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Journal

ISSN

0007215X

DOI

10.21278/brod73203

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INVESTIGATION OF SLOSHING IN THE PRISMATIC TANK WITH VERTICAL AND T-SHAPE BAFFLES

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The demand for liquid carriers, such as liquefied natural gas (LNG), has increased in recent years. One of the most common types of LNG carriers is the membrane type, which is often built by a shipyard with a prismatic tank shape. This carrier is commonly known for its effective ways to mitigate sloshing using a baffle. Therefore, this study was performed to evaluate sloshing in a prismatic tank using vertical and T-shape baffles. The sloshing was conducted with 25% and 50% filling ratios because it deals with the nonlinear free-surface flow. Furthermore, the smoothed particle hydrodynamics (SPH) was used to overcome sloshing with ratio of a baffle and water depth is 0.9. A comparison was made for the dynamic pressure with the experiment. The results show that SPH has an acceptable accuracy for dynamic and hydrostatic pressures. Baffle installation significantly decreases the wave height, dynamic pressure and hydrodynamic force. © 2022, University of Zagreb Faculty of Mechanical Engineering and Naval Architecture. All rights reserved.

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(2023) *Brodogradnja*

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NUMERICAL SIMULATION OF SLOSHING IN THE PRISMATIC TANK WITH VERTICAL BAFFLE USING SMOOTHED PARTICLE HYDRODYNAMICS

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Scopus coverage years: from 1985 to 1988, 1994, from 1996 to Present

Publisher: University of Zagreb Faculty of Mechanical Engineering and Naval Architecture

ISSN: 0007-215X E-ISSN: 1845-5859

Subject area: Engineering: Ocean Engineering Engineering: Mechanical Engineering

Source type: Journal

CiteScore 2021
2.7



SJR 2021
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Status u Hrčku: aktivan

ISSN 0007-215X (Tisak)

ISSN 1845-5859 (Online)

UDK: 629.5(05)

CODEN: BRODBA

DOI: <https://doi.org/10.21278/brod>

Kontakt: Fakultet strojarstva i brodogradnje (Časopis "Brodogradnja")

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Ivana Lučića 5, 10000 Zagreb, Croatia

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Recenzija: vanjske recenzije, podjednako tuzemna i inozemna, samo znanstveni i stručni radovi, jednostruko slijepa, dvostruka

Prva godina izlaženja: 1950.

Učestalost izlaženja: 4

Područja pokrivanja: Brodogradnja

Uključen u Hrčak: 07.02.2006.

Prava korištenja: Please note that for all papers submitted after 31 December 2019 an Article Publishing Fee in amount of 350 Euros applies. Archiving policy Sherpa/ROMEO green route since 2015 All published manuscripts are licensed under a Creative Commons Attribution CC BY 3.0 Unported License Authors are allowed to archive their submitted article in an open access repository. Authors are allowed to archive their accepted article in an open access repository. Authors are allowed to archive the final published article, often a pdf file, in an open access repository. There are not any other requirements for archiving in an open access repository. If the authors are subject to a pre-existing mandate from their institution, funder or government to make their article open access, we grant the author an automatic exemption from any restrictions in our policies which would otherwise prohibit their publication in Brodogradnja The single policy applies to authors of all of journal titles.



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Prepoznajući potrebu da urednici, izdavači te šira istraživačka, akademska i stručna javnost aktivno sudjeluju u raspravama i odlučivanju o statusu i smjeru razvoja Hrčka, Srce je 1. travnja 2021. imenovalo četvrti saziv Savjeta Hrčka.

Zadaće i način rada Savjeta definirani su [Pravilnikom hrvatskih znanstvenih i stručnih časopisa - Hrčak](#).

Članovima Savjeta imenovani su:

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Predsjednicom Savjeta imenovana je prof. dr. sc. Daria Pašalić.

Mandat članova Savjeta traje dvije godine od dana imenovanja.

