

Future-proof hull fairing tool developed

By combining GMS with the strengths of Rhinoceros, MARIN now has a hull fairing tool ready for the future.

Ship hull shapes must be drawn in 3D for model making and CFD calculations in many MARIN projects. As the CAD engineers draw hundreds of ship hulls on a yearly basis, MARIN already developed a unique way of drawing in the GMS program some 20 years ago. An integrated environment is used to quickly draw and fair a ship hull by combining the view of sections, buttocks and waterlines with detailed curvature information. Fast 3D modifications allow the CAD engineers to quickly draw, modify and fair hull shapes.

In 2012, a three-year project started to overhaul MARIN's geometry capabilities for propellers, grid generation and ship hull drawing and Rhinoceros was chosen as the common CAD platform. The development of a Rhinoceros plug-in for propeller geometry was started first, with which the propeller shape can now be prepared for model making (milling) and with sufficient fidelity for CFD calculations with MARIN's viscous flow solver ReFRESKO.

A second project concerned grid generation for the multitude of BEM and RANS methods

that MARIN uses in its daily research activities. For example, for potential flow in RAPID, motions in waves (frequency domain) in DIFFRAC and PRECAL, motions in waves (time domain) in FATIMA, acoustics in EXCALIBUR, real-time simulations for the navigation simulator and viscous CFD RANS in PARNASSOS now all use grids generated by the MARIN plug-ins in Rhino.

To make ship models by milling and to generate grids for calculations, accurate ship geometry is required. In a third project, the unique drawing method of GMS was re-implemented in Rhinoceros. Due to the unsurpassed flexibility in extending Rhinoceros, this has been achieved completely, and in a different time-scale than it would take to create a new program from scratch (months rather than years). The same integrated environment with views of sections, buttocks, waterlines and curvature is now available in Rhino. The user is able to change the 3D surfaces making up the hull efficiently, using both the default functionality of Rhino and the added functionality inspired by GMS. —

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