

Tokyo 2015

A Workshop on CFD in Ship Hydrodynamics

Opening

2 December 2015

Takanori Hino

Welcome Address

Prof. Kazuhiro Mori

President

National Maritime Research Institute

Japan

Opening Speech

Prof. Lars Larsson

Chalmers University of Technology

Sweden

Co-chair

International Steering Committee

Workshop History

- 1980, Gothenburg. Boundary layer methods
- 1990, Gothenburg, RANS methods, "Mystery Case", "Hooks"
- 1994, Tokyo. RANS (and Potential Flow) with free surface
- 2000, Gothenburg. RANS. Propulsion
- 2005, Tokyo. RANS. Manoeuvring, Seakeeping
- (2008, SIMMAN. Manoeuvring)
- 2010, Gothenburg. RANS, DES, LES.
- (2014, SIMMAN. Manoeuvring)
- 2015, Tokyo. RANS, DES, LED. Energy Saving Device

Workshop principles

- Objectives
 - To assess the state-of-the-art of CFD in Ship Hydrodynamics
 - To learn from each other
 - Participation
 - Invitation to all researchers active in the field
 - Test cases
 - Specify several test cases in detail. Let participants chose.
 - Results
 - Request detailed results in a common format
 - Compile and visualize them for easy comparison at a meeting
 - Methods
 - Request *detailed* information on methods (questionnaire)
- Linking of detailed method description and results => the way forward**

Present Workshop

- Statistics
 - 30 participating groups (33 in 2010)
 - 16 Test Cases (18 in 2010)
- The structure of the workshop
 - No papers presented.
 - Emphasis on reviews of organizers and on discussion
 - Poster sessions
- 3 printed Volumes + USB flash memory with Volumes + questionnaire answers

Hulls

Japan Bulk Carrier (JBC)



KRISO Container Ship (KCS)



ONR Tumblehome Ship (ONRT)



Test cases – JBC

Case	Hull	Condition	Attitude	Validation variables	Data provider
1.1	JBC <u>w/o ESD</u>	Towed in calm water	$FR_{z\theta}$	Resistance, sinkage & trim	NMRI*/OU
1.2	JBC <u>with ESD</u>	Towed in calm water	$FR_{z\theta}$	Resistance, sinkage & trim	NMRI*/OU
1.3	JBC <u>w/o ESD</u>	Towed in calm water	$FR_{z\theta}, FX_0$	Mean velocities, turbulence and wave patterns	NMRI*/TUHH/OU
1.4	JBC <u>with ESD</u>	Towed in calm water	$FR_{z\theta}, FX_0$	Mean velocities and turbulence	NMRI*/TUHH/OU
1.5	JBC <u>w/o ESD</u>	Self propelled in calm water	$FR_{z\theta}, FX_0$	Thrust, torque, propulsive coefficients, sinkage & trim	NMRI*/TUHH/OU
1.6	JBC <u>with ESD</u>	Self propelled in calm water	$FR_{z\theta}, FX_0$	Thrust, torque, propulsive coefficients, sinkage & trim	NMRI*/TUHH/OU
1.7	JBC <u>w/o ESD</u>	Self propelled in calm water	$FR_{z\theta}, FX_0$	Mean velocities and turbulence	NMRI*/TUHH/OU
1.8	JBC <u>with ESD</u>	Self propelled in calm water	$FR_{z\theta}, FX_0$	Mean velocities and turbulence	NMRI*/TUHH/OU

Test cases - KCS

Case	Hull	Condition	Attitude	Validation variables	Data provider
2.1	KCS	Towed in calm water	$FR_z \theta$	Resistance, sinkage & trim	KRISO*/NMRI*
2.5	KCS	Self propelled at ship point in calm water	FR_0	Thrust, torque and propulsion coefficients	NMRI*
2.7	KCS	Self propelled at ship point in calm water	FR_0	Mean velocities	NMRI*
2.10	KCS	Captive towed in head waves	$FR_z \theta$	C_T , heave and pitch	FORCE*
2.11	KCS	Captive towed in beam, follow, oblique waves	$FR_{xz\phi\theta}$	C_T , surge, heave, roll and pitch	IIHR

Test cases - ONRT

Case	Hull	Condition	Attitude	Validation variables	Data provider
3.9	ONRT	Free running in calm water	FR _{all}	Thrust, torque, propulsion coefficients, sinkage & trim	IIHR*
3.12	ONRT	Free running in head waves	FR _{all}	Thrust, torque, rpm, motions, trajectory	IIHR*
3.13	ONRT	Free running in beam, follow, oblique waves	FR _{all}	Thrust, torque, rpm, motions, trajectories	IIHR

Program (morning)

Time	Wednesday	Thursday	Friday	Saturday
8.00-9.00	Registration	-	-	-
9.00-9.30	Opening	JBC SP incl ESD Takanori Hino	Discussion Fred Stern/ co-chair Decheng Wan	Organizer's Meeting
9.30-10.00	JBC test data Nobuyuki Hirata		Summary of questionnaire Michel Visonneau	
10.00-10.30	Coffee			
10.30-11.00	JBC test data Takanori Hino	Discussion Takanori Hino/ co-chair Riccardo Broglia	ONRT test data Fred Stern	Meeting Cont.
11.00-12.00	JBC Resistance/s&t/waves Lars Larsson	KCS Resistance/s&t/SP Jin Kim	ONRT SP and course keeping Fred Stern	

Program (Afternoon)

Time	Wednesday	Thursday	Friday	Saturday
13.00-13.30	Discussion Lars Larsson/ co-chair Yoshiaki Kodama	Discussion Jin Kim/ co-chair Suak Ho Van	Discussion Fred Stern/ co-chair Tom Fu	Adjourn
13.30-14.00	JBC Local flow Michel Visonneau	KCS new test data Fred Stern/ co-chair Claus Simonsen	Final discussion, summary and conclusions Local/Global Organizers/ co-chair Milovan Peric & Hrvoje Jasak	
14:00-14.30		KCS Seakeeping Fred Stern/ co-chair Claus Simonsen		
14:30-15.00	Discussion Michel Visonneau/ co-chair Woei-Min Lin			
15:00-15.30	Coffee			
15.30-17.00	Poster session	Poster session	Final discussion, summary and conclusions. Closing	

Use of material

- Policy in the previous Workshop is endorsed
 - All results available for anyone
 - Papers based on workshop results OK with proper acknowledgements
 - Web site kept open for the foreseeable future

Any objections?

Acknowledgements

International steering committee (organizers)

Lars Larsson, Chalmers, Sweden (co-chair)

Fred Stern, IIHR, USA (co-chair)

Michel Visonneau, ECN/CNRS, France

Nobuyuki Hirata, NMRI, Japan

Takanori Hino, YNU, Japan

Jin Kim, KRISO, Korea

Previous and next hosts,

Representatives from Europe, America and Asia,

ITTC CFD committee

Acknowledgements (cont.)

Local Organizers

Nobuyuki Hirata, NMRI

Hiroshi Kobayahsi, NMRI

Yusuke Tahara, NMRI

Kunihide Ohashi, NMRI

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Data providers

NMRI, Japan (JBC, KCS)

Osaka University (JBC)

TUHH (JBC)

KRISO (KCS)

FORCE (KCS)

IIHR (KCS, ONRT)

Future workshops

- International Steering Committee's primary responsibility
 - Select the organizer and venue of the next workshop
 - Define the test cases
 - Coordinate campaigns to obtain more data.
 - Support the Local Organizing Committee of each workshop
- Who is interested in hosting the next workshop?

Let us get started!