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Afifi, A., Aabid, A., Afghan Khan, S.

Numerical investigation of splitter plate effect on bluff body using finite volume method
(2020) *Materials Today: Proceedings*, 38, pp. 2181-2190. Cited 1 time.

DOI: 10.1016/j.matpr.2020.05.559

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Abstract
In aerodynamics study, whenever there is a flat/blunt face, it will result in the maximum drag effect on the flat body. In these types of problems, the splitter plates have found a significant role in reducing the drag force. The splitter plate will separate/bifurcate the flow at the front face of the body. The present study aims to find the fluid flows over a body by varying the length of the splitter plate. In the study, the pressure and Mach number effects near the surface of the body. Also, it is crucial to study the fluid flows for higher velocity. A two-dimensional rectangular bluff body of a 50x60 mm dimension with a splitter plate controller is analyzed using a rectangular fluid domain - the splitter plate located at the front face of the body as a passive control method. Further study of this article, the parametric effect of the splitter plate with respect to the height of the body is considered. The ANSYS Fluent is used to simulate the results using a pressure-based solver because the flow is incompressible. The k-e turbulent model is used to simulate the outcomes and validated them with the wind tunnel experimental results. Based on the present results, it has been realized that the existing model can be utilized for the study of fluid flow over a bluff body. The simulations result in an essential effect of the upstream splitter plate on the separating the flows with a turbulent flow. Results indicate that the splitter plate is useful in separating the flow, which results in reducing the drag.

Author Keywords
Bluff Body; CFD; Finite Volume Method; K-epsilon; Splitter Plate

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Editors: Gupta M., Davim P., Reddy Paturi U.M.
Publisher: Elsevier Ltd

Conference name: 1st International Conference and Exposition on Mechanical, Material and Manufacturing Technology, ICE3MT 2020
Conference date: 9 October 2020 through 10 October 2020
Conference code: 167890

ISSN: 22147853
Language of Original Document: English
Abbreviated Source Title: Mater. Today Proc.
2-s2.0-85103598402
Document Type: Conference Paper
Publication Stage: Final
Source: Scopus