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On the development of catamaran hull form for fish processing vessel to support domestic fishing activities in indonesia

[O razvoju oblika trupa katamarana za brod za preradu ribe kao podršci nacionalnom ribarstvu u indoneziji]

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Save all to author list

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Abstract

Several advantages of multihull, such as catamaran, have been extensively discussed in the previous research. Therefore, this research focuses on developing a catamaran hull form for the fish processing vessel hull. The initial stage is determining the principal dimension and exploring the configurations of catamaran hull forms. The existing high-speed craft catamarans have been adopted to determine the parent model main dimensions using a linear regression equation model. Otherwise, the catamarans single demi-hull geometry was developed by converting and modifying the parent model hull form

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Editorial

Dear Readers,

Naše more, International Journal of Maritime Science & Technology "Our Sea", entered a new century of its existence. It has been a long and turbulent period during which our journal has transformed from a professional to a scientific journal, looking forward to being accepted within the group of the best publications with maritime themes in this part of the world. Also, there are just a few specialised journals on seafaring worldwide, published for such a long period and our publication may be considered to be both our maritime and cultural heritage.

The third issue in 2021 contains 8 papers. The first one is the original scientific paper by Croatian authors: Svjetlana Bobanović-Ćolić, Jakša Bolotin, Nikša Glavić and Enis Hrustić. The paper is titled: Microbiological Quality of Seawater and Mussels (Mytilus galloprovincialis, Lamarck 1819) in the Dubrovnik Coastal Area (Southeastern Adriatic). This is the first intensive study conducted on the water and mussel quality of the coastal area of Dubrovnik. This study shows that it is important to note that microbial contamination has often been detected in mussels.

The second paper is a preliminary communication by Croatian authors: Zoran Veljačić and Krešimir Grilec. The paper is titled: Increasing the Wear Resistance of Marine Diesel Engines Elements Made of Ductile Iron. This paper examines the influence of austempering and shot peening on the wear resistance of ductile iron. Samples for further testing were made from mechanically processed casts.

The third paper is a preliminary communication by Slovenian authors: Gašper Grm and Aleksander Grm. The paper is titled: Testing the Functionality and Applicability of Smart Devices for a Handheld Celestial Navigation System. The autors try to anwer on the question: "Can smart devices be used in celestial navigation as a measurement device to measure the orientation angles of celestial bodies?" This is their primary hypothesis. They elaborate the answer "yes".

The fourth paper is a preliminary communication by Polish authors: Stanisław Milewski, Bogdan Szturomski and Radosław Kiciński. The paper is titled: Strength Analysis of the Marine Weapon's Construction. The authors try to present and harmonize the requirements for naval military structures. The lack of experimental verification of newly built systems was indicated. Therefore the finite element method was used to determine the durability of the critical design elements.

The fifth paper is a preliminary communication by Indonesian authors: Ahmad Fauzan Zakki, Deddy Chrismianto, Aulia Windyandari and Rizaldy Ilham. The paper is titled: On the Development of Catamaran Hull Form for Fish Processing Vessel to Support Domestic Fishing Activities in Indonesia. This research focuses on developing a catamaran hull form for the fish processing vessel hull. The initial stage is determining the principal dimension and exploring the configurations of catamaran hull forms. The existing high-speed craft catamarans have been adopted to determine the parent model main dimensions using a linear regression equation model.

The sixth paper is the last preliminary communication in this issue by author from Montenegro Senka Šekularac – Ivošević. The paper is titled: Fostering Maritime Innovations Through Human Capital: Exploring the Status Quo of the Adriatic Universities. The purpose of the paper is to emphasize the need for enhancing participation of the Adriatic maritime universities and researchers in modern innovation processes in maritime industry. The paper primarily analyses human capital in regard to two constituent components - academic (academic rank and the length of research experience) and collaborative (expertise in innovation projects, the frequency of participation, the constraints related to partnerships and funds).

The seventh paper is a scientific review by Polish author Piotr Kamil Korlak. The paper is titled: Analysis of Operational Efficiency of the Proposed Propulsion Systems for Selected Large RoPax Vessel. This paper presents the characteristics of ferry shipping with particular emphasis on large RoPax vessels operating in the Baltic Sea. A critical review of main propulsion system used on large RoPax ferries has been done.

