

Program for free model tests

KVLCC1 + KVLCC2, KCS, 5415

The free model tests shall (at least) cover the standard 1st quadrant (N,U) manoeuvres as follows:

Manoeuvres

1. Turning circle tests: 35 deg rudder to both port and starboard including pull-out, where rudder is put back at 0 deg after steady state has been reached. Optionally, also 25 deg turning circles to port and starboard.
2. Zig-zag tests: 10/10 deg and 20/20 deg tests accomplishing at least the first two overshoots, first execute of rudder to both to both port and starboard.
3. Spiral test: Reverse spiral test (Bech) covering a range corresponding to rudder angles up to about ± 15 deg. For a stable ship this can be substituted by a direct spiral test (Dieudonné) if tank dimensions are adequate.

Measured data

At least the following data should be measured/derived as time series from the tests:

- time
- position (x,y)
- speed (u,v) giving drift angle
- heading
- yaw rate
- roll angle
- rudder angle
- propeller revolutions

Additionally, the following data should be measured/derived if possible:

- propeller thrust/torque
- rudder forces/moment

Note about propeller revolutions

To allow direct comparison of the manoeuvres with the results from the CFD calculations (at model scale) two conditions should be fulfilled, if possible:

- 1) The rate of revolutions should be adjusted to the model scale self-propulsion point.
- 2) When the model goes into a manoeuvre (e.g. a turning circle) and the speed is reduced due to the increased loading on the propellers, the rate of propeller revolutions should be reduced accordingly. This reduction should follow a constant torque strategy for fixed pitch propellers or a constant power strategy for controllable pitch propellers.