

عنوان مقاله:

Application of Lobed Mixers to Reduce Drag of Boat-Tailed Ground Vehicles

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خلاصه مقاله:

Minimising the aerodynamic drag of commercial vehicles is important economically and ecologically. This work demonstrates the effective use of lobed-mixing geometries, traditionally used to enhance flow mixing, as a viable, passive flow control method for reducing base pressure drag of boat-tailed ground vehicles. Experiments were performed on a 1/24th-scale Heavy Goods Vehicle representative model at a Reynolds number of 2.3×10^5 with force and hot-wire anemometry measurements used to quantify drag and wake characteristics. Tests on a baseline (no boat-tail), an unaltered boat-tail, and lobed-mixing configurations with varying pitch and height were compared. Overall, the baseline and unaltered boat-tail exhibited good correlation to previous results. This provided confidence in the methodology adopted. Results using lobed mixers showed up to a 10.2% drag reduction with the added vorticity produced acting to fundamentally shift the nature of the wake. This is manifested principally through the generation of counter-rotating vortical structures which enhance crosswise flow entrainment into the base wake. This action is observed to limit flow entrainment towards the ground leading to a higher wake and a characteristic 'waist'. Enhanced mixing is also demonstrated. Overall, results suggest the suitability of lobed mixers as an effective means for drag reduction of boat-tailed ground vehicles.

کلمات کلیدی:

Drag reduction, Lobed mixers, Boat, tailed vehicles

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