DESIGN AND FABRICATION OF WIND FANS FOR POWER GENERATION

[1]Krishna. S
Jeppiaar Engineering College

Abstract **- Power demand is necessary to traverse these days, hence the demand for this former is negotiable in the coming future, Many new modern methodology are being found and been founded over these modern generation, various mechanism are useful to produce power in with the help of supporting devices such as an alternator, generator, energy convertor for producing power these days, the major form of power are through the source of air, water, heat & friction. This paper deals with power produced through the source of air ie when the object is in motion the enormous air induces to flow in opposite direction which may lead to opposite reaction this can be in turn converted in to useful one by placing a tiny fans in the air medium that will provide rotary motion ,which can be in turn converted in to energy by means of energy converter were the rotary motion is converted in to energy through these mechanism, during the experiments an power output of about 8 v was received which was stored in a battery for power storing.**

Keywords: Power, Mechanism, alternator, friction, battery

I. INTRODUCTION

Power management is one of the demandable system in these days hence the usage of power is exceeding the limited amount, an alternative solution is to be found to enhance the future power this can be through any source like modification of a system, adding additives, boosters, power back up etc. These proceedings lead to new research forums to mitigate various power breakdown strategies to find alternative solutions in behalf of additional power producing hence on finding the ways [1] suggest power by grab handle mechanism were in rack and pinion is used to generate power using friction reaction with dynamo, In our case wind energy is converted in to electrical energy by means of energy converter system.

A wind mill produces enormous amount of power due its reaction with the air medium in the same way the following project deals with same principle of wind mill but this reaction happens in a movement of a body, consider a radiator fan of an automobile revolves under the motor operation similarly the fans fixed to the attachment rotates to the amount of opposition of the air force that is exerted toward its motion. The power is being

produced from tidal energy in the similar way but in the presence of water as a result every power generation engages through a medium hence the medium determines the rate of power produces according to the pressure or force applied.

II. OBJECTIVES

The main purpose is to produce power by mans of converting the rotary motion in to source of power by means of an energy converting device, which can be used in automobiles for enhancing the rate of power in absence exhausted battery charge to boost up the former, This mounted on a automobile body or interior which is nearby the battery circuit so that the amount of power that is produced by the air medium in turn be stored in the battery by means of energy convertor. This can be achieved by placing series of fans in the respective place ie were the probability of aerodynamics is higher so that rapid movement of fans provide enormous power backup battery. Figure 1shows the basic setup of the circuit with various arrangements like battery, energy converter and battery for storage.

ISSN: 2278 – 7798

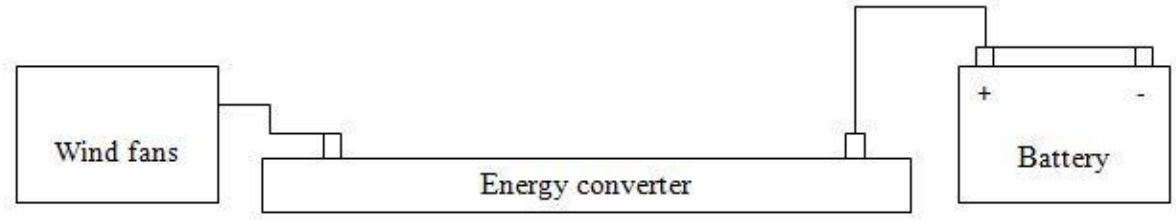

Figure.1 working layout.

III. MECHANISER

WIND FAN: A small fan device is used in this former device with seven blades with an attachment of a Dc motor at its shaft, which behaves as energy converter device in the process of power generation for power storage.

Figure.2 showing the wind fan.

DC MOTOR**:** The dc motor which is connected toward the shaft of the fan which in turn is of specification 12 A, 0.12 V. Usually this device is useful for producing power for an applied load or pressure (means of air medium ie the opposing force).

