SEA the Future 2020

International Conference in South East Asia

Book of Abstracts

on the Future of
Maritime Technology
Use of the Sea

12-14
February
Pattaya,Thailand

KU KASETSART UNIVERSITY

KASETSART UNIVERSITY FACULTY OF INTERNATIONAL MARITIME STUDIES

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SEA the Future – In South-East Asia's Maritime Industries

The "Future of Maritime Technology & Use of the Sea" was the theme of the 1st SEA the Future Conference, www.sea-future.com. Advanced thinkers from research laboratories, maritime authorities and industry met in Pattaya, Thailand, February 12-14, to look into the crystal ball of how humankind will use the seas, and the increasing role South-East Asia will play in this future.

While the conference's intent was being a catalyst for joined maritime research and business activities in South-East Asia, participants came from all over the world, including Europe and the Americas, to share expertise and visions for a better way of using the seas.

Looking at the Sea the Future 2020 program three key areas to contribute to this intent stand out:

- **Safe(r shipping)** – The weakest link in terms of maritime safety is the human factor. The rapid development of autonomous technology also for ships will affect shipping and its safety record profoundly. Various presentations addressed the technology, but also the effect it will have on stakeholders, not least the maritime workforce. In his keynote, Albert Nazarov (Albatross Marine Design) addressed small passenger and recreational craft, which form the backbone of the Thai maritime business ecosystem. He stressed that safety should start at the design stage, reflecting the working reality and human factors.

- **Smart(er shipping)** – Green is the new smart. Shipping is using advanced technologies, not just IT, to reduce its environmental footprint. The keynote lecture of Prof. Dr. Volker Bertram (DNV GL) gave a survey of assorted technology trends for ships and shipping of tomorrow, addressing low-carbon technologies, biocide-free antifouling and future materials.

- **Sustainable (use of the oceans)** – The sea is much more than just a "highway made of water" to transport goods and people. The keynote lecture of Prof. Dr. Omar bin Yaakob (Universiti Teknologi Malaysia) highlighted this, addressing specifically ocean energy as the New Frontier in South East Asia.

Prediction is difficult, especially for the future, said already Nobel prize winner Niels Bohr. However, looking at the response to the conference, it is a safe prediction that we will see a second SEA the Future. Preparations started to have the next SEA the Future conference in 2022 or 2023 (depending on the COVID-19 pandemic situation) in, of course, South East Asia.

Contact for more information: Asst.Prof. Surasak Phoemsapthawee, PhD,
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The First International Conference in South East Asia on the Future of Maritime Technology & Use of the Sea

February 12-14, 2020

Dusit Thani Hotel, Pattaya, Chonburi, THAILAND

Organized by

Faculty of International Maritime, Kasetsart University

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Message from General Chairs

SEA the Future 2020 is the first international conference aiming at sharing and exchanging of knowledge, experience and technology for sustainable development of maritime in South-East Asia.

It is our intention to organize this conference for the most benefit for all participants to have opportunities to directly discuss with mainstream researchers regarding relevant industries and organizations whose efforts and dedication will greatly contribute to the development of SEA maritime, especially during the year of 2020, the beginning of forthcoming decade.

To successfully suit the conference purposes, Pattaya has been selected. Not only it is one of the most popular sea beaches in Thailand, but notably, it also represents an abundance of culture, fruits and seafoods. If time available, participants may enjoy themselves either by playing watersports or joining a near-by island travel.

On behalf of the Faculty of International Maritime, Kasetsart University, I would like to extend our warmest welcome to each and every delegate at the Conference. We hope that you will enjoy during spend time in Pattaya, especially, you will find the conference as a profound, profession interesting, and unforgettable experiences.

Vice-Admiral Professor Emeritus

Nirut Hongprasit

Dean of the Faculty of International Maritime Studies

Kasetsart University

CONFERENCE AT-A-GLANCE

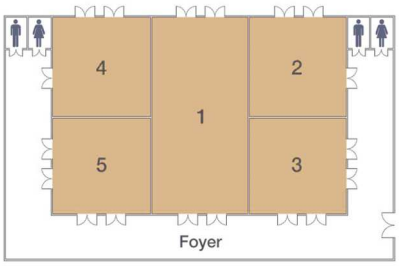
Day 1	February 12, 2020 Wednesday
Time	Session
All day	**Arrival and registration at Dusit 1**

Day 2	February 13, 2020 Thursday
Time	Session
08:30 - 09:00	**Registrations at Dusit 1**
09:00 - 09:30	**Open Ceremony at Napalai C**
Group Photo	
09:45 - 10:00	**Refreshment Break**
10:00 - 10:30	**Keynote Speaker I** [Prof. Dr. Volker Bertram, DNV-GL, Hamburg, Germany] Topic: Technology Trends for Ships and Shipping of Tomorrow
10:30 - 11:00	**Keynote Speaker II** [Prof. Dr. Omar Yaakob, Universiti Teknologi Malaysia] Topic: Ocean Energy New Frontier in South East Asia
11:00-11:30	**Keynote Speaker III** [Prof. Dr. Albert Nazarov] Topic: Small passenger and recreational craft: design innovation and safety improvement
11:30 - 13:00	**Lunch**
13:00 - 15:00	**Oral Presentation** **Sessions 1: Maritime Transportation I at Napalai C** 1) Cross-sectional study of the seafarers' psycho-social working environment 2) Integration in information sharing for safe seas 3) Simulation and Analysis of Container Traffic Flows in a Container Terminal System 4) Deep seaport and National development: Perspective of Bangladesh 5) Development of seaport as logistics center: Bangladesh perspective **Sessions 2: Maritime Innovation I at Dusit 5** 1) Conceptual feasibility analysis of fresh water maritime transportation in Chile using flexible floating bags 2) Hydrodynamic performance of heaving wave energy converter 3) Automatization on ships – are we sufficiently prepared? **Sessions 3: Ship design I at Dusit 6** 1) Seakeeping Prediction for a Generic Naval Vessel 2) Vibration Analysis for Ship Acoustics Signature 3) Ship Stability Assessment Method using Stability Index

