"WIND TURBINE FOR RENEWABLE SOURCEOF ENERGY"

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ABSTRACT

The project focuses on Design, Fabrication and Testing of a VAWT (vertical Axis Wind Turbine) . The project is an ongoing research project and the phase we carried out was concerned in shifting the design from Darrieus type to Savonius type, which created the necessity of freshly designing all the parts, increasing the torque and rpm of the VAWT by implementing a deflector/guide vane system, make the whole structure portable meanwhile maintaining the project within a very low cost range. Several parameters were analyzed with respect to wind speed to determine the best value for each parameter which would give the highest efficiency, thus ensuring the maximum ultimate performance of the VAWT. The parameters that were considered for analyzing are the number of blades the rotor should have, positioning of the blade (i.e. the distance from the shaft to blade and the angle the blade creates with the shaft), the shape of the deflector, and the angle of the deflector so as to generate the highest efficiency.

Keyword : - VAWT, *Savonius Blade, electricity.*

1. INTRODUCTION

Wind is caused due to uneven heating of earth's surface, atmosphere, irregularities of earth's surface and rotation of the earth about its own axis. The amount of wind flow depends on various factors such as earth's rotation speed and difference in temperature of places. Energy produced by this blowing wind is called as wind energy. Electricity plays and vital role for development of the country, so the production of electricity is one of the main aims of the country. About 68% of the production of electric energy is based on thermal power plant, where fossil fuels, coals, diesel are used for power generation and which is very less available and this fuels also creates pollution, greenhouse effect and global warming. Therefore power generation with the help of non-conventional resource such as wind is increasing day by day and this type of power generation is very clean and safe.

1.1 PROBLEM STATEMENT

Horizontal axis wind turbine(HAWT) is expensive to implement and also require ample of space. It has to be set on a particular strategic location for efficient output of electricity, whereas Vertical axis wind turbine(VAWT) is less expensive ,takes less space and can produce a better output irrespective of location as compared to HAWT. In VAWT it mostly depend on the design of the blade, so that we are able to get higher output. The variation of blade angle is made so as to get the maximum output and blades are then fixed.

2. LITERATURE SURVEY

A literature survey is a review of scholarly sources that are relevant to a certain topic or survey question (such as books, journal articles, and so on). It is frequently used in a thesis, discussion, or research paper to anchor your work in the context of existing knowledge. It unequivocally demonstrates the authors' in-depth understanding and familiarity with the issue facing their department. It provides the study's surroundings. demonstrates the scientific writing plan for evaluating the research findings. Make Brighter on how the department's comprehension has changed. Basically, we have developed our project through the research articles below. Our starting point paper is June 2013, together with september 2016.

Year of Publication	Author	Publication Paper/Conference	Advantages & Disadvantages	Application
Sep.-2016	Mahashidha Birajdar	Imperial Journal Interdiciplinery Research(IJIR)	Adv.-Scalability & Efficiency of Rotation is slow	Highway
June-2013	Dr. Narayanam M. Komerath & Akshay Milind Penderkar	ASEE annual conference	Low Cost Implementation & Low Efficiency	Education Aspects
October 2007	Ye Li, J.Lence Barbara, M.Calisal Sander	IEEE	Tidal Current to Electricity	Marine Purpose

3. HARDWARE COMPONENT

1. GEAR MOTOR (12 V DC)
2. DC TO AC CONVERTER
3. PVC BLADE DESIGN
4. SPUR GEAR
5. LED
6. BATTERY
7. RECTIFIER
8. SOLAR CHARGE CONTROLLER

3.1 BLOCK DIAGRAM

The description block illustration is as followed:

The Block diagram start with the blade that are made up of PVC and the blade is Savonius blade design. Then it connected to the gear box for the rotation purpose and this gear box is then connected with the Gear Motor which rotate in both clockwise and anticlockwise direction. gear motor is then connected with generator that convert mechanical energy into electrical energy and then goes to the rechargeable battery for further use.

LED light is connected to the battery for checking purpose if the battery is work or not and one charge controller is used to display the output of the wind energy and rectifier to not over load the system.