The eight paper is a scientific review by Slovak authors: Andrea Galieriková, Matúš Materna and Andrej Dávid. The paper is titled: Unlawful Acts in Maritime Transport & Civil Aviation. This paper provides a comprehensive analysis and comparison of the most serious types of unlawful acts (terrorism and piracy) regarding the legislative and jurisdiction. For the sake of comparability of legal phenomena, special attention is paid to illegal acts at sea and in the airspace above the sea.

In third issue we traditionaly publish Supplement with professional papers. The first one is a professional paper by Latvian authors: Kristine Carjova, Mukharbiy Banov, Leonids Vinogradovs, Guntis Strautmanis and Ineta Irbe. The paper is titled: Acoustic Emission Leak Detection on a Technological Pipeline.

The second paper in Supplement is a professional paper in croatian language by Croatian author Bruno Orešković: The paper is titled: Mjerenje protoka plina na platformi Ivana A (Gas flow measurement on the Ivan A platform).The aim of this article is to process the flow measurement method using the pressure drop (dP) method currently used on INA's Ivan A platform and to present test reports from the platform. The article discusses the mechanical components that need to be installed, the instruments used in the measurement as well as through the control systems (DCS or SCADA) on which the measured values are processed and shows the unit gas flow.

Besides our publisher, The University of Dubrovnik, the journal is considerably supported by The Ministry of Science and Education of the Republic of Croatia. In addition to the support provided by The Ministry and our Editor, our sponsors are especially important, Atlantska plovidba being our longest continuous sponsor. Recently, Society of Friends of Dubrovnik Antiquities, Tourist Board of the City of Dubrovnik, Dubrovnik-Neretva County, Dubrovnik Airport and others have become our partners.

We are especially grateful for all the support and co-operation, and above all, for the constructive comments, suggestions and remarks that will help us sail full speed ahead in future.

Yours sincerely,

Srećko Krile
Editor-in-Chief

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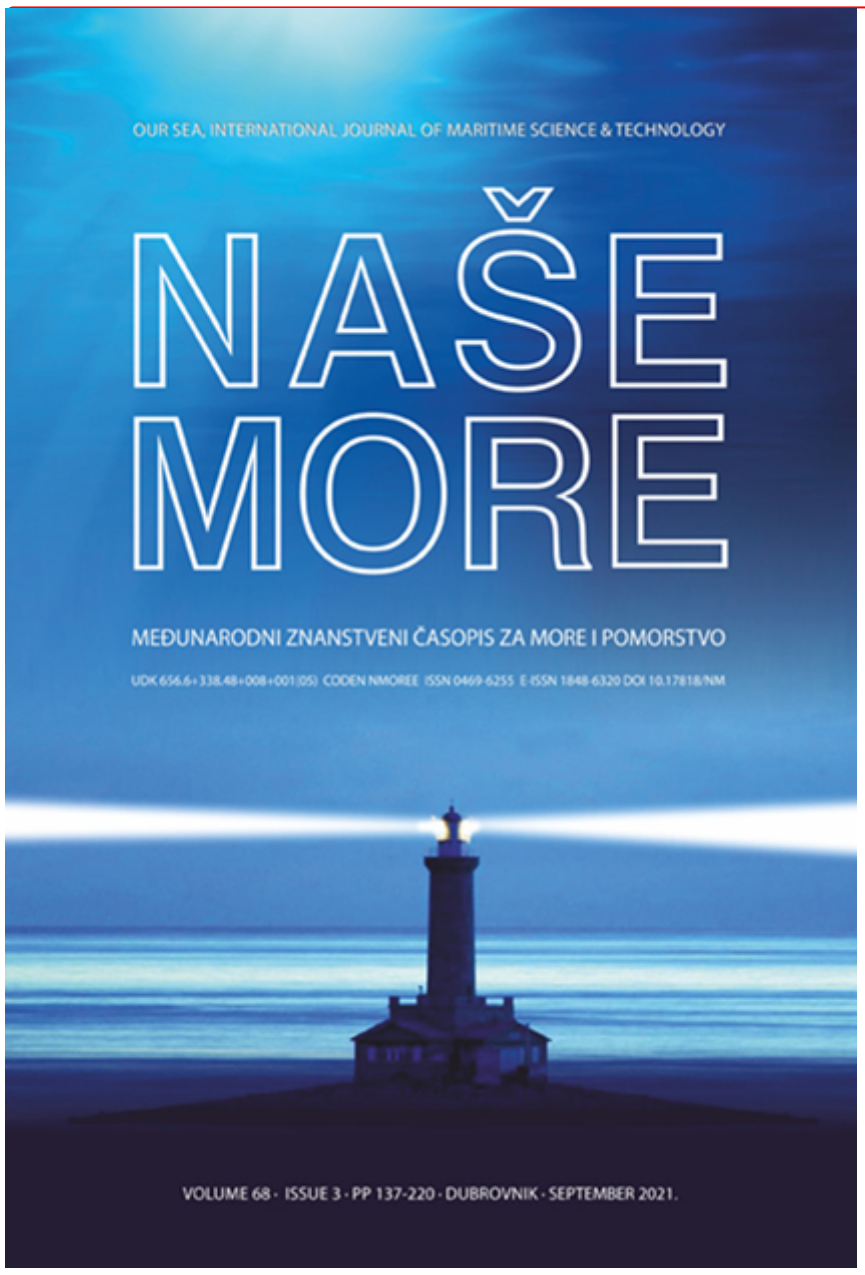

