becker marine systems

PERFORMANCE STORY

SYNERGY FOR SUSTAINABILITY

BECKER MEWIS DUCT® AND PROPELLER OPTIMISATION IN PRACTICAL USE

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From operating profile to efficiency strategy

Retrofit success at Utkilen: Efficiency increase in certain conditions thanks to Becker Mewis Duct, optimised propeller blades, gear modifications and full hull blasting.

For the chemical tankers ‘Golfstraum’ (2011) and ‘Rystraum’ (2012), Utkilen worked with Becker Marine Systems and Brunvoll to implement a retrofit that significantly increases energy efficiency.The customised Becker Mewis Duct® harmonises hydrodynamically with the newly designed propellers and the adapted gear ratio between the main engine and the propeller from Brunvoll. The result: a 17% reduction in fuel consumption during normal operation and up to 25% in ballast mode.

‚Golfstraum‘, photo: Wil Weijsters

‚Rystraum‘, photo: Wil Weijsters

When the operational profiles of the Golfstraum and Rystraum changed, Utkilen was faced with the question of how to make the two tankers compliant with the current EU and IMO regulations, reaching at the same time a noticeable reduction in energy consumption. The answer lay in a holistic fleet optimisation.

The co-engineering approach: Becker × Brunvoll

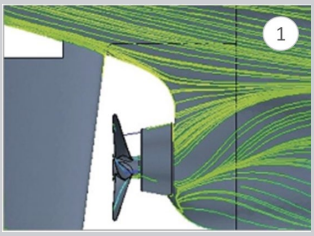
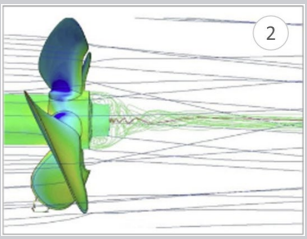
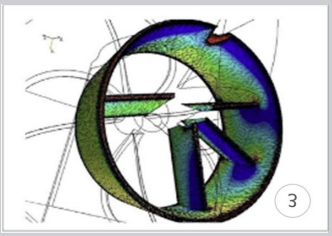
Hydrodynamic synergy instead of individual measures – why interaction matters: The Becker Mewis Duct® modifies the wakefield enhancing the flow into the propeller; the newly designed propeller converts this potential into propulsion.

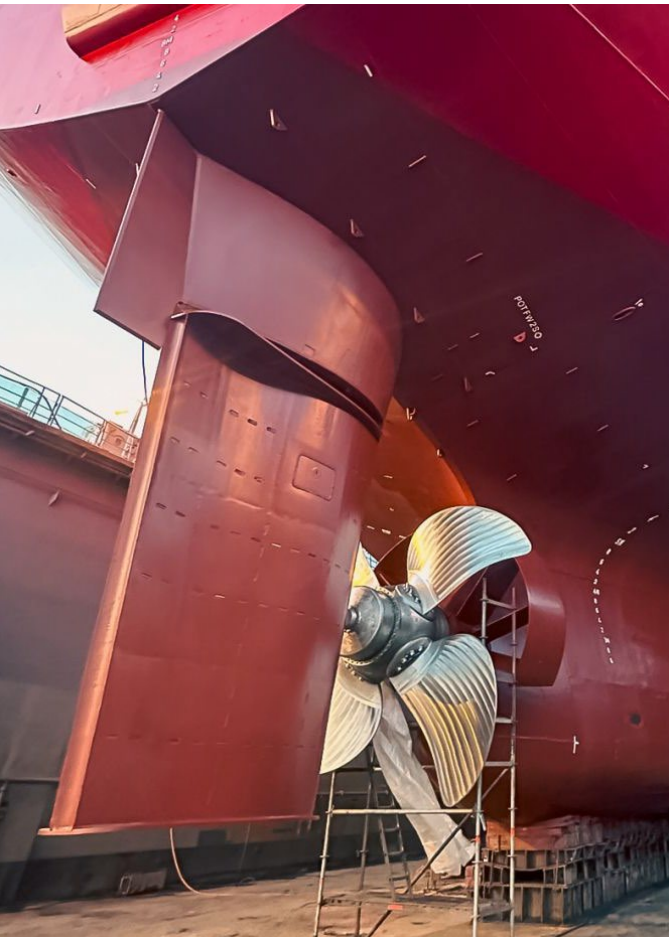
The greatest effect is achieved through the precise coordination of both systems.