Day 2 February 13, 2020 Thursday (Continued)	
Time	Session
13:00 - 15:00	**Oral Presentation** **Sessions 4: Sustainable technology at Dusit 7** 1) Operational Fuel Savings per Operation and Condition: A Combination of Ship Energy Devices 2) An Initial Study of Reutilization Abandoned and Idle Offshore Oil and Gas Platforms for Offshore Aquaculture in Indonesia 3) Sand spit evolution at Laem Talumpuk, Thailand
15:00 - 15:30	Refreshment Break
15:30 - 17:30	**Oral Presentation (Continued)** **Sessions 1: Maritime Transportation II at Napalai C** 1) Application of Multimodal Transport System in Bangladesh Considering the Inland Waterways: Prospects and Challenges 2) Risks of Blockchain technology: A perspective of maritime transportation 3) The new information technology for improving freight forwarder services: A case of iSpot Solution technology in Thailand 4) Using GIS, GPS and sonar chart to identify oceanographic barriers and impacts on the installation of floating pier along the coastal line of Thailand 5) Sulphur pollution prevention in maritime transportation: The potential solutions for international shipping lines **Sessions 2: Maritime Innovation II at Dusit 5** 1) A Study of the Suitability of Marine Transportation Personnel Using Brainwave Analysis and Virtual Reality Technology 2) Digital training solutions in the maritime context: Options and costs 3) Semi-active flapping foil: a practical and efficient biomimetic propulsion **Sessions 3: Ship design II at Dusit 6** 1) Holding force limit of an anchor and a cable 2) Designs of breakwaters to reduce green water loading effects on bow structures 3) Influence of Cavity surface on flow transitions at Taylor Couette Flow **Sessions 4: Material science at Dusit 7** 1) Investigation on the correlation of low-alloy steel welded joint tested by indoor accelerated experiment and atmospheric exposure experiment in a tropical marine environment 2) Study of Corrosion Resistance of Weathering Steel Exposed to Different Tropical Atmosphere 3) Aging Treatment of Grain refined A356 in the recycling process: the effect of Mg
18:00 - 20:00	**Banquet and discussion for future collaboration**

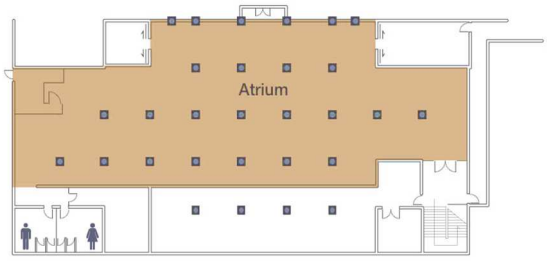
Day 3 February 14, 2020 Friday	
Time	Session
09:00	**Registrations**
09:30 - 12:00	**Visit of industrial site**
12:00 - 13:00	**Lunch**
13:00 - 14:00	**Visit of Kasetsart University, Sriracha campus**
14:00 - 15:00	**Close ceremony and discussion for future collaboration**

4th Floor



1. Napalai A
2. Napalai B
3. Napalai C
4. Napalai D
5. Napalai E

Lower Lobby Level



5th Floor

1. Dusit 1
2. Dusit 2
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12. Dusit 12
13. Dusit 13
14. Dusit 14

Keynote Speech

Technology Trends for Ships and Shipping of Tomorrow

Prof. Dr. Volker Bertram

Senior project manager, DNV GL, Hamburg, Germany

Abstract

This paper surveys techniques for distance learning, discussing the characteristics, suitability, and cost aspects of various digital technology options. While the techniques and the employed software are generic, the discussion concerns the maritime context, with focus on technical and regulatory content and a scattered trainee base, as is typical for a classification society.

Biography

Dr. Volker Bertram is senior project manager at DNV GL. He got his Dr.-Ing. of the Institut für Schiffbau (IfS) with magna cum laude Siemens award for best doctoral thesis and Kurt-Hartwig Siemers award for best doctoral thesis from University of Hamburg. He has worked in both academia and industry. Dr. Volker is the author of the famous book "Practical Ship Hydrodynamics" and the co-author of "Ship Design for Efficiency and Economy". He has published more than 350 publications, largely on ship hydrodynamics. As a visiting professor, he teaches many subjects for many academic institutes, for example: Ship Design for World Maritime University, Malmö, Sweden; Environmental Aspects of Ships for Hiroshima University, Hiroshima, Japan; Design of Autonomous Underwater Vehicles for University of Pisa, Pisa, Italy; and Naval Architecture for University of Stellenbosch, South Africa. Dr. Volker is also the organizer of four international conference series: COMPIT (IT Applications in Maritime Industries), NuTTS (CFD for maritime structures), HIPER (Future Technologies for Ships and Shipping), HullPIC (Hull Performance monitoring).

Ocean Energy, New Frontier in South East Asia

Professor Dr. Omar bin Yaakob
Marine Technology Centre, Universiti Teknologi Malaysia,
Johor Bahru, Malaysia

Abstract

The declining availability of traditional sources of energy and the harmful effects of fossil fuels have spurred the development of various forms of renewable energy. Ocean Renewable Energy (ORE) technology is relatively new. Energy can be harnessed from the temperature difference between the cold bottom and warm surface water (OTEC), the tidal range fluctuations, tidal streams flow, ocean waves and the salinity gradient between salty and fresh water.

The present ORE development in South East Asia is mainly focussed on resource assessment and development of laboratory and small scale prototypes of the various devices. Indonesia and the Philippines are embarking on larger scale projects. Because of the low tidal and wave resources large scale grid connected projects are very challenging. Most pockets of high tidal streams are located far from national grids connections while the regions of high tidal streams speeds are normally restricted channels making arrays impossible. For wave energy devices, the resource-device matching is crucial. Conflicting uses of the sea restrict also large scale arrays. Therefore it is more practical to tailor development towards small local grids for remote islands or coastal communities around the region. On the other hand, OTEC seems to be the most promising for base load. There is a need for establishment of a sound policy environment and institutional framework including legal, environmental, economics, as well as funding mechanisms for pioneering R&D initiatives.

Biography

Professor Omar completed his Ph.D. at the University of Newcastle, United Kingdom. He then started his career at Universiti Teknologi Malaysia (UTM). He was appointed an Associate Professor in 2000 and a Professor in 2011. He has represented Malaysia in a forum on ocean renewable energy at the headquarters of the United Nations in 2012, and several times at meetings of the International Maritime Organisation (IMO) on marine environment protection since 2010. The Royal Institution of Naval Architects appointed him as a Fellow in 2010 and the UK Engineering Council accorded him a Chartered Engineer status in the same year. He was recently appointed as a member of the Marine Environment Committee of the Royal Institution of Naval Architects. In addition, he was also appointed as an Associate of the Academy of Sciences Malaysia. He is one of the founding member of South East Asia Collaboration on Ocean Renewable Energy (SEAcORE), a member of IOC-Westpac Working Group on Marine Renewable Energy as well as a permanent member of the Organising Committee of Asian Wave and Tidal Energy Conference series (AWTEC).

Small passenger and recreational craft: design innovation and safety improvement

Dr. Albert Nazarov
Managing Director,Albatross Marine Design (Thailand),
Chonburi, Thailand

Abstract

Marine tourism and passenger transportation by small craft are integral parts of Thai recreational sector and public infrastructure. The craft used for such transportation is represented by either imported recreational boats or all kinds of domestic built vessels. Unfortunately, not all of them are designed and maintained for commercial operation with safety in mind. The paper provides the review of experience of Albatross Marine Design (AMD) in field of designing such craft for Thai and overseas operators. Perspective types of craft are classified depending on use, capacity, range, type of activities on board. Approaches to dimensioning and safe design of the craft are studied, based on safety, capacity, motion comfort and economics. Styling trends are featured with some innovative designs are featured. Based on statistics of accidents, main safety aspects of design are identified and proposals towards safety improvement are presented. As further step to safety improvement and based on experience of design and operation, safety matrix is proposed by AMD, covering small recreational and passenger craft used for commercial purposes. Innovative designs developed by AMD are featured as case studies.

