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This is to certify that Prof./Dr. V. Kandavel, Department of Mechanical Engg., SSM Institute of Engg. & Tech. presented a paper on Modeling and Comparative Analysis of Conventional Airfoil and Whole Fin Profile Blade in Wind Mill in the NATIONAL CONFERENCE AND EXHIBITION ON RURAL INNOVATIONS (NCERI-23) Organized by Unnat Bharat Abhiyan SSM Institute of Engineering and

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National Conference and Exhibition on Rural Innovations

MODELING AND COMPARATIVE ANALYSIS OF CONVENTIONAL AIRFOIL AND WHALE FIN PROFILE BLADE IN WIND MILL

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Abstract---The objective of the present numerical investigation is to find out the difference between flow over conventional aero foil and whale fin profile blade for same operating condition and comparing the results. In the present numerical investigation, the comparison has been done with leading edge tubercles versus the conventional airfoil at different velocities and different angles of attack. Parameters which are observed are Coefficient of drag (C_d), Co-efficient of lift (C_l), Pressure contour and Velocity vector. The commercial package CATIA is used for modeling purpose. ANSYS ICEM CFD meshing software is used for meshing complicated design and FLUENT is used for analyzing the fluid flow. Pressure based solver, K-epsilon Turbulence model, steady state method and second order upwind scheme has been adopted for numerical investigation. It is found out that, wing with tubercles shows increase in lift by 20.6% and increase in drag by 11.7% for low speed and for high speed it shows increase in lift by 14.4% and decrease in drag by 30%. The increased lift of the wing with tubercles arises from higher pressure along the bottom surface. The tubercles delay, or reduce flow separation at higher angles of attack and this leads to decrease in drag. The increased lift of the wing with tubercles arises from higher pressure along the bottom surface. The tubercles delay, or reduce flow separation at higher angles of attack and this leads to decrease in drag.

Keywords—Whale Fin Profile Blade, Conventional Blade, Lift Force; Dragforce.



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