[Zapisnici sa sjednica Savjeta Hrčka](#) javno su dostupni putem wiki stranica Srca.



Brodogradnja : Teorija i praksa brodogradnje i pomorske tehnike , Vol. 73 No. 2, 2022.



Datum izdavanja: 01.04.2022.

Objavljen na Hrčku: 24.06.2022.

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Brodogradnja : Teorija i praksa brodogradnje i pomorske tehnike, Vol. 73 No. 2, 2022.

Izvorni znanstveni članak

<https://doi.org/10.21278/brod73203>**INVESTIGATION OF SLOSHING IN THE PRISMATIC TANK WITH VERTICAL AND T-SHAPE BAFFLES**Andi Trimulyono ; Department of Naval Architecture, Universitas Diponegoro, Semarang, **Indonesia**

Haikal Atthariq ; Department of Naval Architecture, Universitas Diponegoro, Semarang, Indonesia

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Samuel Samuel ; Department of Naval Architecture, Universitas Diponegoro, Semarang, Indonesia

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preuzimanja: **309**[citiraj](#)

Sažetak

The demand for liquid carriers, such as liquefied natural gas (LNG), has increased in recent years. One of the most common types of LNG carriers is the membrane type, which is often built by a shipyard with a prismatic tank shape. This carrier is commonly known for its effective ways to mitigate sloshing using a baffle. Therefore, this study was performed to evaluate sloshing in a prismatic tank using vertical and T-shape baffles. The sloshing was conducted with 25% and 50% filling ratios because it deals with the nonlinear free-surface flow. Furthermore, the smoothed particle hydrodynamics (SPH) was used to overcome sloshing with ratio of a baffle and water depth is 0.9. A comparison was made for the dynamic pressure with the experiment. The results show that SPH has an acceptable accuracy for dynamic and hydrostatic pressures. Baffle installation significantly decreases the wave height, dynamic pressure and hydrodynamic force.

Ključne riječi

[Smoothed particle hydrodynamics](#), [Sloshing](#), [Vertical baffle](#), [T-shape baffle](#), [Dynamic Pressure](#), [Wave height](#), [Hydrodynamic force](#)

Hrčak ID:

275259

URI


<https://hrcak.srce.hr/275259>

Posjeta: 601 *



Brodogradnja : Teorija i praksa brodogradnje i pomorske tehnike, Vol. 73 No. 2, 2022.

Izvorni znanstveni članak

<https://doi.org/10.21278/brod73201>**RESEARCH ON THE MOTION RESPONSE OF AQUACULTURE SHIP AND TANK SLOSHING UNDER ROLLING RESONANCE**Li Hui  orcid.org/0000-0002-6110-5055 ; College of Shipbuilding Engineering, Harbin Engineering University, Harbin, 150001, **China** 

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Deng Baoli ; College of Shipbuilding Engineering, Harbin Engineering University, Harbin, 150001, China

Puni tekst: [engleski pdf 1.160 Kb](#)

str. 1-15

preuzimanja: **289**

citiraj

Sažetak

The double-row and double-chamfered aquaculture tank is a special tank structure of the aquaculture ship. The tank sloshing of this structure is coupled with the hull motion, which has an important impact on the safety of the hull motion. In the present study, research on the tank sloshing and hull motion response of aquaculture ships was conducted based on the model seakeeping and tank sloshing tests in regular waves. The test results were compared with the numerical simulation results of solid loading without sloshing. The results showed that the numerical simulation of the pitch motion was consistent with the amplitude-frequency response curve of the experimental results. Under certain transverse wave conditions, a large discrepancy existed between the amplitude-frequency response curve of the heave motion by the numerical simulation and the test results, and the roll motion differed most from the experimental result. Severe roll resonance occurred when the wave length-ship length ratio was 0.6. The roll motion amplitude was increased by 183.2%. Therefore, compared with aquaculture ships without sloshing, the sloshing of the tank has little effect on the pitch but has a great impact on the roll and heave motions, with the most significant effect on the roll motion.