Biography

Dr. Albert Nazarov holds the degree in Naval Architecture from Sevastopol National Technical University (1996) and Ph.D. in Ship Dynamics from Odessa National Maritime Academy (2004); he is Fellow of RINA, CEng, member of SNAME, member of Designers Union of Russia. After graduation, Albert was lecturing at Marine Faculty, Sevastopol National Technical University, and also working as instructor at seafarers training center. In Thailand since 2004, Albert was working as a project manager for superyacht refit projects. Since 2006, he is a managing director at Albatross Marine Design (Thailand) specialised in design of small and high-speed craft including yachts, commercial, patrol and fishing craft. Albert is an author of over hundred published research papers on design, safety, composite engineering and hydrodynamics of advanced craft and has been lecturing boat design internationally. He is a member of rules and standards development panels. Albert is also a boating enthusiast and is often a winner of local sailing regattas.

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Please be noted that all the accepted abstracts were presented in this Book of Abstracts while the conference presentation program is adjusted differently due to transport restrictions caused by the COVID-19 pandemic.

SEA the Future 2020

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A Study of the Suitability of Marine Transportation Personnel Using Brainwave Analysis and Virtual Reality Technology

Varinya Phanichraksaphong[1] and **Wei-Ho Tsai**[2,*]

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Keywords
Brainwaves,
Marine Transportation,
Virtual Reality

Abstract
This work aims to investigate the possibility of reducing the occurrence of marine accidents by avoiding the unsuitability of marine transportation personnel. Recognizing that a majority of marine accidents arise from the improper reactions of transportation workers, we propose to evaluate the suitability of transportation personnel with the aid of brainwave analysis and Virtual Reality (VR) technology. By analyzing the brainwaves of a person facing some operation situations simulated via VR, it may be possible to predict his/her responses for the situations and thereby determining if he/she is suitable to involve in a transportation work. Our preliminary experiments show that the brainwave analyses do have a capability of evaluating the appropriateness of the decision made by a people when he/she is facing some situations.

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Aging Treatment of Grain refined A356 in the recycling process: the effect of Mg

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Keywords
A356 alloy,
Aging Treatment,
Hardness,
Marine indsutries

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Abstract
Recycling of A356 scraps is a common practice commonly found in aluminum foundries for marine industry. Basically, these scraps were grain-refined and thermally aged in the previous process to obtain the good mechanical performance. However, the change in mechanical property, such as hardness, during the recycling process was still unclear. In this paper, the role of Mg on the A356 scraps during the remelting process was investigated. Results showed that Hardness of the A356 scraps significantly decreased with increasing the number of recycling. The decreased concentration of Mg was evidently indicated. Thus, the fading of Mg concentration was responsible for the degradation of the mechanical performance of A356 scraps subjected to the continuous recycling process.

An Initial Study of Reutilization Abandoned and Idle Offshore Oil and Gas Platforms for Offshore Aquaculture in Indonesia

R.B.A Nugraha[1], **I.H Cho**[2], **A. Rizal**[1] and **J.S Oh**[2,*]

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Keywords
Abandoned Platform
Offshore Aquaculture
Submersible Cage

Abstract
Indonesian water is home to nearly 500 offshore oil and gas structures. When production from these platforms becomes unprofitable, under Indonesia Regulations, operators are required to remove the platforms. Platform removals are currently costing the oil and gas industry Million US Dollar (MUSD). There is an initiation to utilize the abandoned offshore oil and gas platform for other applications, and one of the potential uses that can be developed in Indonesia is offshore aquaculture for certain species of fish. Even though it is still rise a debate among the experts and policy makers about environmental problems against national income from fish sectors, recently there is a trend reuse the offshore platforms for fish farm in several countries such as US, Malaysia and Australia. The paper tries to examine the potential economic benefits that could result from a mariculture industry, characterizes the potential impact of mariculture on the marine ecosystem, and reviews legal and regulatory considerations to establishing a mariculture industry in the surrounding areas of abandoned platforms. For study case, the fish farming is considered here in case of reusing ATTAKA-I jacket, belongs to Pertamina Hulu Kalimantan TImur (PHKT), without its removal (only the topside to remove) and reengineering of it. Four scenarios of aquaculture options have been simulated based on combination of production characteristics including the fish species (tiger grouper and tuna) and cage types (floating and submersible cages) under consideration and estimation of income and expense.

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Application of Multimodal Transport System in Bangladesh Considering the Inland Waterways: Prospects and Challenges

Sukanta Sen

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Keywords
Multimodal transport,
Logistics,
Container,
Seaport,
Bangladesh

Abstract
Bangladesh is one of the fastest growing countries in the world and it has increased demand for transportation of cargoes. The country has a greater reliance on road transportation in spite of having huge natural inland waterways. Multimodal transportation concept is still underutilized though Bangladesh has a number of containerized cargoes transported to/from all over the world. This paper explored the hindrances and prospects of the multimodal transportation system in Bangladesh. Some points have been advised on how to implement the multimodalism in a country like Bangladesh. The study has been conducted based on extensive literature review and primary data in some cases. The Multimodal Transport system can help in the optimum use of different transport modes in the transportation of freight across Bangladesh and with other countries. This can reduce the pressure and concentration on a particular transportation mode thereby leading to a more efficient system.

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Automatization on ships – are we sufficiently prepared?

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Keywords
Automatization
Working environment
Techical challenges
Education

Abstract

Automatization understood as changes to replace human work (physical or cognitive) on board ships with technologies functioning without direct human assistance has been on the agenda for decades. Initially hard physical labor was replaced by machines and technical solutions. During recent years also more cognitive work tasks on board ships have been replaced by increasingly advanced technology and computers. Automatization has clearly decreased the hard, physical work load for seafarers, it has made the work processes more efficient, and it has reduced the risk of many types of accidents. In general, automatization has not only improved efficiency in the maritime industry, but also improved health and safety for seafarers worldwide.

However, recent research also points us to negative consequences of automatization. More traditional jobs have been replaced by monotonous surveillance jobs, which has been associated with increased risk of stress and fatigue. Further, reduced staffing on board ships has been related to aloneness, increased demands for independence, decision making, and continued and lifelong learning.

Moreover, automatized systems may break down or malfunction and thereby cause unexpected incidences, which on board ships may potentially have fatal consequences. A number of incidents described in the literature including grounding of a large Panamanian passenger ship and the collision between and American destroyer and a tanker not more than a few years ago, have been associated with a combination of technical break downs and lack of ability among officers to recognize and mitigate these failures.

The increasing number of reports on a stressed working environment and technical failures prompt us to ask the question: Are we sufficiently prepared?

Recently, the Secretary-General of IMO, Kitack Lim addressed the issue by two questions, but no answers: 'How will the new technologies impact on the nature of jobs in the industry?', and 'What standards will seafarers be required to meet with respect to education, training and certification to qualify them for the jobs of the future?'

A starting point could be a better understanding and conceptualization of the relation between work, health, wellbeing, and safety combined with an increased focus on preparedness of seafarers through life-long learning. Preparedness in the sense that seafarers irrespectively of whether they work on the deck or on the bridge should be able to intervene and limit consequences of technical failures or break downs.

