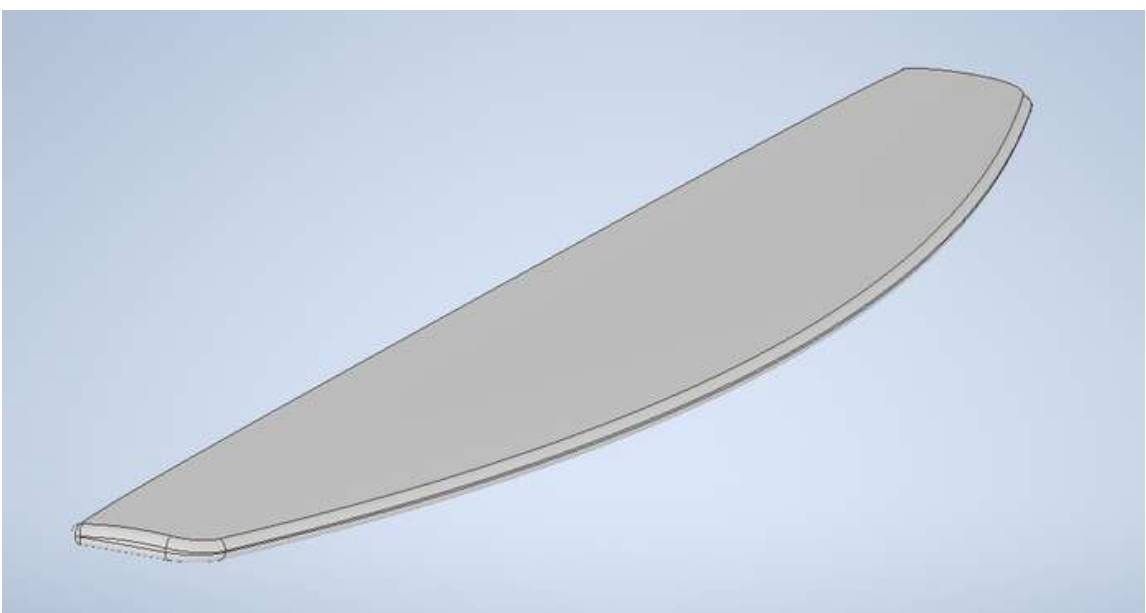
Asymmetric profiles can generate lift, which reduces the overall drag of the boat.

The goal for the profile is therefore high lift with low drag.



From the CFD simulations the following results were obtained:

- Positioning the profile below the propeller increases lift.
- Positioning it above the propeller reduces lift.
- The rotor's distance from the profile also matters: if it's too close, lift is reduced.



CONCLUSION

The main challenge is the installation on the boat, since cages are normally mounted on the cavitation plate above the propeller: One idea: use struts for mounting

Our first test with the new profile achieved better results than the commercially available cage.

GROUP 7	
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