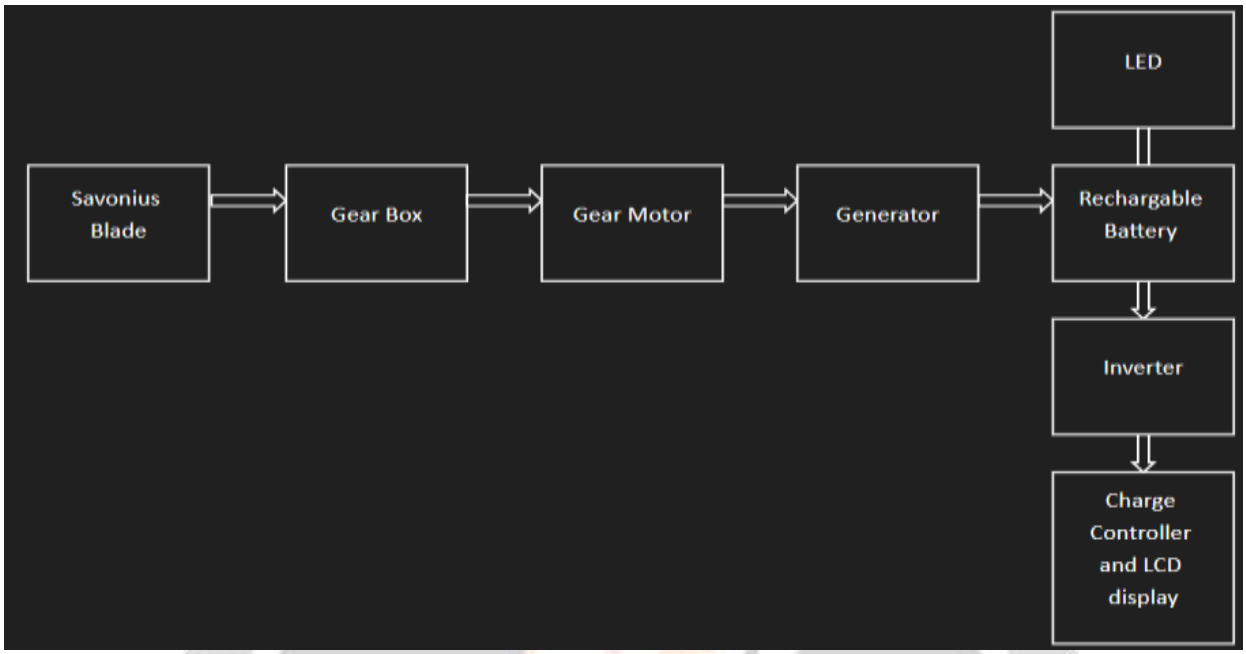

Fig -2: Block Diagram

3.2 Hardware Design

In the VAWTs the main rotor shaft is placed in a transverse position to the wind. The main component of this type such as the generator and the gearbox are positioned near to the ground. This type is used in the sites where the wind is usually varying its direction because the rotors are always directed into the wind.

Fig 3.2.1

Savonius wind turbines do not require any external power source for the starting process, and they are frequently used in the areas where the turbulent wind occurs, and they are less efficient compared to darrieus wind turbines. The VAWTs have many advantages.

For instance, they do not require any mechanisms to point the rotor blades toward the wind and the maintenance of the main parts is easier since they are close to the ground. Additionally, they are commonly utilized in the places where tall structures are not allowed, on mesas, and hilltops. The construction cost is low compared to HAWTs. However, they are less efficient compared to HAWTs, they might need an external power source to start up, and they do not take advantage of the higher wind speed at the higher elevations.