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Conceptual feasibility analysis of fresh water maritime transportation in Chile using flexible floating bags

Marcos SALAS* and **Astrid SANTANDER**

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Keywords
Water
Drought
Sea-transportation
Flexible container

Abstract
Shortage of fresh water in certain regions of the world is a problem that has been evolving to the worst due to climate changes and population growth. The provision of drinking water for human consumption is critical in some regions of Chile and long droughts have exhausted traditional water sources such as underground reservoirs. In addition, agriculture activities require significant amounts of water and many plantations are currently not viable due to lack of water.
Freshwater has a lower density than seawater and therefore floats in salt water. This study analyzes the technical and economic feasibility of transporting fresh water in flexible large containers, from areas of water abundance, to areas of water scarcity, whether permanent or seasonal, taking advantage of natural sea currents and shore proximity in a single jurisdictional maritime authority. The system can also be designed to provide a rapid mean of transporting large quantities of drinking water to coastal areas affected by a water shortage crisis, caused, for example, by a natural catastrophe such an earthquake or mud flood. Conceptually the transport of large volumes of water can be done at a very economical cost if the towing speed is kept sufficiently low and some degree of automation is achieved.

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Cross-sectional study of the seafarers' psycho-social working environment

Olaf Jensen[1,*], **Fereshteh Baygi**[2] and **Despena Andrioti Bygvraa**[1]

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Keywords
Mental health
Psycho-social indicators
Monitoring
Well-being
Seafarers
COPSQ

Abstract

Background: The seafaring employees often face more difficult working conditions in the sea than the employees working on land. Their mental health is affected by the environment in which they live, often coupled with long working hours that contribute to stress, anxiety, loneliness, depression and suicide. The quality of the mental work environment is dependent on a number of well-known indicators which are the object for this study.

Objectives: To provide systematic and current knowledge about the psycho-social working environment for seafarers in in three countries: Thailand, Denmark and Iceland. The survey of the psycho-social working conditions is intended to be part of a joint program (the Maritime Health and Safety Monitoring Program) and the surveys are intended to be repeated every 3-5 years. The aim is to deliver a valid basis for a continuously update of good and safe working environments at sea.

Methods: A cross-sectional study will be performed by the use of mail distributed questionnaires to a sample of seafarers originate from the respective countries. The content is demographic information, questions about psychosocial work environment, ways that work affects seafarers' private life and family, about the company they work at and about their own health and well-being. More specifically, the Copenhagen Psycho-social Questionnaire (COPSQ) will be used. This was developed by the National Centre for the Working Environment Copenhagen, Denmark. It has been used in many countries in different languages and validation studies shown to be a valid tool for workplace assessment of the psychosocial work environment.

Expected results: The results will be used as situation analysis for the industry to make informed decisions. When the employees filled in the questionnaire, the overall results for the workplace and for each of the departments are calculated. If the survey seems to indicate issues with the psychosocial work environment, the work environment committee or other relevant actors at the workplace should discuss how to act on the basis of the results. The results could help initiate prevention strategies on board. In addition, these may fuel the discussions for reforms in the respective working environments.

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Deep seaport and National development: Perspective of Bangladesh

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Keywords
Deep seaport,
National development,
Maritime
International trade,
Shipping,
Export and import

Abstract
The deep sea port development as an economic infrastructure has a positive effect on the growth and development of countries. The economic history of maritime powers such as Britain, Netherlands, and Singapore clearly documents the significant and critical role which ports have played in the development of their economies. Establishment of a deep-sea port has become strategically very critical for Bangladesh considering its potential impact on the development and economic growth of the country. Port economics and macroeconomics are closely related. Any change in port traffic or operation and port organization has an impact on national economy particularly on the hinterland. Therefore, this study focused on the importance of deep seaport in the national development of Bangladesh. Moreover, the paper gives an overview of a deep seaport and national development in respect of Bangladesh. The study also gives an indication of the effect of a deep seaport on national development. At the end, this study states some recommendations for the establishment of the deep sea port. Those Includes-Studies on the selection of strategic location, details investigation of hinterland connectivity, the decision on investment and proper planning etc.

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Designs of breakwaters to reduce green water loading effects on bow structures

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Keywords
Green water
Breakwater
CFD

Abstract
This work aims to study the various designs of breakwaters in reducing green water loading effects for bow structures of Floating Storage Production and Offloading (FPSO). Three different types of breakwaters design are analyzed and discussed here - the windshield, horizontal grillage and perforated breakwaters. The well-known CFD package ANSYS is used to perform this study. A case of the green water behaviour on a rectangular ship model is presented at the beginning to demonstrate the validity of the present simulation method. Thereafter, the proposed three breakwaters are designed under a series of predefined regular head waves which acts as green water impacting the ship model. A vertical plate behind the breakwater which represents a bow structure was fitted with pressure measurement points to evaluate the effectiveness of the different designs of breakwaters. Lastly, comparisons between the different designs of breakwaters were discussed and it was concluded that among the three designs, horizontal grillage and perforated breakwaters have greater capabilities in reducing green water loading effects as compared to windshield breakwater. As well known to many, reducing green water loading effects requires complex analysis considering multiple parameters, which include deck shape, motions of the ship, freeboard, wave conditions, location and the height of the breakwater on deck. In this study, only fundamental relations between green water effects and the breakwater designs are assessed. An attempt to perform simulation or experimental study to consider the effect of multiple parameters is highly recommended to precisely evaluate the effectiveness of the breakwaters.

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Development of seaport as logistics center: Bangladesh perspective

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Keywords
Sea port
Technology
Port performance
Economy
Port development

Abstract
Seaports as multi-dimensional transport node and integrated logistics center are the key components of the global transport system. Logistics and supply chain processes have high efficiencies in terms of increasing port performance. With regard to ports performance, an integrated port logistics center plays an important role in promoting economic development to absorb the value-added demand of local and international customers. Seaports are developing because of its multi-functions and multi-modalities, which focuses on expanding their services. This development of seaports allows them to cope with up growing demands of the trade. This publication presents subject matter concern with the development of seaports in Bangladesh as integrated logistics center. The objective of this research is to identify existing technological issues, challenges and impacts regarding the development of seaports as logistics centers in the maritime logistics system in Bangladesh. This study is a qualitative research and both primary and secondary data have been used. Based on the findings, some strategies and actions are suggested to the port authority; local logistics service providers and other stakeholders towards developing an efficient port logistics center in Bangladesh.

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Digital training solutions in the maritime context: Options and costs

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Keywords
Digital training solutions,
Maritime context,
Options,
Costs

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Abstract
This paper surveys techniques for distance learning, discussing characteristics, suitability and cost aspects of various digital technology option. While the techniques and the employed software are generic, the discussion is in the maritime context, with focus on technical and regulatory content and a scattered trainee base, as typical for a classification society.