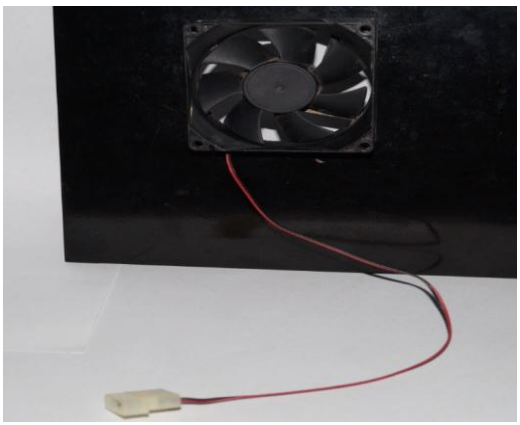

Figure.3 showing fan with battery attachment.

BATTERY**:**Battery used here is a rechargable one which induces power by means of instant charging, as a result the amount of power which is in turn produced the capacity of battery used here is 10V, 1600m Ah, As the apparatus produces 8 V output the amount of power produced is not affect the battery with any short circuit.

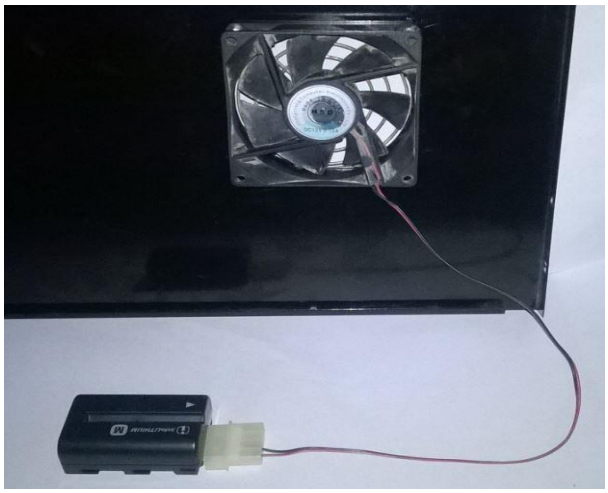

Figure.4 showing the battery power source.

IV. OBSERVATIONS

This setup is made to mount on automobiles (part were aerodynamic flow enhances) so that the device may work as effective power generator for future generations, It is found that while placing the object over the aerodynamic flow of high pressure area were the amount of air traverse increases as a result the outcome of power is also enhanced with increasing efficiency.

While placing the device in between the region of hood and radiator grill position a region of high air pressure flow induces dynamic effect of power for storage.

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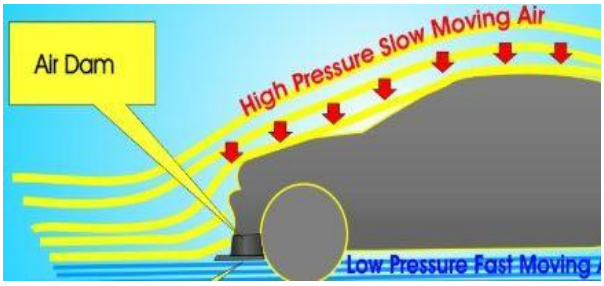

Figure.5 showing the application of usage.

In case as shown in figure 5 rate of power produced is higher which may be added advantage for batteries durability, the front portion also provides easy access for the connection with the car battery which may make the purpose simpler as shown in figure 6.

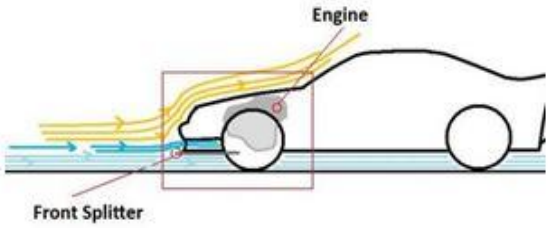

Figure.6 showing the area of mounting.

The following values are observed under the pressure applied by the compressor air to the device as follows

SNO	PRESSURE APPLIED In bar	POWER In V
1	10	2
2	20	3.7
3	30	5
4	40	6.9
5	50	8.2

Table.1 showing the Rate of power produced.

The no of revolution also estimates the amount of power produced as result, For 1 V = 120 RPM as measured with the help of a tachometer.

SNO	NO OF REVOLUTION In RPM	POWER In V
1	240	2
2	480	3.7
3	600	5
4	875	6.9
5	1000	8.2

Table.2 showing the RPM with respect to power.

