Marine Simulation and Ship Manoeuvrability

Edited by
M. S. CHISLETT
Danish Maritime Institute, Lyngby, Denmark
Table of contents

Preface XI
Organization XIII

1 Simulation

1.1 Safety in navigation
Twenty years of marine simulator (CAORF) operations: Lessons learned during these years
H. Eda, F.E. Guest & J.J. Puglisi 3

Effective representation of light aids to navigation in ship handling simulator
M. Numano 13

Safety analysis for the Port of Barcelona (flammable products basin) using a real time
manoeuvring simulator
J.R. Iribarren, J.M. Montero & I. Garcia-Carrasco 21

1.2 Navigation technology
The simulation of tug operations in a multiple simulator environment
B.K. Jakobsen, E.R. Miller, J.H. Wulder & H. Hensen 29

The potential application of virtual reality based simulators to shiphandling and marine
operations
E.R. Miller, M. Fitch & R. Castillo 39

A study on a support of decision-making for collision avoidance in INS
Y. Ishioka, K. Kose, H. Kobayashi, C. Yang, S. Nakamura & H. Yamada 49

A multi vessel training system for high speed craft
A.S. Christensen & P. Schjeldal Jensen 59

1.3 Curriculum/training
The need for improved curriculum development in marine simulation training
P. Barber 77
Inland waterways training using simulation piloting

L. L. Daggett

A study of trainees’ learning attitudes towards shiphandling simulator training

D.-L. Fang

Simulator time and its sea time equivalence (phase I and II)

J. H. Wulder, J. M. C. Schraagen, M. van Hattem & F. L. A. Bloot

Instruction, training and expertise advancement of pilots: The key elements in obtaining the highest possible quality of certified pilots in the Netherlands

H. A. Dijkhuizen, P. den Butter & B. R. Koning

Methodology for bridge simulator skills assessment

S. J. Cross

1.4 Human factors/design

Keynote lecture: Human factors and ergonomics for maritime safety

N. Moray

Development of harbor capability assessment simulation system by the application of fuzzy algorithm


A statistical study of mariners’ behaviour in collision avoidance at sea

J. Zhao, W. G. Price, P. A. Wilson & M. Tan

Cognitive aspects of the captain's work in a critical situation

T. Clemmensen

Beyond bridge resource management: The risk management culture of the U. S. Coast Guard

W. E. Hanson

1.5 Full mission and PC simulators

Insurance and simulation: The next accident that does not happen could be yours

P. Pols & S. Aggevall

Computer system of simulation of ship’s motion

Z. Kitowski, J. Garus, B. Zak

Full integration simulation using both engine room and bridge simulators, design and experiences

M. J. van der Marel, F. S. H. Verkerk & M. Harms

Applying prototype ship transit data to simulator validation

D. W. Webb & R. T. Wooley

The selection and training of simulator instructors

J. D. Douglas
1.6 The STCW Convention

Simulation and the revised 1978 STCW Convention
D.F.Drown

The revised STCW Convention and the new simulator performance standards:
Some implications for simulator designers, operators and instructors
P.M.Muirhead

An analysis of marine simulator instructors qualifications and training needs
R.M.Mercer & D.Sharpe

The role of simulators and the qualifications of instructors and assessors under the STCW Convention
M.L.Barnett

STCW 1995 redemption or receivership
C.R.Pillsbury

2 Manoeuvring

2.1 Manoeuvring standards

Assessment of ship manoeuvrability based on IMO resolution No. A.751
C.-G.Kang & J.-H.Kim

On ship manoeuvrability estimation based on IMO resolution No. A.751(18)
E.Nikolaev, T.Inutina & M.Lebedeva

A classification society’s experience with IMO resolution No. A.751(18)
A.E.Raestad

2.2 New technologies in manoeuvring

Shiphandling at low speed in deep and shallow water
K.Martinussen

New manoeuvring sea trial system using DGPS

Development of a collision avoidance system considering the navigation plan
K.P.Rhee & H.J.Lee

Ability of berthing assisted by joy stick controller
M.Endo, H.Kobayashi & Y.Murayama

A study of supporting system for berthing maneuver
H.Kobayashi

2.3 Prediction of hydrodynamic forces

Keynote lecture: Prediction of ship manoeuvrability: State of the art
M.Fujino
Measurements of stern flow field of a ship in oblique towing motion
K. Nonaka, T. Nimura, T. Haraguchi & M. Ueno

Non-linear hydrodynamic hull forces derived from segmented model tests
J. P. Hooft & F. H. H. A. Quadvlieg

On a prediction method of hydrodynamic forces acting on ship hull including the effect of hull form
K. Kijima, Y. Furukawa & K. Yukawa

Calculation of manoeuvring hydrodynamic force including the effect of viscosity
Liu Zuyuan, Zhang Xiedong & Wu Xiuheng

Performance of an enhanced rudder force prediction model in a ship manoeuvring simulator
A. F. Molland, S. R. Turnock & P. A. Wilson

Hydrodynamic forces on a ship moving with constant rudder angle: A theoretical treatment of rudder angle test
H. Yasukawa, Y. Yoshimura & K. Nakatake

2.4 Performance under special conditions
Experimental determination and modelling of restricted water effects on bulkcarriers
E. Laforce & M. Vantorre

Squat predictions for manoeuvring applications
V. Ankudinov, L. Daggett, C. Huvall & C. Hewlett

Hydrodynamic analysis of a ship collision accident: A triple-play scenario
P. Kaplan

A neural network to identify ship hydrodynamic coefficients
P. Waclawek

On the influence of speed on the manoeuvring behaviour of a container carrier
P. Oltmann

2.5 Manoeuvring prediction
Further notes on the dynamic stability parameter and the prediction of manoeuvring characteristics
N. H. Norrbin

Systematic approach for ship manoeuvrability prediction
K. Kose, W. A. Misiag & X. Xiong

A study on the accuracy of the recent prediction technique of ship’s manoeuvrability at early design stage
T. Ishiguro, S. Tanaka & Y. Yoshimura

Applications of the manoeuvring prediction program SIMSUP to meet the new IMO standards
G. Capurro & P. Sodomaco
Neural networks applied on identification of ship motions
*C. Caux & P. Jean*

2.6 *Mathematical modelling of ships’ steering and manoeuvring behaviour*

A generalized math model for manoeuvring
*M. S. Chislett*

Study on ship manoeuvring mathematical model in shiphandling simulator
*Yang Yansheng*

An advanced physical-mathematical model of ship-hull hydrodynamic forces deduced from simplified vortex model during manoeuvring motion in slow speed
*K. Karasuno & K. Maekawa*

Hydrodynamic modelling for ship manoeuvring simulation
*J. S. Pawlowski*

Full scale measurements of a set of yaw/sway manoeuvring Q-indices
*C. G. Biancardi, D. Cavazzi, G. Graziano & M. T. Masullo*

Author index