Dissecting Digital Twin Implementation Challenges

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Keywords
Digital Twin,
Digital Thread,
Integration

Abstract
The Digital Twin has become a concept that resonates with shipbuilders. Increasingly, shipbuilders are talking about the Digital Twin from the perspective of how it solves their business challenges. However, many organizations are struggling to implement the Digital Twin in a way that benefits the entire organization, removes silos, and facilitates better decision making. This challenge is exasperated because individuals involved with post-delivery (operations, maintenance) need to extract different information from a Digital Twin than those in pre-delivery (concept, design, engineering, manufacturing, etc.) Capturing information at each phase and using the Digital Thread to capture the evolution throughout the lifecycle is one of the ways we can reconcile those two realities. Beyond implementation, developing a system to synchronize, organize, and understand the relationship between the Digital Twin, Digital Thread, and pre and post-delivery stakeholders is what will have a fundamental impact on solving business challenges.

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Dynamic modelling of ship motion by using SVM and ANN

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Keywords
Ship motion in waves, Mathematical model, System identification, Online modeling

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Abstract
To ensure a safe and efficient navigation for a ship sailing at sea, it is essential to predict the ship motion and implement motion control for the ship. For this purpose, an appropriate mathematical model of ship motion needs to be established online or offline. Various modelling methods including physical model test, numerical computation and system identification, as well as their advantages and disadvantages are briefly introduced. Focus is on the online dynamic modelling by using SVM (support vector machine) and ANN (artificial neural network) based system identification method. The research results of dynamic modelling of ship motion in calm water and in waves by using SVM and ANN are presented and discussed. The application prospect of the modelling method in the online dynamic modelling and real-time motion prediction of intelligent ships sailing at sea is highlighted.

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Holding force limit of an anchor and a cable

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Keywords
Holding force limit,
Cable length,
Soil property,
Catenary,
Dragging anchor

Abstract
It is quite important to predict or detect dragging anchor of ships in rough weather to prevent subsequent collisions or groundings that could lead to disastrous environmental damage. Although there are some empirical guidelines of the cable length for safe anchoring that depends only of the depth of the sea, serious marine accidents following dragging anchor continue to occur. A dragging anchor usually occurs during slewing motion of a ship at anchor in rough weather. The author analyses the equilibrium condition of an anchor and a cable of a ship during anchoring by assuming quasi-steady condition even in slewing motion. This assumption means that the external force acting on the anchor-cable system at a cable end or at a hawse consists not only of the external force acting on a ship but also of the inertia force due to ship mass during slewing motion. He considers the condition of an anchor and a cable in which no part of cable lies on the seafloor separately from the other condition in which a part of cable lies on the seafloor. In the latter condition, the cable may rise from the seafloor with non-zero gradient of slope, though the cable forms catenary in water as in the former condition. He takes into account the effect of vertical component of cable tension on holding force of an anchor by considering decrease of apparent weight of an anchor. He presents formulae of the holding force limit in each condition based on the analysis of parameters representing these cable conditions. Numerical examples demonstrate the effects of extended cable length, depth of the sea, soil properties of the seafloor, and the coefficient representing the effect of vertical component of cable tension on the holding force limit and parameters representing the cable conditions. Some discussions are provided on how to evaluate the risk for dragging anchor.

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HOMESIDE – An Advanced Tool for Polymetallic Sulphide Exploration in the Indian Ocean

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Keywords
Multibeam bathymetry,
Exploration,
Seafloor massive sulfides,
Hydrothermal plume

Abstract
In 2010, BGR prepared an exploration claim on polymetallic sulphides in the Indian Ocean, prospecting started in 2011. After three years of resource-oriented and environmental base line studies, BGR applied for an exploration license at the International Seabed Authority (ISA) and contracted in 2015 up to 2030, plus five years optional extension.
To identify, locate and visualise economically feasible occurrences of Seafloor Massive Sulphides (SMS) along the Central Indian Ridge and Southeast Indian Ridge, BGR developed the deep-towed multi-sensor platform HOMESIDE. It is a towed system for acquiring high-resolution multibeam bathymetry in water depths up to 6000 m.
Resolution is very high (few cm) and the vessel requirements are low, except a fibre-optic tow cable. The tool is easy to handle during deployment and recovery. Beside bathymetry, HOMESIDE acquires water colum reflections and can be equipped with several sensors as needed. For SMS exploration, the integration of a magnetometer and a self-potential measurement array is standard, as well as sensors for retrieving physico-chemical parameters of the seawater like turbidity, redox potential, pH, and CTD. Video, still cams and lights are optional. Main advantages of the system compared to an AUV is the unlimited deployment time and the real-time control and availability of all acquired data. The “open” construction of the telemetry and interfaces allows for continuous improvements like dual-head extension.
Inactive SMS sites are locatable by shape and surface texture of the mounds, magnetic signature and self-potential signal. Active sites are easier to find as they are traceable by a relatively large plume and show typical edifices (“black smoker”). Nevertheless, the target size of polymetallic sulphide mounds is much smaller than the resolution from shipborne bathymetry.
Here we present some results of the exploration methods for active and inactive SMS in the Indian Ocean.

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How an XPRIZE competition can Inspire and create Innovation through next generation ocean engineers

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Keywords
NOAA
XPRIZE
Innovation
Education
Autonomous
Search and Tracking
Student

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Abstract
Innovation is the key to driving ocean technology and engineering to the next century. This session will cover the amazing $1 million dollar XPRIZE NOAA competition won by the high school students from San Jose, CA who are the youngest team to ever win an XPRIZE and show the detailed innovation they created in the 3 year journey. It will show examples of innovation in Space engineering and other fields and how it can also be applied to inspire the next generation of ocean innovator and how companies can leverage this new youthful talent today. It will outline the skills and character the young team needed to succeed and how that applies to all engineering today.

Hydrodynamic performance of heaving wave energy converter

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Keywords
Wave Energy Converter, Asymmetric Buoy, Oscillating Wedge, Capture Width Ratio, Resonance

Abstract
An asymmetric body such as a heaving wedge buoy is one of common designs of wave generator. The oscillation of the floating buoy in heave direction creates wave radiation essentially from the inclined face of the wedge. Via reverse process of such wave radiation mechanism with appropriate motion together with a proper load, sea wave power can theoretically be extracted efficiently. A two-dimensional investigation has been carried out to numerically study the effects of the buoy waterplane area and power take-off load on the power capture performance of such asymmetric wave energy converter. The simulated results have shown that the power efficiency of the asymmetric wedge buoy noticeably exceeds the theoretical limit of symmetric heaving body within a wide range of load condition. Moreover, the wave energy device is considerably efficient when it is resonated and simultaneously resisted with a proper load.

