

## WAGENINGEN Propeller C- and D-Series JIP

### Background

The Wageningen Propeller B-Series are used by designers and engineers worldwide. These series comprise the open water characteristics of conventional fixed pitch propellers with various numbers of blades and blade area ratios for different pitch. For several of these propellers, also the characteristics in 4-quadrants (positive and negative rpm and positive and negative speed) were published by MARIN in the sixties and seventies.

Today many ships are equipped with Controllable Pitch Propellers (CPP). Both for ships and offshore structures, use is made of ducted CPPs. The thrust-torque performance of these units is not only of importance for ship designers but also for accurate analysis of speed trial results, DP-systems and DP-simulation models and manoeuvring simulators. Due to lack of this systematic information for CPPs in such cases, normally use is made of the B-series data. The characteristics of CPPs, however, differ substantially from those of fixed pitch propellers. For these reasons a Joint Industry Project called "Wageningen Propeller C- and D-Series" is initiated.

In addition to the propeller thrust and torque, the hydrodynamic characteristics of the blade spindle torque will also be measured.

### Objective

The "Wageningen Propeller C- and D-Series" will provide open water characteristics in complete 2 quadrants for modern CPP designs, including blade spindle torque. Both open and ducted CPPs will be considered.

### Scope of work

Open water model tests will be conducted for a systematic series of CPPs and ducted CPPs. The number of cases which will be tested depends on the number of participants in the JIP.

At this stage the following series is foreseen:

- C4-40, C4-55, C4-70
- C5-75
- D4-40, D4-55, D4-70 in both 19A and 37 ducts

The tests will cover the complete range of pitch settings as well as both flow directions so that the complete 2 quadrants can be derived.

### Deliverables

Open water characteristics (propeller thrust and torque, and blade spindle torque) of the specified series of CPPs and ducted CPPs. The results will be delivered in diagrams and polynomials.

### Organisation

The work will be conducted by MARIN in the joint industry project "Wageningen Propeller C- and D-Series". Participation is open to all interested companies such as propeller designers, navies, class, yards, DP system suppliers. Participation is confirmed by signing the JIP Participation Agreement with MARIN.

The results and costs will be shared between these participants. Results will be confidential for 3 years after completion of the JIP.

For more information please contact the departments;

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