

Document details

< Back to results | 1 of 1

Export Download Print E-mail Save to PDF Add to List More... >

[Full Text](#) View at Publisher

International Journal of Mechanical and Production Engineering Research and Development
Volume 8, Issue 2, 20 June 2018, Pages 1057-1066

CFD analysis of human powered submarine to minimize drag (Article)

Khan, S.A.^a, Fatepurwala, M.A.^b, Pathan, K.N.^b, Dabeer, P.S.^b, Baig, M.A.A.^c

^aDepartment of Mechanical Engineering, Faculty of Engineering, IUM, Malaysia

^bTrinity College of Engineering and Research, Pune, Maharashtra, India

^cDepartment of Mechanical Engineering, CMR Technical Campus, Hyderabad, Telangana, India

Abstract

[View references \(12\)](#)

This paper deals with finding the optimum fineness ratio, i.e. ratio of length to maximum diameter, of human-powered submarine of different shapes to reduce the drag force on the body using Computational Fluid Dynamics (CFD) analysis. These types of submarines are used in events like ISR and eISR. This paper focuses on finding the total drag force on submarine models with a constrained diameter and different fineness ratios. The analysis is done by using ANSYS Fluent. In this paper, only the fully submerged flow is considered on a hull without any appendages. The total drag on a body is caused in three different parts that are wave drag, skin friction drags and base drag. The analysis is done different shapes of submarines like Conic shape hull, Elliptical shape hull, Ogive shape hull and Parallel mid-body hull by flowing water at velocities of 3 m/s, 4m/s and 5 m/s. The fineness ratios at which the drag is minimum are found in all submarine shapes. The optimum value of fineness ratio, which gives minimum drag is obtained by the analysis is 6 for Conical shape hull, Elliptical shape hull and Ogive shape hull whereas for the submarine with Parallel mid-body hull shape the optimum fineness ratio is 7. © TJPRC Pvt. Ltd.

Author keywords

CFD Drag Fineness ratio Submarine

ISSN: 22496890

Source Type: Journal

Original language: English

DOI: 10.24247/ijmperdjun2018111

Document Type: Article

Publisher: Transstellar Journal Publications and Research Consultancy Private Limited (TJPRC)

References (12)

[View in search results format >](#)

All Export Print E-mail Save to PDF Create bibliography

1 Joubert, P.N. Some aspects of submarine design," University of Melbourne (1920) *DSTO*

2 (2011) *Australian Maritime College*

Metrics

0 Citations in Scopus
0 Field-Weighted Citation Impact



PlumX Metrics

Usage, Captures, Mentions, Social Media and Citations beyond Scopus.

Cited by 0 documents

Inform me when this document is cited in Scopus:

[Set citation alert >](#)

[Set citation feed >](#)

Related documents

CFD analysis of effect of flow and geometry parameters on thrust force created by flow from nozzle

Pathan, K.A. , Khan, S.A. , Dabeer, P.S.

(2017) *2017 2nd International Conference for Convergence in Technology, I2CT 2017*

CFD analysis of effect of area ratio on suddenly expanded flows

Pathan, K.A. , Khan, S.A. , Dabeer, P.S.

(2017) *2017 2nd International Conference for Convergence in Technology, I2CT 2017*

CFD analysis of effect of Mach number, area ratio and nozzle pressure ratio on velocity for suddenly expanded flows

Pathan, K.A. , Khan, S.A. , Dabeer, P.S.

(2017) *2017 2nd International Conference for Convergence in Technology, I2CT 2017*

[View all related documents based on references](#)

- 3 Moonesun, M., Javadi, M., Charmdooz, P., Mikhailovich, K.U.
Evaluation of submarine model test in towing tank and comparison with CFD and experimental formulas for fully submerged resistance

(2013) *Indian Journal of Marine Sciences*, 42 (8), pp. 1049-1056. Cited 11 times.
<http://nopr.niscair.res.in/bitstream/123456789/25467/1/IJMS%2042%288%29%201049-1056.pdf>

- 4 Moonesun, M.
CFD analysis of bow shapes of submarines
(2016) *Journal of Scientific and Engineering Research*

- 5 Pathan, K.A.
CFD analysis for production of carbon nanotubes
(2014) *International Journal of Current Engineering and Technology [IJCET]*, 3, pp. 165-169. Cited 4 times.
April

- 6 Reddy, P.R., Saikiran, M.
Aerodynamic Analysis of Return Channel Vanes in Centrifugal Compressors
International Journal of Mechanical Engineering (IJME), 5 (1), pp. 73-82. Cited 3 times.

- 7 Ahmed, P.K., Dabeer, P.S., Khan, S.A.
CFD Analysis of the Supersonic Nozzle Flow with Sudden Expansion
(2016) *International Organization of Scientific Research-Journal of Mechanical and Civil Engineering (IOSR-JMCE)*, Special Issue, 4, pp. 05-07. Cited 4 times.

- 8 Cagan, S., Buldum, B.
Investigation of the Effect of Minimum Quantity Lubrication (Mql) on the Machining of Titanium and Its Alloys a Review. Cited 3 times.

- 9 Pathan, K.A., Khan, S.A., Dabeer, P.S.
CFD analysis of effect of area ratio on suddenly expanded flows

(2017) *2017 2nd International Conference for Convergence in Technology, I2CT 2017*, 2017-January, pp. 1192-1198.
ISBN: 978-150904307-1
doi: 10.1109/I2CT.2017.8226315

View at Publisher

- 10 Pathan, K.A., Khan, S.A., Dabeer, P.S.
CFD analysis of effect of flow and geometry parameters on thrust force created by flow from nozzle

(2017) *2017 2nd International Conference for Convergence in Technology, I2CT 2017*, 2017-January, pp. 1121-1125.
ISBN: 978-150904307-1
doi: 10.1109/I2CT.2017.8226302

View at Publisher

□ 11 Singh, G., Singh, J.
(2016) *Materials to Improve Tensile Strength of Concrete at Micro Level*

□ 12 Pathan, K.A., Khan, S.A., Dabeer, P.S.
CFD analysis of effect of Mach number, area ratio and nozzle pressure ratio on velocity for suddenly expanded flows

(2017) *2017 2nd International Conference for Convergence in Technology, I2CT 2017*, 2017-January, pp. 1104-1110. Cited 2 times.

ISBN: 978-150904307-1

doi: 10.1109/I2CT.2017.8226299

[View at Publisher](#)

© Copyright 2018 Elsevier B.V., All rights reserved.

[< Back to results](#) | 1 of 1

[^ Top of page](#)

About Scopus

[What is Scopus](#)
[Content coverage](#)
[Scopus blog](#)
[Scopus API](#)
[Privacy matters](#)

Language

[日本語に切り替える](#)
[切换到简体中文](#)
[切换到繁體中文](#)
[Русский язык](#)

Customer Service

[Help](#)
[Contact us](#)

ELSEVIER

[Terms and conditions](#) [Privacy policy](#)

Copyright © 2018 Elsevier B.V. All rights reserved. Scopus® is a registered trademark of Elsevier B.V.

Cookies are set by this site. To decline them or learn more, visit our [Cookies page](#).

 RELX Group™