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Influence of Cavity surface on flow transitions at Taylor Couette Flow

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Keywords
Drag reduction
Taylor Couette flow
CFD
Cavity surface

Abstract
The motion of viscous flow in the annuals gap between two concentrated cylinders named as Taylor Couette flow has gained a lot of attention from researchers due to its complex and non-linear behaviour. In Taylor Couette flow, both cylinders can rotate in same or opposite direction; or either one cylinder is in rotation while another one stationary. This study concentrates on Taylor Couette flow with cavity on the stationary outer cylinder and smooth rotating inner cylinder for radius ratio 0.893. The Taylor Couette flow of Large eddy simulation with Wall-adapting local eddy-viscosity (WALE) has been performed for Reynolds number ranging between 30 to 738. The motivation of present study is to investigate the influence of cavity surface on the flow transitions states involved in Taylor Couette flow. Study finds that several pair of vortices appear in the cavity which in turn leads to the Taylor vortices to be expanded along the radial direction. This results in the suppression of the strength of Taylor vortices. In addition, the emergence of vortices in the cavity leads flow to slip over the interface of cavity vortices and Taylor vortices. The combined effect of these two is found to reduce the wall shear stress which is attributed to the appearance of a maximum of 20% drag reduction. This finding may play a significant role in the study of drag reduction and can be practically applied in various fluid structure interaction systems involving rotational parts to improve frictional efficiency. For example, this could have potential impacts for marine industry such as optimizing the bearing and lubrication system design.

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Integration in information sharing for safe seas

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Keywords
Maritime domain awareness,
Real time picture,
Integration of maritime pict

Abstract
As per the geography, more than half of the countries in the world map are littoral states. Hence Maritime Domain Awareness is a great concern of many states (Bateman, S. (2011). However incidents that are reporting in maritime environments are evident that, it is not safe as we thought and influences the national security of a state. Hence maritime security is great concern of littoral and non-littoral nations and emphasis must have given for effective maritime detection as it is the gateway for a maritime interdiction and apprehension.
How much our maritime environment is deserted and far from human eye each and every bit of ocean environment is monitored by many agents of different nations for different perspectives and interests. However in contradictory exploitation Sea for crimes and criminalities is significant and drug trafficking, human smuggling and human trafficking are some of the top list crimes cause threat to the national security of states. Even though mankind is capable to monitor every inch of ocean mass still sea is the main supply route for bulk of drugs and narcotics and reporting illegal migration is a common topic in many news forums. The real cause of this enigmatic situation is not nations are not committed to apprehend the culprits but nations are selfish in information sharing. In some conditions different organization in same nation are reluctant to share information for broader maritime picture. As a result many of us are far from complete maritime picture and monitoring maritime environment absolute isolation for individual interest. Especially developing countries like us must focus for integration as we do not have luxuries to spend on very sophisticate and expensive methods as developed nations. Hence every bit of information is really important to connect the story proper to have a better understanding things are happening in and around our maritime environment. My paper is to propose an effective mechanism to integrate information sharing with national and friendly international bodies to enhance decision making ability to effective interdiction. AIS of merchant vessel tracking and management, VMS on fishing boat management are some of the low cost commercial remote sensing systems which are giving the real time maritime pictures for an effective decision making.

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Investigation on the correlation of low-alloy steel welded joint tested by indoor accelerated experiment and atmospheric exposure experiment in a tropical marine environment

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Keywords
Low alloy steel weld joint,
Tropical marine atmosphere corrosion,
Corrosion step,
Exponential

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Abstract
The correlation as-weld joints of low-alloy steel (LAs) manufactured by in-house filler metal and weld parameters were performed on one-year atmospheric exposure test in Trat of Thailand and wet/dry cyclic corrosion test (CCT). Through cross-section morphological characterization of corrosion pits and electrochemical measurements for the rust layer formed on BM and WZ, it is found that the number and size of corrosion pits on both regions increase with the increase of CCT period, and more obvious galvanic behavior between WZ around fusion line and BM. The corrosion step obtained from 360h CCT is basically conformed to that withdraw from a one-year actual atmospheric exposure test, which is approximately equal to 5μm. Though curve fitting, the evolution of the corrosion step for CCT shows the approximately exponential change.

New approach for establishing global shipping emission inventory and allocating responsibility to nations

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Keywords
Bilateral trade,
Emissions inventory,
Climate,
Premature death

Abstract
Last 20 years witnessed explosive growth of international trade, and the maritime industry flourished driven by the transportation demand. Our paper is the interdisciplinary research began with marine emission inventory model "SEIM" (Liu et al, 2016 in Nature Climate Change) and put forward an integrated model that couples trade, marine emission inventory and epidemiological impacts. We adopted Decision Tree (DT) algorithms of machine learning to predict the missing ship static information. The international Emission Control Area (ECA) and stagewise Domestic Emission Control Area (DECA) of China were embedded in the model to generate global real-time ship emissions. Inland vessels were recognized and applied the low sulphur diesel oil in accord with the standard values. Assigning climate mitigation responsibility is a challenge. Related regulation was intentionally set outside the national allocation schemes in the Paris Agreement. Therefore, this study established a comprehensive model of coupled trade data and ship emissions calculation methods from the perspective of trade-based responsibility distribution and inversely linked global shipping activities and their emissions to driving forces. Taking China and US, two of the biggest economy as an example, here we show, US-China bilateral trade was responsible for ~2.5% of global shipping CO2 emissions and 5,700 (95% CI, 2,700-6,600) premature deaths related to PM2.5 pollution in 2016, in which 1,900 deaths were not local. Emissions per value embodied in US-to-China exports are double than those of China-to-US exports because of the large fraction of agricultural products and waste from US to China. Given the connection between trade and maritime emissions and provided a better tool to assess the maritime emissions through international trade perspective, the analysis presented in this article will be interesting to a wide range of scientists and highly relevant to policymakers.

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Numerical simulation on oblique towing tests and pure yaw tests of a containership on surf-riding condition

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Keywords
Maneuvering in waves
Hydrodynamic derivatives
Surf-riding condition
Numerical simulation
PMM tests

Abstract
Maneuvering in waves is a complex and critical issue that confuses researchers for the last several decades. Among the present methods on that, the widely-used mathematical model approach is considered to be efficient and accurate in large wavelength and little wave steepness conditions. However, based on the assumption that the Maneuvering forces in waves are the same as those in calm water, the wave effect on the hydrodynamic derivatives is neglected in most mathematical model approaches. According to previous studies and theoretical analysis, this assumption is flawed. Therefore, several experiments and few numerical simulations have conducted to research the wave effect on hydrodynamic derivatives. In the present study, oblique towing tests and pure yaw tests will be simulated using the state-of-the-art CFD techniques to obtain the linear hydrodynamic derivatives. The simulation cases in the present study are set according to previous PMM tests of S175 containership on surf-riding conditions. And the simulation results are compared with experimental ones which shows good agreement. Based on that, the wave effect on hydrodynamic derivatives is obtained and the reason for that is analyzed. Finally, the course stability of the containership on the different relative position of the wave are calculated to analyze the reason for the broaching-to phenomenon.

