ISSN: 2278 – 909X
International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE)
Volume 5, Issue 4, April 2016

ELECTRICITY GENERATION USING ROOFTOP VENTILATOR

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ABSTRACT

In Auditoriums, Theaters, work places, etc. there were number of peoples gather together, due to this warm atmosphere gets form. This warm air is lighter than cold air, so it goes upward towards roof and gets thrown out in atmosphere through roof ventilators. This warm air is a natural source provided by human being. The ventilator sucks the warm air in the building and throws it to the outside of the building, then the inside building temperature and humidity are not too high.

We can convert this warm air into electrical energy using Rooftop Ventilators. By using this technique we can glow at least 5 watt bulb. This technology is popularly installed on the roofs in warehouses, workshops, industrial buildings and even residences.

1. INTRODUCTION

Nowadays, the world is talking about the green energy that can save the world from pollutions and green house effects. The main function of the free spinning roof ventilator is to provide fresh air in roof space and living area all year round 24 hours a day free of charge. The additional function of this project is to produce the electrical energy from the roof ventilator that will spin. The new idea of the additional fins is helps to improve the ventilator speed and electrical production.

The human being not just can enjoy the benefits of the better air ventilation in the house, but also have extra electricity supply for load appliances such as radio, mobile phone charger, etc. The main component of the system is the DC motors. It will convert the kinetic energy from the warm air to the electricity for our usage. This free electricity has to use the battery charger to allow the charging process running. This to ensure that there will be no back-flow current if the roof ventilator is not functioning.If we want to drive an AC load then inverter is use to convert from DC to AC for our AC load usage.

2. ROOFTOP VENTILATOR

Wind turbine ventilators are exactly as the name implies, they are a ventilator that is powered by the wind to create effective ventilation for different industries. This product works on wind assisted ventilation. Turbine ventilators are round metal vents with fins in them. Even just a little bit of wind can be just enough for the turbo ventilator to rotate. The faster the wind, the faster the turbine will rotate and exhaust the heat, smoke, fumes, humidity, etc.

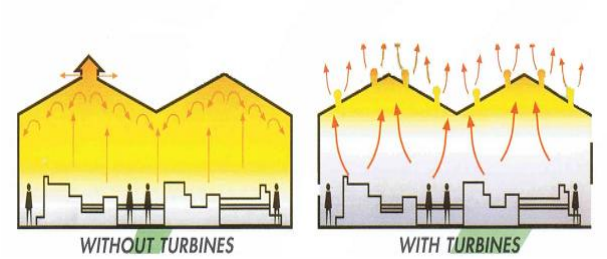

FIGURE 1

The mechanics involved in the air movement is very simple. The hot air inside the shed tends to rise up. When the turbines rotate, they suck the warm air out through the vent.

Thereby, bringing out a drop in temperature in the shed and allow supply of fresh air through doors and windows.

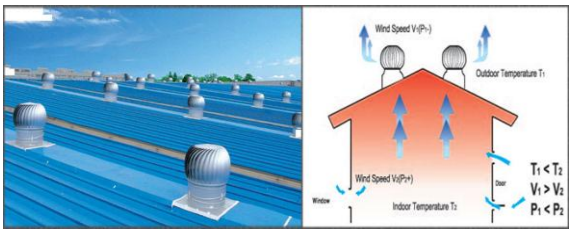

FIGURE 2

The size, number and installation all depend on different factors which include wind velocity, temperature differential, environment conditions, and the size of the building. Turbine vents have been vastly used for many years in residential, agriculture, industrial buildings and warehouses.

When it comes to roof top ventilators, they have several advantages which include that they do not need to be powered by electricity, they are located such that they exhaust the hottest air first, they do not cause any harm what so ever to the environment, they tend to save a lot of money because there is no operating cost plus they are maintenance free.

There are different sizes of wind turbo ventilators that range from 14″ to 36″.Due to the fact that they are located at the highest point of the roof, they are able to give off optimum ventilation. They also have to be strong and anti-corrosive.

FIGURE 3

As they are installed on the top of the roof and would come in contact with rain and birds the ventilators are made to be rainwater and bird proof. The ventilators are also designed in a way that prevents leakage and down draft into the building allowing air entry from the side openings. Ultimately wind turbine ventilators are pleasant looking, and tend to enhance the architectural looks of the building.

Efforts to clear smoke, foul air and damp from dwellings, ships and factories have produced various designs of ventilators, sometimes fitted to assist draft through chimneys but more often mounted on roofs. Wind influenced roof ventilators (also called educators) such as cowls, swivelling elbows, venture and turbine types compete with powered fans to clear spaces of vapours and foul air.

These ventilators also allow hot gases to escape, as well as exclude rain and vermin.

The main structure of the rooftop ventilator comes from the ventilation turbine, as bought off the shelf. Fulfilling the goal of an easily installed system, the all modifications to the turbine are superficial to or surrounded by the visible exterior of the turbine.

3. MOTOR

Workings of a brushed electric motor with a two-pole rotor (armature) and permanent magnet stator. "N" and "S" designate polarities on the inside axis faces of the magnets; the outside faces have opposite polarities. The + and - signs show where the DC current is applied to the commutator which supplies current to the armature coils.