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Review article

english *pdf 433kb*

On the Development of Catamaran Hull Form for Fish Processing Vessel to Support Domestic Fishing Activities in Indonesia

O razvoju oblika trupa katamarana za brod za preradu ribe kao podršci nacionalnom ribarstvu u Indoneziji

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Summary

Several advantages of multihull, such as catamaran, have been extensively discussed in the previous research. Therefore, this research focuses on developing a catamaran hull form for the fish processing vessel hull. The initial stage is determining the principal dimension and exploring the configurations of catamaran hull forms. The existing high-speed craft catamarans have been adopted to determine the parent model main dimensions using a linear regression equation model. Otherwise, the catamarans single demi-hull geometry was developed by converting and modifying the parent model hull form with enlarging the hull displacement to achieve the deadweight capacity and service speed requirements. The demi-hull spacing configuration with s/L 0.17, s/L 0.20, s/L 0.30, and s/L 0.40 on the resistance characteristics, intact stability, and sea-keeping behaviour were also explored. Furthermore, the comparisons with the previously proposed monohull were presented. Regarding the hull resistance performance, the analysis indicated that the catamaran hull form had better total resistance characteristics than the monohull on the service speed over 23 knots. In the case of intact stability, the analysis results presented that the catamaran hull form has better intact stability characteristics than the monohull. The dynamic stability of the catamarans also gave better dynamic stability at the heeling angle below 41.57°. Otherwise, the catamarans with s/L 0.17 and s/L 0.20 have lower dynamic stability than the monohull at the heeling angle larger than 41.57° and 58.03°, respectively. In the sea-keeping performance, the catamaran hull has shown an excellent rolling motion required for the offshore environment loading/unloading process. The large demi hull spacing of the catamarans hull can reduce the effect of the wave creating load on the roll motion response at the Beam Sea.

KEY WORDS

Catamaran
monohull
fish processing vessel
domestic fishing

Sažetak

Nekoliko prednosti višetrupaca, kao što je katamaran, detaljno je obrađeno u ranijim istraživanjima. Zato je ovo istraživanje usmjereno na razvoj oblika trupa katamarana kao trupa broda za preradu ribe. U početnoj fazi utvrđuju se osnovne dimenzije i ispituje konfiguracije oblika trupa katamarana. Postojeći brzi katamarani prilagođeni su kako bi se odredile glavne dimenzije osnovnog modela koristeći se pritom jednadžbom linearne regresije. Pored toga, razrađena je geometrija jednostrukog polu-trupa pretvaranjem i modificiranjem osnovnoga modela oblika trupa na način da se povećala istisnina trupa kako bi se udovoljilo zahtjevima pune nosivosti trupa i brzine broda. Također je ispitana konfiguracija prostora kao polutrupa sa s/L 0,17, s/L 0,20, s/L 0,30 i s/L 0,40 na karakteristike otpora, siguran stabilitet i ponašanje na moru. Dane su usporedbe s ranije predloženim višetrupcem. Što se tiče otpora trupa, analiza je pokazala da je trup katamarana imao ukupno bolje karakteristike otpora nego jednotrupac kod brzine preko 23 čvora. Što se tiče stabiliteta, rezultati analize pokazali su da je stabilitet bolji kod trupa katamarana nego kod jednotrupca. Dinamički stabilitet katamarana također se pokazao boljim u nagibu pod kutom manjim od 41,57°. Katamarani sa s/L 0,17 i s/L 0,20 pokazali su lošiji dinamički stabilitet od jednotrupca u nagibu pod kutem većim od 41,57° i 58,03°. Pri ispitivanju ponašanja na moru, trup katamarana pokazao se izvrsnim u uvjetima valjanja, što je potrebno u operacijama ukrcaja/iskrcaja na moru. Veliki razmak polutrupa katamarana može smanjiti utjecaj valova koji stvaraju opterećenje na trup pri valjanju s boka.