Bridge Rectifier:

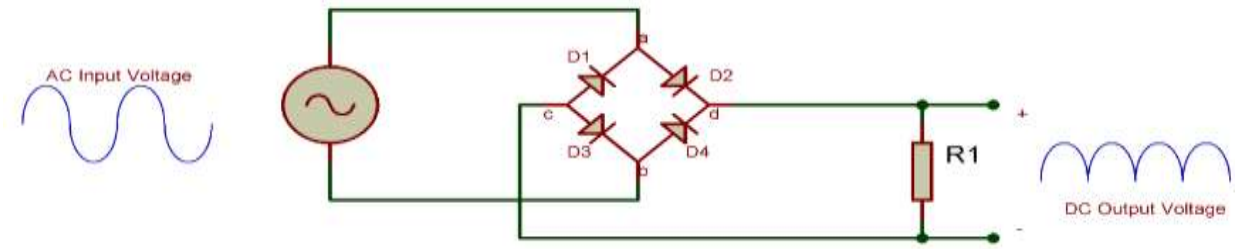

Fig 3.2.2

The rectifier circuit is used to convert the AC (Alternating Current) into DC (Direct Current). Rectifiers are mainly classified into three types namely half-wave, full-wave, and bridge rectifier. The main function of all these rectifiers is the same as the conversion of current but they not efficiently convert the current from AC to DC. The center tapped full wave rectifier as well as bridge rectifier converts efficiently. A bridge rectifier circuit is a common part of the electronic power supplies. Many electronic circuits require a rectified DC power supply for powering the various electronic basic components from available AC mains supply. We can find this rectifier in a wide variety of electronic AC power devices like home appliances, motor controllers, modulation process, welding applications, etc. The main advantage of the bridge rectifier is that it produces almost double the output voltage as with the case of a full-wave rectifier using a center-tapped transformer. But this circuit doesn't need a center-tapped transformer so it resembles a low-cost rectifier.

SMF Battery:

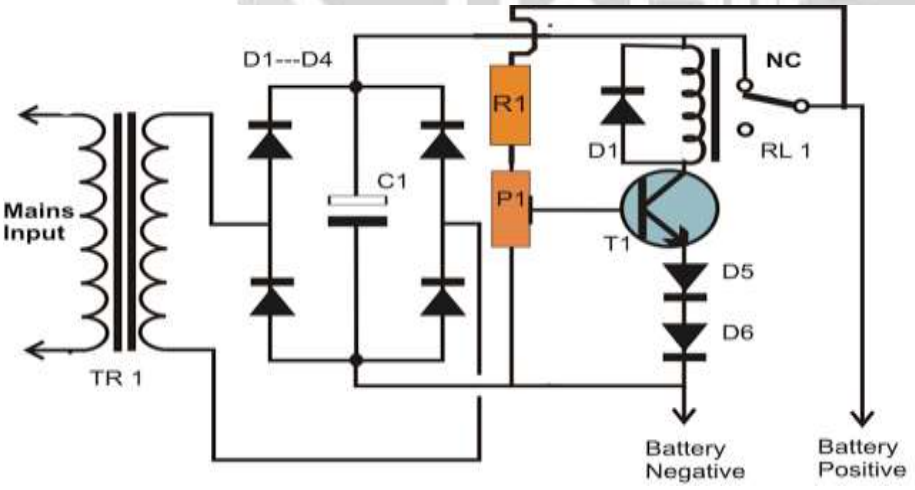

Fig 3.2.3

SMF (Sealed Maintenance Free) batteries also known as the Valve Regulated Lead Acid (VRLA) batteries. These flat plate batteries that do not require topping-up and normally do not emit any fumes or gases on a continuous basis. They are completely sealed and therefore eliminate the risk of acid spillage during transportation. Due to their construction these can be mounted in any orientation and do not require constant maintenance.

4. CONCLUSIONS

In conclusion, The project "Vertical Axis Wind Turbine" is easy to implement in normal house hold and industrial application. From the project it can be concluded that wind turbines have a large base of applications in power production. Wind power is an untapped resource and it can easily suffice our power needs in the coming future

The Energy balance of wind energy is very positive. The energy consumed in the whole chain of wind plants is recovered in several average operational months.

The goal of our project is to investigate whether the design proposed by wind is indeed better than the classic Savonius vertical wind turbine, by reverse engineering their design from their promotional material, model it, build it, and test it. Our research first establishes a performance benchmark of a classic Savonius turbine, and then compares the results and draws conclusions accordingly. The project also includes a fabrication step, where the model is going to be built and physically tested to obtain experimental data that describes the rotor's performance.

5. REFRENCES

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BIOGRAPHIES

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