

RECENT PROJECTS

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Flow Around Ships at Trans- and Supercritical Speeds

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A set of model experiments has been carried out aimed at providing as full as possible description of the flow around a ship moving in shallow, laterally confined water at transcritical and supercritical speeds.

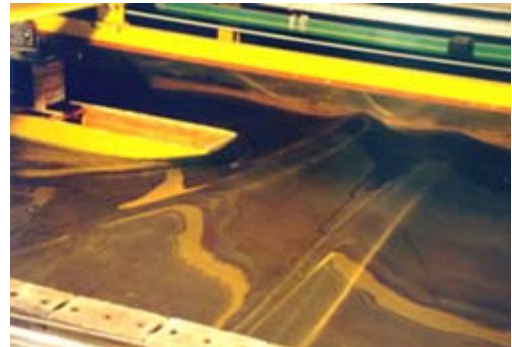
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A barge-like hull form of typical inland-ship dimensions has been tested in the towing tank of the Franzius Institute for Hydraulic, Waterways and Coastal Engineering, Hannover, Germany.

The speed range $FH = 0.8 - 1.5$ has been covered for depth/draft ratios of 2 and 3. The model has been towed along a line off the centerline of the tank.

The following quantities were measured: wave height - 18 longitudinal profiles both sides II; bottom pressure - 7 pressure gauges at different offsets from model's centerline; fluid velocity at 4 depths under the model along its centerline (by Acoustic-Doppler Velocimetry).

Complete 3D picture of the wave pattern has been obtained, as well as the bottom pressure distribution and vector velocity field under the hull.



Ship motion in a canal at transcritical speeds is accompanied with generation of solitons, which periodically detach from the hull running faster than the vessel at supercritical speeds. The speed and the amplitude of the solitons, and their form depend on the blockage of the waterway. The velocity of solitons is related to their amplitude

Beyond a speed limit, depending on blockage, the soliton velocity becomes lower than the model speed, i.e. the solitons can not escape from the model. A bore ahead of the bow is formed instead accompanying the model down the tank.

The results of these measurements are expected to elucidate the nature of the associated phenomena and to provide verification information for their numerical modeling.

Part of the results concerning the wavemaking at trans- and supercritical speeds has been presented at the 22nd International Conference HADMAR 2001 in October 2001, Varna, Bulgaria.