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Studies on Performance of an Airfoil and Its Simulation

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Abstract : The main objective of the project is to bring attention towards the performance of an aerofoil when exposed to the fluid medium inside the wind tunnel. This project aims at involvement of civil as well as mechanical engineering thereby making itself as a multidisciplinary project. The airfoil of desired size is taken into consideration for the project to carry out effectively. An aerofoil is the shape of the wing or blade of propeller, rotor or turbine. Lot of experiment have been carried out through wind-tunnel keeping aerofoil as a reference object to make a future forecast regarding the design of turbine blade, car and aircraft. Lift and drag now become the major identification factor for any design industry which shows that wind tunnel testing along with software analysis (ANSYS) becomes the mandatory task for any researchers to forecast an aerodynamics design. This project is an initiative towards the mitigation of drag, better lift and analysis of wake surface profile by investigating the surface pressure distribution. The readings has been taken on airfoil model in Wind Tunnel Testing Machine (WTTM) at different air velocity 20m/sec, 25m/sec, 30m/sec and different angle of attack 00,50,100,150,200. Air velocity and pressures are measured in several ways in wind tunnel testing machine by use to measuring instruments like Anemometer and Multi tube manometer. Moreover to make the analysis more accurate Ansys fluent contribution become substantial and subsequently the CFD simulation results. Analysis on an Aerofoil have a wide spectrum of application other than aerodynamics including wind loads in the design of buildings and bridges for structural engineers.

Keywords : wind-tunnel, aerofoil, Ansys, multitube manometer
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