Joint International Conference on Marine Simulation and Ship Manoeuvrability 1990

(MARSIM & ICSM 90)

Tokyo, Japan 4 - 7 June 1990

ISBN: 978-1-62276-663-5

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (1990) by International Marine Simulator Forum All rights reserved.

Printed by Curran Associates, Inc. (2013)

For permission requests, please contact International Marine Simulator Forum at the address below.

International Marine Simulator Forum Prof. Capt. Stephen J. Cross Maritime Institute Willem Barentsz P.O.Box 26 8880 AA, West Terschelling The Netherlands

Phone: +31 653 590001 Fax: +31 517 412111

sjcross@hetnet.nl

Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA

Phone: 845-758-0400 Fax: 845-758-2634

Email: curran@proceedings.com Web: www.proceedings.com

MARSIM & ICSM 90

PROCEEDINGS

CONTENTS

Preface	i
List of The Local Organizing Committee	ii
List of The Local Executive Committee	iii
List of The International Technical Committee	iv
Keynote Lectures	
-ACTIVITIES OF THE INTERNATIONAL MARITIME ORGANIZATION (IMO) IN THE FIELD OF	4
MANOEUVRABILITY OF SHIPS	3
J1 Session: Validation of Marine Simulation and Index of Manoeuvrability	
	7
-PROPOSAL ON A PRACTICAL PREDICTION METHOD OF SHIP MANOEUVRING MOTIONS BY	
USE OF THE INDEX OF MANOEUVRABILITY	19
—A PRACTICAL APPROACH TO VALIDATE SHIP MANOEUVRING SIMULATORS FOR RESEARCH	
AND TRAINING PURPOSES	27
J2 Session: Manoeuvrability Standards	
—SHIP HANDLING STANDARDS—CAPABILITIES AND REQUIREMENTS	37
RECENT ADVANCES IN THE DEVELOPMENT OF SHIP MANOEUVRING STANDARDS	
-STUDIES ON MANOEUVRABILITY STANDARDS FROM THE VIEWPOINT OF MARINE PILOTS	59
J3 Session: Simulator Applications in Harbour and Waterway Designs	
—A MANEUVERING SIMULATOR STUDY FOR A LNG TERMINAL IN TAIWAN	
— VISUAL REQUIREMENTS OF FORT DESIGN SIMULATORS—A COMPARATIVE STUDY	
— SHIP SIMULATOR APPLICATIONS TO WATERWAY DESIGN—LESSONS LEARNED	
—SHIF SIMOLATOR AFFLICATIONS TO WATERWAY DESIGN—LESSONS LEARNED	93
A1 Session: Marine Simulator Technology	
-A DYNAMIC PARALLEL PROCESSOR SYSTEM FOR 3D IMAGE GENERATION IN REAL TIME,	
COMPLETED FOR SIMULATION BY A UNIVERSAL SYSTEM FOR DESIGN AND MANAGEMENT	
OF DATA BASES	
—SHIP MANEUVERING TRAINER WITH INTELLIGENT OBJECTS USING FUZZY DATA	111
— NEW TECHNOLOGIES FOR PREPARATION AND VISUALIZATION OF ENVIRONMENTS FOR MARINE SIMULATION PURPOSES	117
—A MODERN REVIEW OF AUDIO SYNTHESIS TECHNIQUES FOR MARINE AND BRIDGE	117
SIMULATOR SYSTEMS	125
A2 Session: New Marine Simulators	
—DEVELOPMENT AND VALIDATION OF A MODEL FOR ARCTIC NAVIGATION SIMULATION	105
— THE BRIDGE WING SHIPHANDLING SIMULATOR	
-ON AN INTELLIGENT HARROR MANELLYERING SIMULATOR AND ITS APPLICATIONS	

