

Speed/Power Trials

The determination of the ship's performance through the measurement of ship speed and propulsion power at sea is often the last step in the design cycle. Accurate performance of speed/power trials and measurements of all environmental conditions is of crucial importance for the analysis of speed/power trials.

Services:

- Independent measurement and analysis of speed/power trials
- Verification of contractual obligations
- Verification of ship speed for EEDI
- STAIMO analysis
- Validation of model tests or CFD
- Research on speed/power performance before and after refits, hull cleaning, etc.



Background

In 2006, leading ship owners, yards, class societies and MARIN developed a new industry standard for speed/power trials, called STA. This standard was drafted with the goal to create an accurate, transparent and non-manipulative standard. In 2012 the ITTC adopted the STA-standard, soon followed by ISO15016 in 2015. IMO declares the ITTC/ISO15016:2015 standard as the preferred standard for the determination of ship speed for the Energy Efficiency Design Index (EEDI).

Objectives

MARIN carries out speed/power trials with the following objectives:

- To establish contracted obligations between builders and owners relating to speed, power and fuel consumption
- To determine ship speed for the Energy Efficiency Design Index (EEDI)
- To obtain performance data on full scale ships for use in future designs
- To update ship-model correlation studies based on statistic analyses
- To validate MARIN's design models

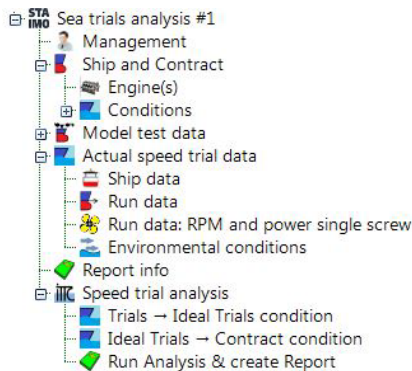
The MARIN Speed/Power trial

In order to establish ship speed accurately, ideal environmental conditions are necessary. Since ideal conditions often do not apply during a sea trial, MARIN offers a large number of measurements that can be used to correct the sea trial during the post-processing phase. The measurements comprise:

- Determination of ships' conditions at trials (draught, displacement, water density, water and air temperature)
- Ship's position, speed, heading and course using a Differential GPS system
- Power and rotation rate on propeller or drive shaft(s)
- Wind speed and direction
- Wave height and period by wave buoy, C-Drone or wave radar



Installation of power measurement system on a thruster drive shaft



Speed/power trial analysis software STAIMO, developed by MARIN

Related products:

- Noise and vibration measurements
- IMO manoeuvring trials
- Propeller cavitation observations
- Sea trial acceptance tests
- STAIMO freeware for speed/power trial analysis
- MARIN consultancy

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All measurements will be recorded continuously and synchronously to enable fast processing and in-depth analysis if required.

MARIN Speed/power trials are conducted and analysed according to the ISO15016:2015 and ITTC Recommended Procedures and Guidelines.

Analysis

For the analysis and correction of speed/power trials, MARIN has developed a computer program called STAIMO, which is compliant with the ITTC and ISO15016:2015 standard. A report of the speed/power trials can be produced within minutes after the last speed run. This report describes in full detail and transparency:

- All measured values during trials
- Applied corrections (for wind, waves, temperatures, displacement, etc.)
- Comparison with model test results
- Achieved speed at the stipulated contract conditions (in ideal trial conditions, or including contractually agreed wind and wave conditions and sea margin)
- Achieved speed at the EEDI condition

Options

Besides measurements conducted by MARIN, the trial can be completed by means of measurements of the ship's own equipment (e.g. water depth, speed log, fuel consumption, propeller pitch, diesel generator load, delivered thruster power, etc.)

Furthermore, in combination with the speed/power trials the following services can be offered:

- Measurement of manoeuvring characteristics according to IMO regulations
- Noise and vibration measurements
- Propeller induced pressure fluctuations
- Propeller cavitation observation
- Seakeeping measurements
- Pre-contractual consulting for ship owners (what to include in your new build contract)