V. POWER CALCULATION &AERODYNAMICS

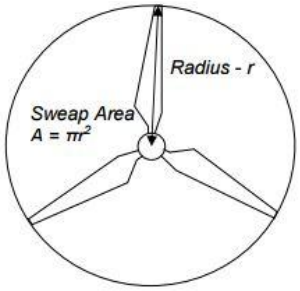

Figure.7 showing the model fan

In case finding power produced as follows:

Blade Length, l = 0.045 m

Assumed wind speed, v = 12 m/sec

Air density, ρ = 1.23 kg/m^3

Power Coefficient, C_p = 0.4

Since the radius is equal to the length in case of wind mills.

$$L = r = 0.045 \text{ m}$$

$$A = \pi r^2$$

$$= \pi \times (0.045)^2$$

$$= 0.0064 \text{ m}^2$$

Hence the area of the blade is 0.0064 m^2.

Power can be calculated as follows:

$$P_{produced} = 0.5 \times \rho A v^3 C_p$$

$$= 0.5 \times 1.23 \times 0.0064 \times 12^3 \times 0.4$$

$$= 2.72 \text{ Mw}$$

The following power can be produced in mass Quantity which is 2.72 Mw.

Below calculations follows the reaction aerodynamic effect in automobiles.

$$Cx0 = \frac{Fx}{q \times Sref} = 16.80$$

$$\rho = \frac{1.27 \times Vg}{m3} \text{ hence}$$

$$V = 8.33 \text{ m/sec}$$

Sref = 0.3429m2

Fx = Axial force acting = 300N

ISSN: 2278 – 7798

The figure 7 shows the simulation of various air streams falling over the blades (single one) in ANSYS, due to this force of about 5 kpa is being acting on each blades which remains in nominal stress range, figure 8 shows deformation due to aerodynamic forces.

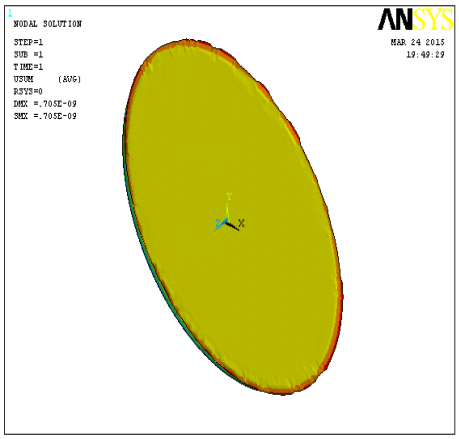

Figure.8 showing the thermal analysis.

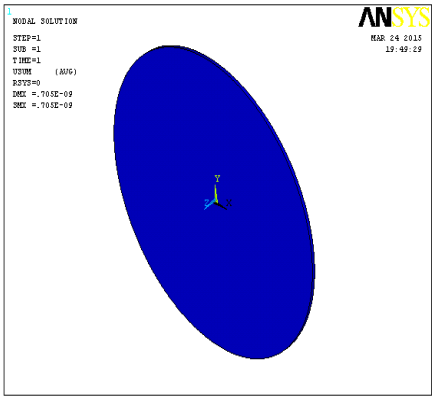

Figure.9 showing the aerodynamic deformation.

VI. CONCLUSION

Hence the following power generation technique can be used in automobiles and various zones of parts were air is the source of power generation. When the device is placed in a region of aerodynamics flow the results obtained favours the battery life time in increasing the durability, former can be used for various applications in generating 8 V for a cycle. From the following subject lesser the weight of the fan more will be the rate of power.

The rate of power produced is proportional to No of revolutions in blades is shown in the figure 7 the graph between pressure applied Vs power for comparison.

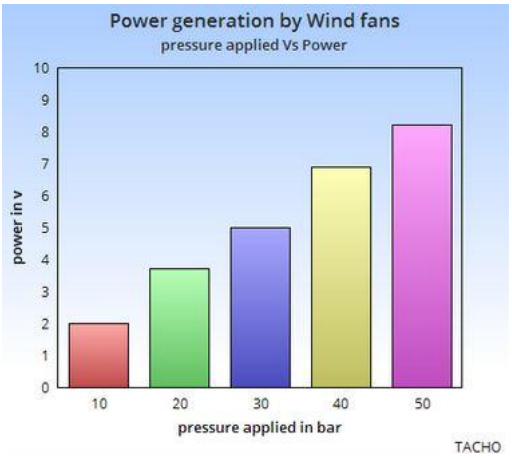

Figure.10 showing the power produced for applied pressure.

