2022
PRADS
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PRADS 2022
Book of Abstracts

15th International Symposium on Practical Design of Ships and Other Floating Structures

09 - 13 OCTOBER 2022 - DUBROVNIK - CROATIA

EDITORS
Nikola Vladimir   Šime Malenica   Ivo Senjanović

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08:30 - Onwards	REGISTRATION		
09:00 - 09:45	PLENARY LECTURE 3 - MARE I J.J. Jensen: **Extreme Value Predictions and Critical Wave Episodes for Marine Structures**		
09:45 - 10:30	PLENARY LECTURE 4 - MARE I Q. Derbanne: **Brief History of Rule Loads and Longitudinal Strength of Ships**		
10:30 - 11:00	**Coffee break**		
11:00 - 12:40	13. TECHNICAL SESSIONS **Mare II** **Seakeeping I**	14. TECHNICAL SESSIONS **Mare III** **Design IV**	15. TECHNICAL SESSIONS **Mare IV** **Structures, Structural analysis IV**
	X.B. Chen, M.Q. Nguyen, I. Ten, C. Ouled Housseine, Y.M. Choi, L. Diebold, S. Malenica, G. De-Hauteclocque, Q. Derbanne: **New Seakeeping Computations based on Potential Flows Linearised over the Ship-Shaped Stream** A. Olmez, F. Cakici., P. Sahoo: **Validation of Strip Theory Based Frequency-Domain Ship Motion Code** D.J. Jung, S.H. Kim: **Study of Submarine Seakeeping Performance at Free Surface Condition in Regular Waves** A.K. Banik, M.R. Teja, S. Roy: **Hydrodynamic Performance of Single and Double-Row Floating Breakwaters**	B. Sulkowski, A. Magistro, J. Van Houten, M.D. Collette: **Long-Term Voyage Decision Making for Crewless Platforms** S. Jung, S. Ha, J. Cha, J. Lee, S. Kang, P.A. Rahmanto: **Configuration of Small Unmanned Surface Vessel Prototype with Autonomous Navigation** N.P. Ventikos, A. Koimtzoglou, V. Podimatas, A. Rammos, E. Trifonopoulos: **Initial Design Elements for the Development of a Testbed for Safety Analysis of MASS** T. Kuroda: **Evaluation and Countermeasures for Excessive Acceleration at the Bridge Caused by the Ship Stability**	A. Tatsumi, Y. Kageyama, M. Fujikubo: **Development of Bayesian Statistical Model of Welding Initial Deflection and Ultimate Strength Assessment of Plates under In-Plane Compression** T. Miyashita, K. Mikami, M. Kobayashi, Y. Komoriyama, C. Ma, K. Toh, H. Murayama: **Deformation Estimation of Container Ship in Waves by Inverse Finite Element Method** J. Choung, D.H. Yoon: **Structural Damage Assessment of an Icebreaker due to Collision with a Small-Sized Iceberg Considering Hydrodynamic Forces** J.P. Pineau, E. Lerondel, P. De Champs, T. Looten, F. Conti, H. Le Sourne: **Ship Side Grounding Parametric Analysis based on a Super-Element Approach**
12:40 - 14:10	**Lunch**		

STUDY OF SUBMARINE SEAKEEPING PERFORMANCE AT FREE SURFACE CONDITION IN REGULAR WAVES

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[2] Department of Naval Architecture & Ocean Engineering, Inha University, Incheon, Korea

Abstract. Submarines spend most of their time below the water surface, so the design is optimized for submerged condition. However, a performance in free surface condition is also important because submarines face various scenarios and the free surface condition is unavoidable for port departure and arrival. Generally, a potential flow theory is used for seakeeping analysis of a surface ship, and it is known for excellent numerical accuracy. In case of a submarine, the accuracy of potential flow theory is high at underwater, but it is low at free surface condition because of the non-linearity near the free surface area. In this study, seakeeping performance of Canadian Victoria Class submarine in regular waves was investigated to improve the numerical accuracy at free surface condition by using Computational Fluid Dynamics (CFD) and the results were compared to those of the model tests. In addition, Hydrostar, the potential theory software developed by Bureau Veritas is also used for seakeeping performance to compare with CFD results. From the calculation results, it is found that the seakeeping analysis by using CFD give good results compared with those of potential theory. In conclusion, the seakeeping analysis based on the CFD can be good solution for estimating the seakeeping performance of submarines at free surface condition.

Keywords: Submarine, CFD, Potential flow theory, Seakeeping performance, Regular waves.

HYDRODYNAMIC PERFORMANCE OF SINGLE AND DOUBLE-ROW FLOATING BREAKWATERS

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Abstract. Breakwaters (or Wave attenuators) are the structures that protect the coastal line from erosion, protect the marine structures, and provide ideal harbourage conditions against strong water waves. Despite high protecting performances, bottom-founded fixed breakwaters are obsolete now due to their disadvantages like un-economical constructions, blocked water circulation, etc. Floating breakwaters (FBW) which attenuate incident wave energy either by reflection, dissipation, transmission, or any combination are common in use due to their low profile, least effect from tidal variations, and ability to rearrange and re-usage. Up to now, a number of floating breakwaters with novel configurations have been proposed based on better performances and/or high-cost effectiveness. The objective of this paper is to study the hydrodynamic performances of pontoon-shaped, pontoon with top wing-shaped and plus-shaped floating breakwaters in terms of performance parameters that are: a) Wave transmission coefficient (C_t), b) Response amplitude operators (RAO), and c) Mooring tensions. For determining the hydrodynamic performances, FEM-based ANSYS AQWA software is employed, and its hydrodynamic diffraction and hydrodynamic response plug-in results are utilized. For validation, the double-row rectangular-shaped floating breakwater is selected from the work of Rajabi and Ghassemi (2021), and associated hydrodynamic performances were calculated, and compared with the considered data. Results showed there is good agreement between considered and calculated results. Then, the Hydrodynamic performances of pontoon-shaped, pontoon with top wing-shaped and plus-shaped floating breakwaters in a single row and double rows under varied irregular waves are presented and compared. The results showed that the plus-shaped floating breakwater has preferable performance in reducing wave transmission, RAO response, and mooring tension.

Keywords: Floating Breakwater, Wave transmission coefficient, RAO, Mooring tensions, Ansys, Plus-shaped FBW.