A3 Session: Desktop Simulators	
—DEVELOPMENT AND APPLICATION OF AN ON-BOARD MANEUVERING SIMULATOR	161
- DEVELOPMENT OF A DESKTOP SIMULATOR AND ITS APPLICATION OF SIMULATOR LINK	169
—ON-BOARD SYSTEM FOR MANEUVERING PLAN	175
A4 Session: Applications of Simulation in Ship Design	
—A SIMULATION PROGRAM FOR ESTIMATION OF THE TUG HANDLING BEHAVIOUR IN	
DESIGN STAGE	185
A5 Session: Ship Operation Supporting and Automating Systems	
—THE PILOTING ADVISORY SYSTEM	
—SHIP CONTROL WITH ELECTRONIC CHART AND PATH PREDICTION	203
—CONCEPTS AND SAFETY EVALUATION OF INTELLIGENT SYSTEMS IN FUTURE SHIP NAVIGATION	209
A6 Session: Marine Traffic Simulations	
—COMPUTER SIMULATION OF SHIP NAVIGATION IN REALISTIC MARINE TRAFFIC FLOW	219
-APPLICATION OF SIMULATOR AND SIMULATION TO ASSESS MARINE TRAFFIC	
ENVIRONMENT	227
A7 Session: Modelling of Vessel Traffic	
— NAVIGATOR-SHIP MODELS FOR THE ASSESSMENT OF MANEUVERING PERFORMANCE AND VESSEL TRAFFIC SYSTEMS	237
—KNOWLEDGE ACQUISITION FOR COLLISION AVOIDANCE MANEUVER BY SHIP HANDLING SIMULATOR	245
—REAL-TIME SIMULATION FOR EVALUATION OF AUTOMATIC COLLISION AVOIDANCE SYSTEM PERFORMANCE	253
A8 Session: Simulator Training for Mariners	
-BRUSH-UP COURSES FOR NAUTICAL OFFICERS USING SHIPHANDLING SIMULATOR	
IN JAPAN	263
-INTERNATIONAL CO-OPERATION ON THE USE OF SIMULATION FOR PILOT TRAINING	269
—THE ROLE OF A PORT AUTHORITY IN EDUCATION/TRAINING AND RESEARCH	279
A9 Session: Procedures and Aids for Mariners' Training	
—COMPUTER SIMULATION PROGRAMME FOR MARINER TRAINING OF LARGE SHIP'S	
MANOEUVRING IN THE HARBOUR	287
—A UNIVERSAL CAI-SYSTEM FOR REAL-TIME SIMULATORS	293
B1 Session: Prediction of Manoeuvring Motions	
- MANOEUVRING PREDICTIONS FOR PRELIMINARY SHIP AND PORT DESIGN	303
PREDICTION METHOD OF SHIP MANOEUVRABILITY IN DEEP AND SHALLOW WATERS	311
—PREDICTION OF STOPPING MANOEUVRES	319
B2 Session: Prediction of Manoeuvring Motions	
-SHIP CONTROLLABILITY: AN INDUSTRIAL PERCEPTION	333
—PREDICTION OF MANOEUVRING PERFORMANCE IN PARTICULAR REFERENCE TO	0.44
MODEL-SHIP CORRELATION TECHNIQUE IN MANOEUVRABILITY	341
—THE ADDITION OF A HEEL-ROLL SERVO MECHANISM TO THE DMI HORIZONTAL PLANAR	340

B3 Session: Model of Manoeuvring Motions	
MODULAR SHIP MANOEUVRING MODELS	363
- HYDRODYNAMIC FORCES BY PROPELLER AND RUDDER INTERACTION AT LOW SPEED	
B4 Session: Manoeuvring in Harbours	
-SHIP MANEUVERING MOTION BY TUGS IN DEEP AND SHALLOW WATER	379
—ON THE DIRECTIONAL STABILITY OF A SHIP DURING STOPPING MANEUVER	387
—PHYSICAL-MATHEMATICAL MODELS OF HYDRO- OR AERO-DYNAMIC FORCES ACTING ON SHIPS MOVING IN AN OBLIQUE DIRECTION	393
B5 Session: Environmental Effects on Manoeuvring Motions	-
-SIMULATION CALCULATION AND COMPREHENSIVE ASSESSMENT ON SHIP	
MANEUVERABILITIES IN WIND, WAVE, CURRENT AND SHALLOW WATER	
—THE MANOEUVRING MOTION OF THE MARAD TYPE SHIP IN WAVES	
—MANOEUVRING MOTION OF A SHIP IN WAVES	421
B6 Session: Procedures to Assess Manoeuvring Performance	
—AN IMPROVED BERTHING VELOCITY INDICATION SYSTEM	
—A PROPOSAL OF A PRACTICAL SHIP MANEUVERABILITY TEST	439
—MANOEUVRING SIMULATION AT LOW SPEED FOR A SHIP WITH TWIN SCREW, RUDDERS AND THRUSTERS	447
B7 Session: Simulation Studies in Harbour and Waterway	
—A PRACTICAL APPLICATION OF A SIMULATOR TO PORT STRUCTURE PLANNING	459
—ON THE TRACK-KEEPING PERFORMANCE OF A CABLE SHIP	467
B8 Session: Hydrodynamic Forces in Restricted Water	
—A STUDY ON SHIP HYDRODYNAMIC FORCES IN RESTRICTED WATER	477
—THE EFFECT OF BANK SLOPE AND WATER DEPTH ON THE FORCES ON A SHIP IN	
RESTRICTED WATER	
—THEORETICAL DETERMINATION OF SHIP MANOEUVRING MOTION IN SHALLOW WATER	493
—INVESTIGATIONS OF PILOTED PERFORMANCE IN RESTRICTED WATERWAYS: PRECISION	505
ELECTRONIC NAVIGATION AND SHIP PERFORMANCE	508
B9 Session: Manoeuvring Performance in Restricted Water	
MANEUVERING PERFORMANCE OF TUG/BARGE ASSEMBLIES IN RESTRICTED WATERWAYS	515
- HYDRODYNAMIC THEORY AND SIMULATION STUDIES OF SHIP INTERACTIONS DURING	
MANEUVERING IN SHALLOW CHANNELS	
—COMPUTER SIMULATION OF SHIP MANOEUVRING MOTION IN RESTRICTED WATER	535
Panel Discussion on Manoeuvrability Standards	
-RECENT STUDIES AND PROPOSALS OF THE MANEUVERABILITY STANDARDS	
(Written Contribution)	545