

2nd Workshop on Cavitation and Propeller Performance

Introduction

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Potsdam Model Basin (SVA)

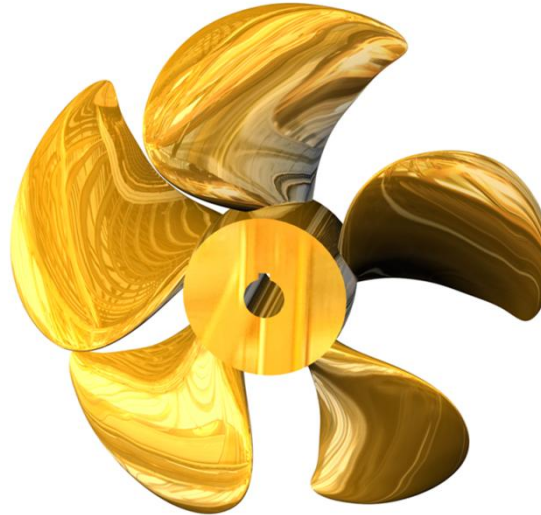


The fourth International Symposium on Marine Propulsors 2015 – smp'15

Introduction

- The first workshop was held in Hamburg 2011
- Initiated by Prof. Abdel-Maksoud
- 2 cases (Delft foil and propeller case)
- Propeller case was hosted by the SVA
- In course of the workshop the data of the VP1304 propeller was published under the acronym **PPTC** (Potsdam Propeller Test Case)
- For the smp'15 new test cases were generated on basis of the VP1304 propeller.

Geometry



VP1304

Diameter	D	[m]	0.250
Design pitch ratio $r/R = 0.7$	$P_{0.7C}/D$	[-]	1.635
Area ratio	A_E/A_0	[m]	0.779
Chord length $r/R = 0.7$	$c_{0.7}$	[m]	0.1042
Hub ratio	d_h/D	[-]	0.300
Number of blades	Z	[-]	5
Sense of rotation		[-]	right
Type			CP-Prop.

smp'11 vs. smp'15

PPTC	Case1	Case2	Case3
smp'11	Open water, $\psi^{bP} = 0^\circ$	Velocity field (PIV-data), $\psi^{bP} = 0^\circ$	Cavitation pattern for 3 points, $\psi^{bP} = 0^\circ$
smp'15	Open water, $\psi^{bP} = 12^\circ$	Cavitation pattern for 3 points, $\psi^{bP} = 12^\circ$	Pressure pulses for 3 points, $\psi^{bP} = 12^\circ$

- smp'11: homogeneous inflow steady, only 1 blade passage needed, blind test
- smp'15: inhomogeneous inflow unsteady, entire propeller needed, blind except one operation point

smp'15: Case 1, 2 and 3

Case 1

- Open water curves
- $J = 0.6, 0.8, 1.0, 1.2, 1.4$

Case 2

- Cavitation pattern and thrust breakdown, $n = 20$ 1/s

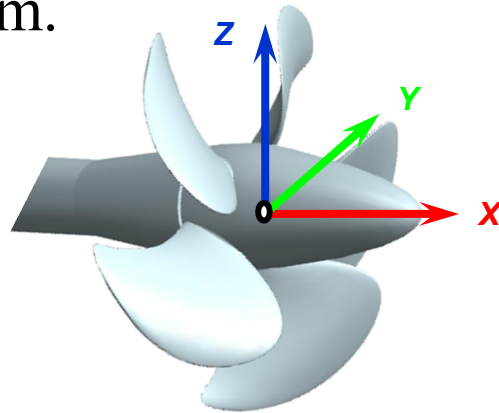
Case 3

- Pressure pulses for 3 operation points at 3 positions
- Wetted and with cavitation, $n = 20$ 1/s

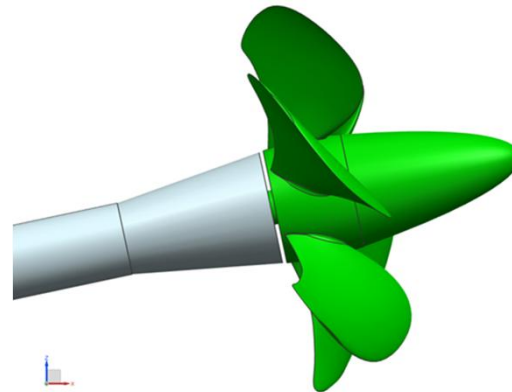
	Case 2.1 and 3.1	Case 2.2 and 3.2	Case 2.3 and 3.3
J	1.019	1.269	1.408
σ_n	2.024	1.424	2.000

Forces

- Propeller forces were always requested in Propeller coordinate system.



- Propeller forces were always requested including the forces on the hub



* smp'11: blade forces

- Although the shaft is inclined by 12° we continue to talk about **Open Water Tests**

Data

- All data remains published on the SVA web site www.sva-potsdam.de/pptc
- SVA report 4273 “Potsdam Propeller Test Case (PPTC), Open Water and Cavitation Tests with the Model Propeller VP1304 in Oblique Inflow” will be published soon (Case 1 and Case 2).
- Cavitation videos will be published.
- Report containing the pressure pulses will be published
- The presentations will be published.
- Workshop proceedings will be revised and published.