

## Maritime Research Institute Netherlands (MARIN)

MARIN has done extensive research in the Wind propulsion field and is ready to independently predict fuel savings for wind assisted ships compared to a conventional ship design, including the environment on actual routes, and to advise how savings can be improved. Several tools have been developed that are relevant depending on the project status. Also, the special issues of operability, compliancy (and safety) that are related to wind assisted ships, e.g. course keeping, non-steady roll angle, different ship motions, can be dealt with. The main processes and tools are described in the attached document 'Performance of Wind Assisted Ships'. These are followed by examples from the Wind Hybrid Coaster and SAIL projects.

These tools include: Hull form and appendages combined with wind propulsor & Model Testing, Speed-Power prediction and Voyage simulation.

The Wind Hybrid Coaster project was a demo case for wind assisted ships. The Wind Hybrid Coaster project dealt with the development of a prototype Flettner rotor, which is integrated into the design of a coaster. The SAIL project was the Ecoliner design as developed by Dykstra Naval Architects. MARIN also conducted voyage simulations for this design.

This year finds MARIN working closely with researchers at TU Delft - Nico van der Kolk and Giovanni Bordogna's PhD at TU Delft/Politecnico Milano on systematic variation of hull form and appendage arrangement in order to find the influence of lift, drag and yawing moment for application of the wind (assisted) ship propulsion. As that latter project is still very much ongoing for us, there is no public information available on it yet. Also attached is a copy of the new proposed joint industry group pitch 'WiSIPJIP' presented this year.

MARIN also continues to support the development of wind propulsion research by hosting the 'Natural Propulsion Seminar'. In it's 5<sup>th</sup> year, this has been a very successful seminar series bringing hundreds of researchers, NA's, engineers, project developers and the shipping industry together to present and discuss developments in wind propulsion & other natural propulsion technologies.

Archive of those presentations [http://test.blueforum.org/?page\\_id=1994](http://test.blueforum.org/?page_id=1994)

Website: <http://www.marin.nl>