- **Becker Mewis Duct® (Becker Marine Systems):** ship-specific design for more uniform inflow and reduced vortex losses (flow homogenisation, increased efficiency)
- **Propeller (Brunvoll):** Redesign of the propellers for more efficient geometry to match the new profile.
- **Operational levers (Utkilen):** Reduction of service speed from 14.5 knots to 12.5 knots as an enabler for overall optimisation.
- **Shipyard measures:** Blasting & coating as complementary efficiency components

Optimisation of ship propulsion with the Becker Mewis Duct®

Rising fuel costs and stricter emission regulations call for smarter solutions in ship propulsion. The Becker Mewis Duct® addresses these challenges by optimising the flow of water around the hull and propeller, unlocking significant efficiency gains while reducing emissions.

Wakefield equalization	Reduction of hub vortex	Contra-rotating swirl
		
The Becker Mewis Duct® straightens and accelerates the hull's wake into the propeller and also produces net forward thrust.	An improved slipstream behind the duct significantly reduced the hub vortex with a corresponding reduction in thrust, leading to improved thrust and inflow to the rudder.	Due to individually placed fins a pre-swirl in counter direction of the propeller operation is generated, recovering the rotational energy from the slipstream.



Results at a glance

The synergy of propeller optimisation and Becker Mewis Duct® delivering measurable efficiency gains.

- **–17%** power consumption during **normal operation**
- Up **to –25%** power consumption in **ballast condition**
- **CII rating**: improvement from C (2024) to A (2025); this high performance is expected to be maintained until 2029/2030
- **CO_2 cost reduction in the EU ETS**: expected savings of approx. EUR 200k (2025), approx. EUR 400k (2026)
- **ROI**: payback period of Becker Mewis Duct® approx. 3,5 years

M/T "Rystraum" in dock following completion of retrofit.

Working together for optimum efficiency

Our preferred approach is to work closely with propeller manufacturers – regardless of the supplier – and to analyse the individual ship operating profile together with the shipping companies. On this basis, we develop tailor-made combinations of the Becker Mewis Duct® and optimally matched propulsion solutions. The result: maximum efficiency gains, better CII ratings, and tangible benefits in the emissions trading system.

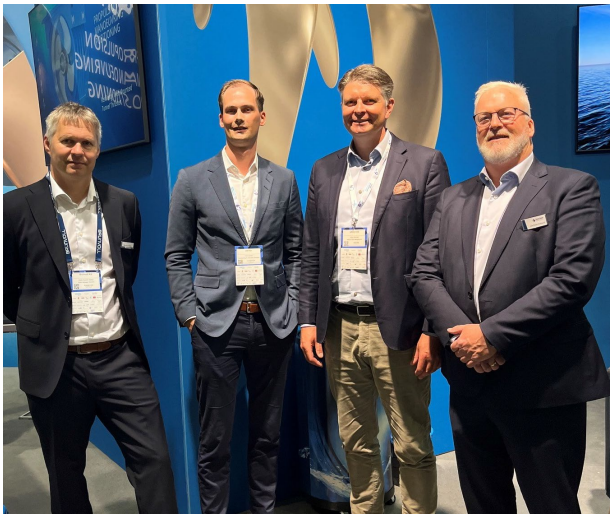
Voices directly from the project team

Jarle Hillestad, Utkilen

"The retrofit exceeded our expectations. The combination of Becker Mewis Duct®, Brunvoll propeller blades and -gear optimization, as well as a full hull blasting delivers the highest savings in practice. Not only do we benefit in terms of fuel, but we are also better positioned in terms of regulations. The collaboration was focused, professional, and measurably successful."

Jan Peter Folsland, Becker Marine Systems

„The precise hydrodynamic tuning of the Becker Mewis Duct® to the actual operating conditions and the new propeller layout was crucial. Our team used CFD simulations to smooth the wake field so that the propeller operates in a more efficient load range – this is exactly where the double-digit savings are achieved in everyday fleet operation."



From left: Mads E Melbø (Brunvoll), Eirik Gjerde (Utkilen), Jarle Hillestad (Utkilen), Jan Peter Folsland (Becker Marine Systems Norway AS).

Mads E Melbø, Brunvoll

"The redesign of the propeller and gearbox would hardly have been as effective without the improved inflow provided by the Becker Mewis Duct®. The project shows how important integrated engineering across company boundaries is."

Ready to improve your vessel's performance?

Reach out to our sales experts now.

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