Document details

International Journal of Mechanical and Production Engineering Research and Development
Volume 8, Issue 3, 30 June 2018, Pages 1001-1008

Flow control with aerospike behind bluff body (Article) (Open Access)

Khan, S.A.[a], Asadullah, M.[a], Fharukh Ahmed, G.M.[b,c], Jalaluddeen, A.[d], Baig, M.A.A.[e]

[a]Department of Mechanical Engineering, Faculty of Engineering, International Islamic University Malaysia, Kuala Lumpur, Malaysia
[b]Department of Mechanical Engineering, Bearys Institute of Technology, Mangalore, Karnataka, India
[c]Department of Mechanical Engineering, Government Engineering College, Karnataka, India

View additional affiliations

Abstract

View references (23)

Flow control in high-speed is challenging due to the high-pressure shock and low-pressure recirculation bubble attached around the vehicle. Wave drag, and Base drag are important accouterments of flow around high-speed objects. This paper deals with base drag, only and presents an experimental study of aerospikes behind the base of bluff bodies to control this drag. A plate of 1 mm thickness with two spikes at 11.5 mm is placed between the nozzle and duct as a passive controller. The Mach numbers deployed for the subsonic regime were 0.6, 0.7 and for transonic regime were 0.8, 0.9 for area ratio 6.25. The L/W ratio taken were 4W, 6W, 8W and 10W. Aerospikes were found to be very effective in controlling base pressure in the transonic regime without influencing the main flow field. © TJPRC Pvt. Ltd.

SciVal Topic Prominence

Topic: Drag reduction | Hypersonic flow | opposing jet

Prominence percentile: 80.561

Author keywords

Base pressure | Mach number | Wall pressure

ISSN: 22496890
Source Type: Journal
Original language: English

DOI: 10.24247/ijmperdjun2018106
Document Type: Article
Publisher: Transstellar Journal Publications and Research Consultancy Private Limited (TJPRC)

References (23)

View in search results format >

All Export Print E-mail Save to PDF Create bibliography

1 Yunqing, G., Tao, L., Jiegang, M., Zhengzan, S., Peijian, Z.
Analysis of Drag Reduction Methods and Mechanisms of Turbulent (Open Access)

(2017) *Applied Bionics and Biomechanics*, 2017, art. no. 6858720.
http://www.hindawi.com/journals/abb/contents/
doi: 10.1155/2017/6858720

View at Publisher

2 Gad-El-Hak, M.
Flow Control: Passive, Active, and Reactive Flow Management. 2000. Cited 581 times.
ed: Cambridge University Press

3 Viswanath, P.R.
Flow management techniques for base and afterbody drag reduction

(1996) *Progress in Aerospace Sciences*, 32 (2-3), pp. 79-129. Cited 57 times.
doi: 10.1016/0376-0421(95)00003-8

View at Publisher

4 Tanner, M.
A method for reducing the base drag of wings with blunt trailing edge
(1972) *The Aeronautical Quarterly*, 23, pp. 15-23. Cited 81 times.

5 Naughton, J.W.
(2002) *Reduction of Base Drag on Launch Vehicles*. Cited 2 times.

6 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 10 times.
ISBN: 978-150904307-1
doi: 10.1109/I2CT.2017.8226299

View at Publisher

7 Kangovi, S., Page, R.
The Turbulent flow through a sudden enlargement at subsonic speeds
(1977) *6Th Australasian Hydraulics and Fluid Mechanics Conference. Adelaide*, pp. 213-216. Cited 2 times.

8 Eghlima, Z., Mansour, K.
Drag reduction for the combination of spike and counterflow jet on blunt body at high Mach number flow

(2017) *Acta Astronautica*, 133, pp. 103-110. Cited 12 times.
http://www.journals.elsevier.com/acta-astronautica
doi: 10.1016/j.actaastro.2017.01.008

View at Publisher