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جامعة الفيوم كليــة الهندســة قسم الهندسة الميكانيكية

Aerodynamic Performance Enhancement of a Heavy Trucks using Experimental and Computational Investigation

ملخص البحث (الخامس) باللغة الإنجليزية

Improving the aerodynamic performance of heavy vehicles is one of the essential issues used in automotive industry to reduce fuel consumption. In this work, various drag reduction devices were added to improve the vehicle profiles and the effects of each device were experimentally and computationally investigated. These additional devices are Cap of truck with different angle, Gap device with different length and Flat Flap with different angle and dimensions. 1/50th scale of a standard heavy truck were taken to construct the computational and experimental model. The drag coefficient, contours of turbulence kinetic energy, pressure, velocity, streamlines, velocity vectors were predicted with and without additional devices. The obtained results show that these attached devices have a notable impact on the aerodynamic drag reduction of heavy vehicles and trucks. Installing all supplementary parts at the same time helps to reduce the drag coefficient by about 59 % compared with the truck without any profile modifications. Finally, the experimental results show good agreement with the computational results with an acceptable percentage error of about 5%.