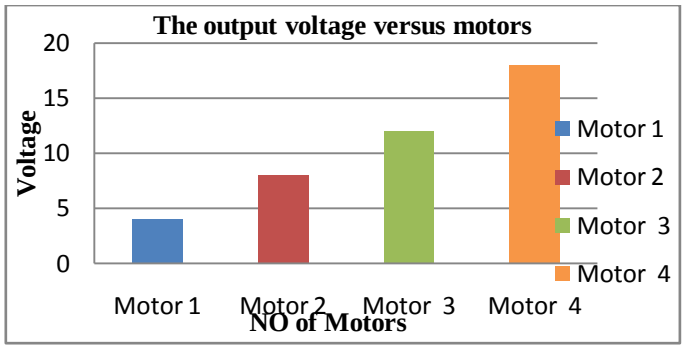

FIGURE 4

4. ELECTRICITY GENERATION

The DC generator in some ways is simpler than the AC generator. AC generator, a magnet turns inside fixed loops of wire that carry the current produced. A DC generator looks like the simple cartoon, with current loops turning inside the field produced by a fixed magnet.

Most DC generators are essentially simple rotating-coil AC generators in which the builders have made an effort to keep the current from reversing direction. The connection between rotating loop and brushes is a “split ring” that acts to reverse the direction of the current. (This device is also known as a “commutator”).

Simple DC generator with rotating loop, brushes and split-ring commutatorNote that although a DC generator makes current flowing only in one direction, it doesn’t make constant current - the current still varies between zero and maximum, meaning that power produced will be jerky. For this reason, all but the earliest and most primitive DC generators are arranged with many coils of wire at different angles, so that the power output is the sum of many rectified sine waves and is therefore much smoother (though it can never be perfectly smooth). “Ripple” in power production is not important if all you are doing with the generator is charging a batter, but if the generator is used to directly drive a mechanical device it can be problematic. Finally, the advent of modern electronics means that the AC and DC worlds need not be so separated.

AC generators can in fact also be used to produce DC, since rectification can now also be done electronically using diodes that allow current to pass in only one direction. The alternator in your car is an alternating-current generator whose output is rectified via a set of diodes. The output of small home wind turbines, which drive AC generators, is often rectified to DC by the same means. By using the wind turbine for DC, one can avoid the need of controlling its speed to produce 60 Hz power and allow the turbine to turn at whatever speed gives maximum efficiency of power production. We don’t have a generator to show you in class - commercial generators tend to be large and expensive - but we do have several small, inexpensive electric motors that

will run in the Electric Motors II lab. Since a generator is essentially an electric motor run backwards, these motor should give you some insight into generators.

5. FLOWCHART

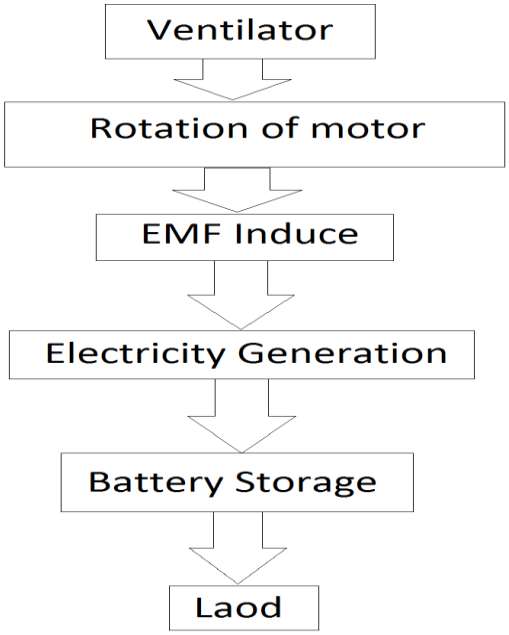

FIGURE 5

6. FUTURE SCOPE

Due to the development of technology around the world, the need of energy is increasing every year. But, what would be the best way to produce energy without polluting the air, or depleting fossil fuels? Renewable energy would also be the best solution for this problem. Of the available sources of renewable energy, wind power shows much promise.

There are many benefits of using wind energy in comparison to using fossil fuels. The first is that once wind turbines are built, they don't release greenhouse gasses into the atmosphere. Wind energy also doesn't pollute the air or water with other pollutants.

Renewable forms of energy are becoming more and more necessary for a sustainable future. Wind energy is a form of energy that is becoming more and more popular, and it offers a way for people to harness energy from something natural to create electricity.

As we can implement this technology to use "green energy" instead and help preserve Mother Nature.

7. CONCLUSION

In this Project, after the objective and introduction of the rooftop ventilator and DC motors which we have used, one typical generator is practically design successfully. Afterwards the generator elements analysis, some of parameters of generator was calculated, after the electricity generation using rooftop ventilator is experimentally calculated. When the airs flow of heat air (Hot Air) present under the roof, it will help to rotate or turns the rooftop ventilator. When roof ventilator moves, motors get operated and hence electricity gets generated. Based on the practical experiments the results of the output voltage is at 18V with 70mA (series connection) and 4V with 270mA (parallel connection).The output power achieved at 1.26Watt.For the above results after fixing the ventilator on roof of buildings, it able to charge12V battery. And this prototype is relatively small and no more expensive. After fabricating and testing of this prototype the system has been practically applicable.

Electricity Generator testing with roof ventilator 7.1

8. Acknowledgements

We would like to thank you the Department of Electronics & Telecommunication Engineering, and Dr.S.V.Rode faculty at Sipna College of Engineering & Technology, Amravati (Maharashtra), India for their dedicated supervision and thoughtful Advice.

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