KLJUČNE RIJEČI

katamaran
višetrupac
brod za preradu ribe
nacionalno ribarstvo

Analysis of Operational Efficiency of the Proposed Propulsion Systems for Selected Large RoPax Vessel

Analiza radne učinkovitosti predloženih porivnih sustava za odabrani veliki RoPax brod

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Summary

This paper presents the characteristics of ferry shipping with particular emphasis on large RoPax vessels operating in the Baltic Sea. A critical review of main propulsion system used on large RoPax ferries has been done. Optimal propeller parameters and required brake power have been estimated on the basis of total resistance of bare hull and appendages approximated according to Holtrop-Mennen method. Main engines and generating sets have been selected for minimized fuel consumption approximated with quadratic regression. Operational parameters and costs of analysed large RoPax main propulsion systems have been compared.

KEY WORDS

Marine propulsion
CODAD
CODEL
CODED
Azipod

Sažetak

U ovome radu prikazane su karakteristike trajektnog prijevoza s posebnim osvrtom na velike RoPax brodove koji plove u Baltiku. Dan je kritički pregled glavnoga porivnog sustava koji se koristi na velikim RoPax trajektima. Procijenjeni su optimalni parametri propelera i potrebna efektivna snaga kočenja na temelju ukupnog otpora samoga trupa i dodataka što je približno izračunato uporabom Holtrop-Mennen metode. Glavni motori i generatori odabrani su za minimalnu potrošnju goriva procijenjenu kvadratnom regresijom. Uspoređeni su radni parametri i troškovi analiziranih velikih RoPax glavnih porivnih sustava.

KLJUČNE RIJEČI

brodski pogon
CODAD
CODEL
CODED
Azipod

1. INTRODUCTION / *Uvod*

Ferry shipping has been an extremely important component of international transport system for decades. Due to their functions, in particular complementary role in respect of the existing routes of land transport and shore outline, ferry routes are largely limited to sea basin with a highly fragmented shoreline [1]. The Baltic Sea is a leading market for ferry services where approximately 17% of international ferry fleet is used [2]. These specific conditions prejudge local advantage of ferry shipping both over land transport and container shipping which is the most popular on a global scale. Implementation of horizontal loading (Roll-On/Roll-Off) of passenger cars and trucks, semi-trailers, wagons and roll-trailers, etc. on board has greatly contributed to facilitation of loading and unloading of ferries while indirectly leading to the decrease of the transport distance, cost and time as well as to the elimination of time-consuming container handling.

The most popular vessels in contemporary ferry shipping are RoPax (Roll-On/Roll-Off – Passenger) vessels with separate decks for passengers and rolling cargo. The first RoPax ferries were constructed as a result of conversion of the existing RoRo ferries with an expansion by a passenger section, whereas the following models were designed bottom-up by adjusting vessel specification to the characteristics of a given route [3]. International trans-Baltic routes are currently dominated by large RoPax vessels with a gross tonnage above 40,000 [2].

Nowadays the development of propulsion systems is aimed primarily at energy efficiency and reduction in emissions of harmful substances. Chapter 4 of the MARPOL Annex VI, put into effect in July 2011, obliged shipowners to use technical solutions to reduce carbon dioxide (CO2) emissions. All vessels over 400 GT built as from January 2013 are subject to the Energy Efficiency Design Index (EEDI). The standard puts a cap on the amount of CO2 allowed per unit of transport work. Until 2025, ships are required to achieve a 30-percent reduction in their CO2 emissions compared with the average emissions of ships built between 1999 and 2009. The EEDI value calculated in accordance with the procedure shown in Figure 1 must be less than or equal to the value required for the type and size of vessel [4]. In addition, according to the findings of the 75th session of the Marine Environment Protection Committee (MEPC), from 2023 all in-service vessels are planned to be subject to minimum energy efficiency standards, as defined by the EEDI-equivalent Energy Efficiency Existing Ship Index (EEXI) [5].

