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Blind Resistance Prediction Using CFD - A Summary of the Lucy Ashton Workshop

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ABSTRACT

The confidence in using CFD for full-scale predictions is hampered by the lack of validation at full-scale, where measurements are much scarcer than at model-scale. In particular when it comes to ship resistance, it would appear to be extremely difficult to perform bare hull experiments at full-scale in a similar manner as they are conducted at model-scale. However, some cases exist that prove this to be possible, such as the towing of the H.M.S. Greyhound (Froude, 1874) and the "Lucy Ashton" measurement campaign in the 1950s (Conn et al., 1953; Denny, 1951; Lackenby, 1954; Smith, 1955). In the latter, the "Lucy Ashton" paddle steamer was fitted with four jet engines on its deck for propulsion, thus avoiding the need for a propeller and consequently propeller-hull interaction effects. As a result, the "Lucy Ashton" experiments provide a rare and valuable opportunity. Despite its merits, this campaign is not well known in the maritime community.

As part of the JoRes project, a blind CFD workshop based on the "Lucy Ashton" trials was organised and took place in 2024. This contribution provides an overview of the workshop, which received data from more than 40 different participants. Results for varying model-sizes at a constant Froude number, and variable Froude number at full-scale were received. Discrepancies in the reported resistance between participants were larger at model-scale rather than at full-scale, as a consequence of different approaches to handle the boundary-layer, i.e. wall-resolved vs wall-functions. The numerical results tended to underpredict the measured values since roughness was not considered and the simulations were carried out at even keel.

References

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