

Modified PM Generator for Low RPM Wind Turbine

Saurav M. S. Basnet, Ranjan Sharma, Pramod Ghimire, Peter Freere and Ward T. Jewell

Department of Electrical and Computer Engineering, Wichita State University

A modified tractor alternator is designed and constructed to suit a 300 Watt low speed, high altitude wind turbine. The tractor alternator does not produce the required power output for the given speed of the turbine. A modification was thus required, and this report discusses the redesign and construction techniques. The primary issue with small wind turbines is the cogging torque, especially when permanent magnet alternators are used. It is very useful to have a wide range of operations for the small wind machines, and hereby the reduced cogging torque will allow the turbine to generate power for low wind speeds. Some techniques such as skewed and multiple stator stacks were implemented. Various connection techniques for better power extraction are discussed and compared. The report discusses design aspects, topologies, modeling and testing of the alternator. Final results are not up to initial expectations; nevertheless, promising results were obtained. All major results are presented and further modification prospects are discussed as well.