Unlawful Acts in Maritime Transport & Civil Aviation

Nezakonite radnje u pomorskom prijevozu i civilnom zrakoplovstvu

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Summary

Maritime and civil aviation security is a global problem posed by terrorism and illegal acts and therefore requires global attention and solutions that can only be provided by relevant international organizations (International Maritime Organization and International Civil Aviation Organization). Nineteen years have passed since the attacks of 11 September 2001 on the World Trade Center, but the threat of another terrorist attack is still just as possible and unacceptable. The series of attacks in the USA have started a new period of history. This period can be characterised as unsteady, unpredictable, and transforming of complex systems, including new types of dangers. The paper provides a comprehensive analysis and comparison of the most serious types of unlawful acts (terrorism and piracy) regarding legislation and jurisdiction. For the sake of comparability of legal phenomena, special attention is paid to illegal acts at sea and in the airspace above the sea.

KEY WORDS

maritime terrorism
maritime piracy
unlawful interference
safety
security
civil aviation
airspace

Sažetak

Sigurnost u području pomorskog prijevoza i civilnog zrakoplovstva predstavlja globalni problem koji je nastao kao posljedica terorističkih i nezakonitih radnji, te kao takav zahtijeva globalnu pozornost i rješenja koja samo odgovarajuće međunarodne organizacije (Međunarodna pomorska organizacija i Međunarodna organizacija za civilno zrakoplovstvo) mogu pružiti. Prošlo je devetnaest godina od napada na zgrade Svjetskog trgovačkog centra 11. rujna 2001., a ipak još uvijek postoji rizik od mogućeg terorističkog napada. Niz napada u SAD-u značio je novo razdoblje u povijesti čovječanstva. To razdoblje može se opisati kao nestabilno, nepredvidljivo i kao doba koje je dovelo do promjena u oblikovanju složenih sustava, uključujući i nove vrste ugroza. U ovome radu dana je sveobuhvatna analiza i usporedba najozbiljnijih vrsta nezakonitih radnji (terorizam i piratstvo) s obzirom na zakonodavstvo i sudsku nadležnost. Kako bi se pravni fenomeni mogli usporediti, posebna pažnja posvećena je nezakonitim radnjama na moru i u zračnom prostoru iznad mora.

KLJUČNE RIJEČI

terorizam na moru
piratstvo na moru
nezakonito uplitanje
sigurnost
osiguranje
civilno zrakoplovstvo
zračni prostor

1. INTRODUCTION / *Uvod*

Terrorism is considered as the worst type of unlawful act. This social phenomenon is currently presented as the potentially greatest threat immediately after the war. It poses a threat to the security of people, property, states, the democratic establishment, and the natural development of human society. Terrorism is an instrument of forcibly promoting social interests. Although this unlawful act has many forms, its basic feature is its globality. The manifestations of terrorism are influenced by economic, political, religious, historical, social, cultural, and other conditions (Hansut & David, 2018). Terrorism in both air and maritime transport poses a huge threat not only to people but also to world trade. The prerequisite of terrorism is the paralysing of world trade and security regardless of human lives, influenced primarily by political and religious motives. On the other hand, piracy, currently mainly in maritime transportation, means a threat of financial damage. Modern Somali pirates attack seagoing vessels with the prospect of enrichment, but, unlike terrorists, they try to avoid injuries or killings (Møller, 2009).

Both unlawful acts at sea and in civil aviation require prosecution and punishment of offenders involved. Following chapters provide a comprehensive overview of legal standards defining unlawful acts in maritime transport and civil aviation, jurisdiction and the assessment of such acts.

2. LITERATURE OVERVIEW / *Pregled literature*

Unlawful acts at sea are an urgent global problem of the present century and pose economic, cultural, religious, environmental and humanitarian risks. For this reason, more and more scientific publications and studies on operational, organizational, economic and political implications are dealing with this alarming issue to examine the impact on the current economy and security of each country. A comprehensive review of the literature has shown that maritime safety research has been studied from many perspectives, including the pirate code and hostage obligations (Zavesický, 2009), behaviour, purpose, and areas where modern pirates operate (Hansut & David, 2018). Also, the most important base for this research represents mainly legal framework - United Nations Convention on the Law of the Sea (UNCLOS) (1982) defining the term of piracy; and also Convention for the Suppression of Unlawful Acts