UNIVERSITI TEKNOLOGI MARA

BEHAVIOUR OF SYMMETRICAL AND ASYMMETRICAL GEOMETRIES IN FULLY IMMERSED FLOW

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for the degree of
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Candidate's Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as reference work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

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ABSTRACT

Studies of various shapes of geometries in a moving fluid have been a subject of intense attention from a practical point of view in relation of designing most of the engineering equipment and devices. In the present study, the aerodynamics investigations are carried out on various of geometries using the computational and experimental methods. The computational analysis is made on a three dimensional model of hemispherical and conical geometries using computational fluid dynamics (CFD) code FLUENT 6.1.22. The experimental works are carried out on those models and tested in an open circuit wind tunnel. The investigations have been carried out at seven different velocities, i.e., 8 m/s, 10 m/s, 12 m/s, 14 m/s, 16 m/s, 18 m/s and 20 m/s, at different angle of attack. The aerodynamics characteristics lift and drag coefficient obtained from the experimental work are compared to simulation result. The result shows that the drag curve is showing the cosine response trend and the lift curve is showing the sine response trend. The simulation result shows the fairly good agreement with the experimental result. From this, extension works on the model is investigated using CFD; by means different dimension and shape to get which geometry is the most efficient. The results obtained will provide an additional drag and lift coefficients database for the respective geometries.

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