Ključne riječi

Aquaculture ships, Tank sloshing, Ship motion, Roll resonance

Hrčak ID:

274709

URI

<https://hrcak.srce.hr/274709>



Posjeta: 599 *



Brodogradnja : Teorija i praksa brodogradnje i pomorske tehnike, Vol. 73 No. 2, 2022.

Izvorni znanstveni članak

<https://doi.org/10.21278/brod73202>**NUMERICAL PREDICTION OF SCALE EFFECTS ON THE PROPULSION PERFORMANCE OF JOUBERT BB2 SUBMARINE**

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Puni tekst: [engleski pdf 2.152 Kb](#)

str. 17-42

preuzimanja: **515**[citiraj](#)

Sažetak

The motivation of this study is to present the scale effects on the propulsion performance of Joubert BB2 submarine with MARIN7371R propeller. Joubert BB2 submarine was designed as a realistic attack submarine to be used in benchmarking studies. Numerical analyses were conducted solving RANS equations. The propeller in the self-propelled case was modeled using the body force method. The numerical method was verified both for submarine and open water propeller cases. The resistance, open water propeller and propulsion characteristics were validated with the available numerical/experimental data. After, the results were extrapolated to the full-scale and compared with other studies. Full-scale RANS analyses were then conducted to calculate the resistance and propulsion parameters by eliminating the possible scale effects. The extrapolated full-scale results were compared with the full-scale analyses and self-propulsion method (SPE) results. The scale effects on the resistance and propulsion parameters were obtained in detail. 1978 ITTC prediction method coupled with the body force method was utilized to observe the scale effects. In addition to this, the practicality of the SPE method for the estimation of the propulsive performance was shown. The scale effects on the propulsive parameters such as nominal wake and thrust deduction factors, open water propeller efficiency and propulsion efficiency were seen.

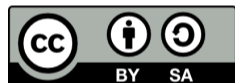
Ključne riječi

Body force, CFD, Joubert BB2, MARIN 7371R, Self-propulsion

Hrčak ID:

275228

URI

<https://hrcak.srce.hr/275228>


Posjeta: 840 *



Brodogradnja : Teorija i praksa brodogradnje i pomorske tehnike, Vol. 73 No. 2, 2022.

Izvorni znanstveni članak

<https://doi.org/10.21278/brod73206>**WAKE WASH OF A FAST SMALL BOAT IN RESTRICTED WATERS: MODEL TESTS AND FULL-SCALE MEASUREMENTS**

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Puni tekst: [engleski pdf 1.943 Kb](#)

str. 93-119

preuzimanja: **240**

citiraj

Sažetak

This paper presents the model testing of an 8.23m boat with hard chine planning hull generated waves at the Kilim recreational park. Wake is considered one of the main causes of riverbank erosion due to the energy carried by waves hitting the riverbank. Initially, ship particulars were measured from actual boats to generate a hull form using MAXSURF software. A lines plan was then generated to fabricate the model using fibreglass. Experiments were conducted in the National Hydraulic Research Institute of Malaysia (NAHRIM) at various speeds at a constant operating draft. The wave patterns generated by the modelled boats at different speeds were recorded for analysis. Wave attenuation for deep water conditions was studied and it was found that the wave exponent, n ranged from -0.36 to -0.75 for all depth Froude number (F_{nh}) condition. Wave decay analysis was used to estimate wave height for defined water depth. For 11 people with an average mass of 65 kg on board, the produced wave height was greater than the permissible wave wake height of 75 mm. The generated energy exceeded 60 Joules/m for nearly all measured speeds. A boat speed of less than 5 knots was suggested for boats loaded with the maximum passenger limit of 11 people. Other recommendations were made to minimize the wave wake height produced by the modelled boat.

Ključne riječi

Boat generated waves, Boat Wake Analysis, Wave attenuation, Wave energy

Hrčak ID:

278857

URI

<https://hrcak.srce.hr/278857>

Posjeta: 469 *