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Operational Fuel Savings per Operation and Condition: A Combination of Ship Energy Devices

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Keywords
Economizers,
Mewis duct,
Energy devices,
Fuel savings,
Environment

Abstract
Latsco Marine Management Inc., among its fleet, operates five Product Carriers (three of 115.000 tons DWT and two of 112.000 tons DWT), constructed in HHI Group on 2014 and 2012 accordingly, which employ several energy saving technologies including Exhaust Gas Economizers (EGE) on the auxiliary engines as a Waste Heat Recovery System and a Mewis Duct. G/E EGE can supplement the steam production while the vessel is at sea and reduce or eliminate the need to run the auxiliary boiler at port or/and at anchorage. Mewis Duct has the ability to harmonize and stabilize the water flow generating a pre-swirl to reduce rotational losses in the propeller slipstream. Subject paper intends to evaluate the energy efficiency of these investments –both as a distinct installation and together-, quantify the energy savings for the past years per operation and condition and transfer the fuel consumption reduction to earnings in order to evaluate the viability of these investments under the prism of an innovative Ship Management Company. Finally, one principal target of this paper is to descry the environmental benefits of these investments as far as nowadays, the environmental factor has been included in the guiding decision criteria.

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Prospects and Challenges of Inland Waterway Transportation System in Bangladesh

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Keywords
IWT
Inland Transport
Dredging Maintenance
Inland Port

Abstract
Bangladesh is crisscrossed by rivers and inland waterways have been playing a significant role to the transportation of goods. Almost all big cities and commercials centers of bangladesh have been established by the river-ports. In bangladesh there are seven hundred rivers and twenty complete rivers-ports. Most of them are being used regularly. The whole zone of the nation comprises of 24,000 kilometers broad system of inland conduits. For nation's economic prospects it is very important to develop the inland waterway transportation system in bangladesh. But inland waterway in bangladesh are facing challenges due to many problems in spite of having good prospects. Therefore, the objectives the objectives of the study are to examine the present IWT systems, its challenges and how it can contribute more than others transportation systems to our national economy. This paper is mainly based on secondary data. The data is collected from journal papers, internet, newspaper, books and articles. Data is also gathered from different maritime authority's website. The research findings indicate that the Bangladeshi inland waterways have huge prospects, but lack of knowledge gap of current condition of inland navigability, not conducting hydrographic survey after 1989, lack of poor management, inadequate inland port facilities, low quality vessel and poor connectivity are the reasons for all of this problem. Inland waterway transports are environmentally friendly than others transportation systems and many local business persons, exporter, importer will be benefited by using IWT. But authority should have to utilize the inland waterways in a right manner. Adequate the depth and air draft should have to be maintained and inland port facilities improvement and infrastructure development are necessary for IWT.

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Risks of Blockchain technology: A perspective of maritime transportation

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Keywords
Blockchain
Cyberthreat
Risk assessment
Safety Assessment
Maritime transportation

Abstract
Blockchain is a technology developed to revolutionize international trade. It is equipped with the distributed ledger technology distributing data and keeping an unchanged record of transaction among stakeholders, creating trust and transparency. Both public and private organizations have adopted this technology into their operation. This includes the Customs Department of Thailand in collaboration with IBM to use TradeLens Platform with Blockchain Technology to increase the capability of port and maritime transportation of the country. However, an increasing of cyber attacks around the world highlighted the Blockchain risks in maritime industry. Therefore, this research aimed to identify the risks of Blockchain technology related to container terminals and seaports by using documentary research method. Besides, the most updated risk assessment method recommended by International Maritime Organization was also discussed in ways that help port managers address the Blockchain risks in business governance, process, and technology. The finding can propose the guideline for risk management preparation of port operators, customs department, and other stakeholders.

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Sand spit evolution at Laem Talumpuk, Thailand

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Keywords
Coastal engineering and management
Sand spit
Shoreline change

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Abstract
Sand spit is a deposition of sediments built up above high tide level and diverging from the coast. The spit has numerous benefits and disadvantages. It protects inland properties, its large accumulation of sediment promotes tourism development and town establishment. The spit varies in size and shape, and may cause frequent nuisance to navigation, affecting width and depth of navigation channel. Understanding its evolution is therefore necessary for successful coastal and navigational management. This study focuses on Laem Talumpuk, in Nakhon Si Thammarat, Thailand since it is one of the biggest spits along the Gulf of Thailand. Thirty years of remotely sensed images were collected from different sources such as U.S. Geological Survey and Google Earth. Shoreline of each image was digitized. Overlaying them revealed a trend; its growth, shape, and orientation. As the result, it was found that the spit has continually grown as much as 30,000 – 120,000 m2/yr. A linear regression curve was later fitted to show a future trend. Related stakeholders can plan their works accordingly.

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Seakeeping Prediction for a Generic Naval Vessel

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Keywords
Seakeeping,
Intact Stability,
Naval Vessel

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Abstract
The capability of a naval vessel does not solely depend on the firepower, size, tonnage, speed and autonomy. The most crucial task of a naval vessel is to perform a complex or routine mission in international water. Therefore, optimising the seakeeping performance is the most critical elements for a naval vessel to move. At the same time, having high seakeeping performance also increase the combat system performance in term of firing capability and accuracy. In this paper, a concept of seakeeping prediction is explored. The illustrations and methods of predicting the seakeeping characteristics were explained. In this present case study, a generic naval vessel is tested during the full-scale trial. The prediction results were presented to demonstrate the seakeeping behaviour.

Semi-active flapping foil: a practical and efficient biomimetic propulsion

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Keywords
Marine propulsion
BEM
Bio-inspired
Fluid-structure interaction
Resonance

Abstract
A flapping foil is an efficient biomimetic propulsor that mimics how fishes or cetaceans propel themselves. In order to generate thrust, the foil heaves and pitches simultaneously to create lift force and to orientate the lift force toward desired direction. These heave and pitch motions need two actuators for each motion or at least one actuator with a complex mechanism. Such configurations are indeed not practical to apply for ships. The configuration of semi-active flapping foil is simpler. A torsional spring is attached to the foil eliminating the requirement of the pitch actuator. Eventually, the semi-active flapping foil is driven with only one actuator in the heave motion. As for the pitch motion, the foil rotates according to the hydrodynamic and the spring moments. With this configuration, the semi-active flapping foil is more practical to use in ships. In this work, the performance of the semi-active flapping foil is studied using a Boundary Element Method (BEM) coupled with a Newton-Euler solver. The effects of spring stiffness together with natural frequency are studied. The propulsive efficiency of the device is found to be comparable with a very high efficient screw propeller.

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Ship Stability Assessment Method using Stability Index

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Keywords
Ship Stability
IMO Regulation
Stability Parameter
Loading Condition
Stability Index

Abstract
The stability of the ships is assessed by various parameters defined in the IMO Stability Regulations. However, it is difficult for the captain to accurately assess the stability of ship due to the absence of a comprehensive review of all IMO stability parameters. In this study, a method of comprehensively evaluating ship stability using the stability index was developed to solve these problems. Through the method, parameters including GM are calculated by the stability index, which can quantify the stability of the ships as a single value. The captains can review the stability of the ships by the stability index and can be provided with appropriate guidelines. To verify the method, the basic stability performances by the IMO stability regulations and stability indices are calculated for 32 loading cases. Comparing the stability indices with the basic stability calculation results, it was found that the stability index properly explained the stability of the ships. The method was found to assess the stability of the ships more accurately than the previous study. By the ship stability assessment method using the stability index, the captains can assess the stability of the ships more easily and accurately.

