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DESIGN OF VERTICAL AXIS WIND TURBINE FOR LOW WIND SPEED APPLICATION IN HIGHWAY

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ABSTRACT

Wind energy is considered as the fastest growing source of renewable energy. Availability of wind force will depend on the season. Highway roads can provide considerable amount of wind force to drive a turbine due to pressure difference created by the vehicle movement on both side of the median. Here design of airfoil based on vertical axis wind turbine (VAWT) for low wind speed application ranging from 2 to 8m/s is done. The main advantage of vertical axis wind turbine over horizontal axis wind turbine is that blades can have constant shape over the length. It can extract power from any direction of wind without the yaw mechanism. Due to the vehicle movement in highway wind force is created on both side of the highway in opposite direction. The VAWT can be placed on the median so that air flow on both side of highway can be extracted. The national Advisory Committee for Aeronautics NACA series blades NACA0012, NACA0015, NACA0021 Were analyzed here. The graphical relationship between optimal angle of attack and Reynolds number which predict the flow pattern were analyzed, based on this The angle of attack that generate high lift over draw ratio (C_d /C_l) can be identified.

KEYWORDS: Renewable Energy, Wind Power, Vertical Axis Wind Turbine, Blade Aerodynamics, PMSG

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