

Preface

SEN TA is an annual seminar on marine technology, organized by the Faculty of Marine Technology, Institut Teknologi Sepuluh Nopember (ITS), Surabaya, Indonesia. Initially, SEN TA was a national seminar, the first being organized in 2001, but since 2016 it becomes an international seminar as a response to the need of ITS to be an internationally reputable research institute and as a support in positioning Indonesia as a global maritime axis.

As part of the vision of ITS, marine technology takes a prominent place among most outstanding research fields of the institute. By having this seminar and gathering research institutions, industries and academicians, it is expected that new ideas and concepts can be conceived and developed for the future of marine technology.

Indonesia, particularly, where two-third of its territory is water, depends heavily on marin transportation for domestic and international trade. It is therefore of great importance for the country to master state-of-the-art marine technology, which accompanied by other essential knowledges, can be utilized to manage the marine natural resources sustainably.

This proceeding documents selected, peer-reviewed manuscripts which were presented at SEN TA 2016 held in Surabaya, Indonesia, on 15-16 December 2016. The topics cover coastal and natural resources management, marine energy development and exploration, marine transportation and logistics, marine machinery and system, ship design, construction, production and recycling as well as offshore structures.

The seminar would not have run successfully without the support of various parties. First, we would like to convey our sincere gratitude to the Rector and Senior Officers of ITS for their continuous support and advices. Furthermore, thanks are due to the keynote speakers, invited speakers, authors and presenters. Finally, we are indebted to the reviewers and the International Scientific Committee for their invaluable contributions.

We hope this book can be of great value for researchers, academicians and engineers in the field of marine technology and can contribute to a sustainable marine technology development.

Editors

Surabaya, October 2017

Committees

Patron	Prof. Ir. Daniel M. Rosyid, Ph.D Sutopo Purwono Fitri, ST., M.Eng., Ph.D Ir. Wasis Dwi Aryawan, M.Sc., Ph.D
Advisors	Dr. Eng. Muhammad Badrus Zaman, ST., MT Dr. Eng. Rudi Waluyo P., ST., MT Ir. Tri Achmadi, Ph.D
Chairman	Aries Sulisetyono, ST., MA.Sc., Ph.D
Secretary	Teguh Putranto, MT
Treasury	Gita Marina Ahadyanti, MT
Ceremonial, Culture & Attraction	Imam Baihaqi, MT.
Sponsorship	Sufian Imam Wahidi, M.Sc
Web & Promotion	M. Sholikhan Arif, MT
Exhibition	Ardi Nugroho Yulianto, MT
Food & Beverage	Sri Rejeki W. Pribadi, MT
Accommodation & Transportation	Dedi Budi Purwanto, MT
Documentation	Dhimas Widhi Handani, Ph.D
Logistic & Technical	Agro Wisudawan, MT Prof. Dr. Adi Maimun (UTM, Malaysia) Prof. Dr. Omar bin Yaakob (UTM, Malaysia) Prof. Dr. Wan Mohd Norsani (UMT, Malaysia) Prof. Dr. M Rafiqul Islam (BUET, Bangladesh) Prof. Dr. Takeshi Shinoda (Kyushu-U, Japan) Prof. Dr-Eng. Nobumasa Sekishita (Toyohashi-UT, Japan) Prof. Dong Myung Bae (PKNU, Korea) Prof. Dr. Neil Bose (AMC-UTAS, Australia) Prof. Dr. Richard W Birmingham (Newcastle Univ, UK) Prof. Philip A Wilson, DSc (Southampton Univ, UK) Prof. Dr.rer.nat. Norbert Gruenwald (Wismar Univ, Germany) Prof. Dr. Rob Zuidwijk (RSM, the Netherlands) Dr-Ing. Wolfgang Busse (Wismar Univ, Germany)
International Scientific Committee	

Sponsors

Special thanks to our sponsors,
Your support made this event possible



ITS
Institut
Teknologi
Sepuluh Nopember