The rate of power increases when rate of torque increases between the vehicle and surface, hence the rate of drag is also a major factor in generation of power production.

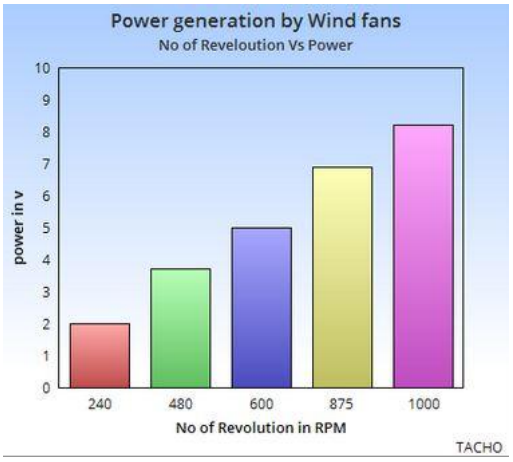

Figure.11 showing the power produced for No of revolution.

The figure 8 shows the drag comparison with aerodynamics in case of a moving object in varying speed.

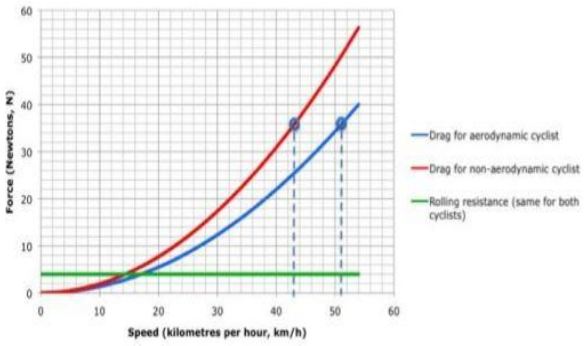

Figure.12 showing the drag comparison motion.

ISSN: 2278 – 7798

VII. REFERENCE

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S.Krishna S/O N.Srinivasan, Final year Mechanical Engineering, Anna University, Jeppiaar Engineering College, Chennai.

INTRESTS

Automobile research and material science.

PUBLICATIONS

1. DESIGN AND EXPERIMENTAL ANALYSIS OF AN IMPACT ATTENUATOR , Twelveth IRF International Conference, 31st August 2014, Chennai.
2. POWER GENERATION THROUGH GRAB HANDLES, IJISET - International Journal of Innovative Science, Engineering & Technology, Vol. 2 Issue 3, March 2015.
3. HYBRID SPRINGS FOR POWER GENERATION, IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-ISSN: 2278-1684,p-ISSN: 2320-334X, Volume 12, Issue 3 Ver. III (May. - Jun. 2015), PP 01-06.
4. DESIGN OF ENERGY CAPTURING MEDIUM USING PIEZOELECTRIC EFFECT, International Journal of Scientific Engineering and Applied Science (IJSEAS) - Volume-1, Issue-4, July 2015.
5. IMAGE PROCESSING OF METAL PARTS USING QUALITY INSPECTION METHOD IN COMPARISON WITH MATLAB, IJISRD, International Journal For Scientific Research & Development, vol 3, Issue 4, 2015.
6. FABRICATION OF PARABOLOID SOLAR BEAM COLLECTOR, IJIRST, International Journal For Innovative Research In Science & Technology, Vol 2, Issue 1, June 2015.
7. DESIGN AND FABRICATION OF HYBRID GREEN VEHICLE, IJST, International Journal of Science & Technology, June 2015.

CURRENT RESEARCH

Acoustics performance of natural fibers.

ACHIEVEMENTS

1. Participated in EFFICYCLE 2014 an SAE event and represented as our College Team captain and bagged 61th position out of 90 colleges in all India level competition held in UIET Punjab University Chandigarh.
2. Bagged best paper award in Twelveth IRF International Conference on topic "DESIGN AND EXPERIMENTAL ANALYSIS OF AN IMPACT ATTENUATOR" 31st August 2014, Chennai.

ISSN: 2278 – 7798