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Simulation and Analysis of Container Traffic Flows in a Container Terminal System

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Keywords
Simulation
Container Terminal
Traffic Flows

Abstract
Ports are important role in global trading and international business by serving as a multimodal interface between the sea and land transports. Effective management of land-side transportation provides the competitive advantage to port operators in improving services and efficient use of limited space. Modelling and simulation are essential tools for making modifications to existing terminals and evaluating the benefits of new resources or impacts of operation policies. This study present a simulation model that consist of traffic-flow modelling and discrete-event simulation for land-side port planning and evaluation of traffic conditions for a number of what-if scenarios. We design our model based on a real-world case of a container terminal and focuses on a complexity of internal vehicles and external vehicles traveling in spaces and the traffic interactions with port operations such as receiving and delivery of container. Our simulation results show the peak traffic flow data and reveal that an increase in the number of operator increases the container yard throughput. In addition, the proposed methods can also provide decision-support scenarios for decision makers to evaluate future port planning possibilities.

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Study of Corrosion Resistance of Weathering Steel Exposed to Different Tropical Atmosphere

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Keywords
Tropical marine environment, weathering steel, corrosion resistance, XPS

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Abstract
The corrosion resistance of weathering steel in tropical atmosphere environment was investigated by using electrochemical impedance spectroscopy, X-ray diffraction and X-ray photoelectron spectroscopy measurements through one-year exposure experiments at four locations in Thailand (from the sea to the distant sea): Trat, Sriracha, Bangkok and Korat. The results showed that the corrosion rates of weathering steel in four locations are much lower than that of carbon steel. At the same time, the carbon steel has the highest corrosion rate at Trat. However, due to the enrichments of alloy elements Cu and Cr in the inner rust layer in the form of CuFeO2 and Cr2O3, respectively, the corrosion rate of weathering steel in Trat is similar to that in other three locations. It shows that the protective effect of alloy elements on steel is more obvious in tropical marine environment.

Sulphur pollution prevention in maritime transportation: The potential solutions for international shipping lines

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Keywords
IMO 2020 measurement
Sulphur emssion
HSFO
VLSFO
LNG

Abstract
On the1st January 2020, the International Maritime Organization will strictly enforce the IMO 2020 Measurement to control the Sulphur emission occurred during maritime transportation from 3.50% m/m to 0.5% m/m. This measure heavily affects the shipping line in selecting the solutions for controlling Sulphur emission from their operation. This research aimed to explore the potential methods to reduce the Sulphur emission of cargo ships used in international routes by using documentary research. The results showed that there are three possible methods popularly used to reduce Sulphur emission, namely, switching to clean fuels with low Sulphur, installing exhaust gas cleaning systems, and using liquefied natural gas. Each method had both advantages and disadvantages, which were appropriate for different operators depending on the financial target of each operator, ship's structure, and onboard space needed for cargo transportation. It was also found that the first method had the highest popularity due to the long term benefit, while using the other two methods possibly increased the operation cost of the shipping line.

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The new information technology for improving freight forwarder services: A case of iSpot Solution technology in Thailand

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Keywords
Logistics management service
iSpot solution technology
Container tracking technology
Freight forwarder

Abstract
Efficiency in providing logistics management service for container transportation plays an important role on freight forwarders business. Among many practices, the use of information technology is the most sustainable strategy helping freight forwarders survive in the increasingly competitive environment. By using content analysis and expert interview, this study pointed out the successful implementation of iSpot Solution in freight forwarders of Thailand for increasing their efficiency and safety. The findings also indicated that this technology outperformed in container tracking which greatly help customer satisfaction improvement. However, the iSpot Solution technology was suitable for only the high-value products due to the cost of technology installation; therefore, the study suggested the government agency in collaboration with private sectors to develop a policy or project that help reduce cost of iSpot Solution technology to attract more freight forwarders to use iSpot Solution technology.

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The role of the intermodal freight transportation system for increasing the maritime freight transport facilities in Bangladesh

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Keywords
Intermodal
Containerization
Sustainabilty
Qualitatitve
Maritime

Abstract
Intermodal freight transportation system is denoted as best economic and environmentally friendly transportation system in the age of containerization. A small scale road intermodal is operating between Chittagong port and Inland Container Depot-ICDs/Off-docks in the port city Chittagong only. In addition, the share of rail and river intermodal is increasing due to the full utilization of rail mode and increased attention to the river mode in terms of cost and sustainability of freight transport in Bangladesh. However, the current share of intermodal is not in a significant figure and standard of intermodalism for a maritime nation. The government of Bangladesh is planned to set up 100 Special Economic Zones-SEZs and it is essential to provide freight transport facilities to support SEZs strategically. The intermodal system is a great way to connect all SEZs to the seaports for doing international trade. Besides, all manufacturing and Ready-made Garments-RMG industry will get international access for managing their imports and exports through the intermodal freight transportation system. In this context, the qualitative research method is used to research in getting the qualitative data and accompanying research surveys at the field. This research tries to explore the barriers and scope of work to manage an integrated intermodal freight transportation system in Bangladesh. Overall, the intermodal freight transportation system will foster the transport of containerized cargo and last-mile delivery as well as maritime freight transport facilities in Bangladesh.

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Using GIS, GPS and sonar chart to identify oceanographic barriers and impacts on the installation of floating pier along the coastal line of Thailand

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Keywords
Sea Walk floating pier
passenger terminal
in Thailand
cruise business

Abstract
Cruise business in ASEAN region that has continuously grown from year to year has highlighted the essences of infrastructure expansion and improvement of passenger ports. However, increasing the physical port capacity along the coastal line is difficult in practice because of many limitations, such as environmental impacts on marine ecosystem and species, coastal structure, and large amounts of investment. To help these problems, this study aimed to analyze the pros and cons, including possibility, in installing the floating pier along the coastal line. Using the piers lie on the coast of the Andaman Sea and the Gulf of Thailand, the authors adopted GIS, GPS and sonar chart to identify the oceanographic barriers and likelihood for the floating pier (i.e. Seawalk) implementation. The finding demonstrated that the floating pier helped reduce limitations of the fixed pier and increase the potential of the passenger port to increase their capacity and flexibility in providing port services. Moreover, the study also found that the passenger ports in Krabi had the highest feasibility for using floating pier, followed by Phuket, Ranong, Surat Thani, Chonburi, Songkhla, Phangnga, Satun, and Trad, respectively. Among many barriers, the average depth of the ocean was the major cause obstructing the use of floating pier, followed by traffic jam and tourist attraction.

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Vibration Analysis for Ship Acoustics Signature

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Keywords
Vibration
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Mine warfare

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Abstract
Vibration analysis in Naval Industry has been around for many decades; however, the limited open literature creates a moderate development on the vibration domain particularly in the Naval Ship. Vibration analysis refers to the process of measuring the vibrations level and frequency on the equipment or ship structure. Several guidelines available for the naval industry as a benchmark or general standard. However, actual vibration values are also kept as secret information. In this presentation, a vibration analysis on a rotary machinery onboard naval vessel is presented. The outcome is expected to prescribe the machinery health condition and its components. Furthermore, the ship structure vibration also presented to explain the philosophy of ship acoustics signature.

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