

Development of a Jeepney-Mounted Micro Wind Energy Conversion System for Battery Charging Applications

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ABSTRACT

Wind energy is a promising source of renewable energy. The design of a jeepney-mounted micro wind energy conversion system (WECS) for battery charging applications was based primarily from the actual wind speed encountered by travelling passenger jeepney, 8.5 m/s, and the result of the survey conducted for community's acceptability in the rural barangay of Malvar in Naujan, Oriental Mindoro. The turbine diameter was set at 80, 85, and 90 cm by considering the following: proportion of the micro WECS to the jeepney, the resulting total vertical height of the jeepney, and the aesthetic appearance of the jeepney with mounted micro WECS. The chord length of the blade was computed based on the design criteria as 6.3, 6.7, and 7.1 cm, respectively. The two-level-three-factor complete factorial experiment of Box and Behnken was used in optimizing the three-bladed turbine design of the micro WECS. The optimum turbine design used in field testing was the combination of turbine diameter of 80 cm and chord length of 7.1 cm with an average power coefficient, C_p , of 0.36.

Keywords: micro WECS, jeepney-mounted micro WECS, battery charging applications

Citation:

Onal, M.K.S., Resurreccion, A.N., Amongo, R.M.C., Suministrado, D.C., Elauria, J.C. and San Juan, E.R. (2013). Development of Jeepney-Mounted Micro Wind Energy Conversion System for Battery Charging Applications. *Philippine Journal of Agricultural and Biosystems Engineering*, 10, 3-13.