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Analysis and Performance of Small Wind Turbine Blades

Satheesh Kumar S[1]
Assistant Professor, Department of Electrical and Electronics Engineering, Karunya University[1]
Email:satheesh@karunya.edu[#]

Abstract: The objective of this project is to design, model and analyze a 750W wind turbine blade. The blade profile chosen is NACA 4412 series. Here two types of blade materials, fiber material and teak wood are considered. The blade profile is designed using Pro-E considering the blade length, 1.2m. An analysis is done using Ansys v.12. In the structural analysis module of Ansys the stress intensity and displacement for different lengths of the blade are noted. From the value twist at which the stress levels for the both the type of materials are minimum, noted using the structural analysis module of Ansys. From the comparative study the best material for the wind turbine blade is selected. The theoretical output is compared with that of the experimental output from the fabricated blades.

Keywords: Glass fiber, Teak wood, stress intensity, displacement, power output.