

CONVERGENT WIND MILL WITH VELOCITY AND ACCELERATION CONTROL

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Abstract: This paper is related to effect of blade design and ratio of convergent nozzle's inlet and outlet. The improvement of angled fan blades rotating radius is to calculate the velocity. The convergent wind mill is to control the velocity of air in various direction by using convergent nozzles in four directions. The outlet area of nozzle is half of the inlet area. The exit area of nozzle is partially closed and it controls the velocity of air. The wind force is effectively passed through horizontal axis vertical blades by using convergent nozzles.

Key words Renewable energy, convergent nozzles, blade angle, velocity, power.

1. INTRODUCTION

There are many renewable energy sources around us. We are not utilizing these sources completely. But we are using high power obtained by non renewable energy sources. The finite sources will be extinct in future. So we are planning to utilize the flow of air (wind) to generate power from various places. Because it is the most independent and non polluted renewable energy source in the world. Energy cannot be created but it is converted from one form to another form. Modern devices (such as TV, fan, machines, etc) are running with the help of input energy. The fossil fuels give high power and high efficiency for a certain period only. But the wind energy can produce small amount of power forever.

2. SCENARIO

Tamilnadu's power producing capacity by wind is 29% of India's total power. The report says that the maximum power recruitment in India.

Table 2.1 power requirement in various locations

year ending	Consumption (GWh)	Domestic	Domestic	Industrial	Traction	Agriculture	Misc	Per-Capita Consumption (in kwh)
31 march 2016	1,031,642	22.97%	8.05%	44.20%	1.63%	18.17%	4.97%	1074.65
31 march 2015	938,823	23.53%	8.77%	42.10%	1.79%	18.45%	5.37%	1010.0

3. OBJECTIVE

- To reduce the electricity shortage in rural and urban areas,
- To increase the efficiency when compared to existing methods,
- To reduce the weight of the apparatus, initial and maintenance cost,
- To reduce the size of the design and to obtain high power,
- To create job opportunities in wind power stations and it will reduce the unemployment problems.

4. DESIGN

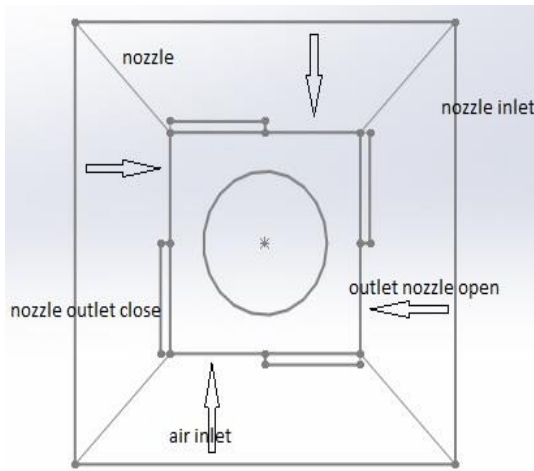


Fig 4.1 Top view

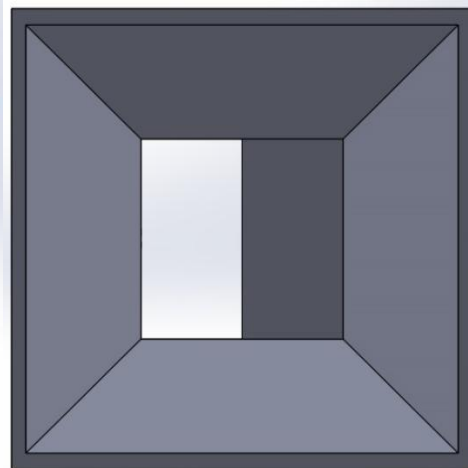


Fig 4.2 Front view

5. SPECIFICATION

Convergent nozzle inlet area = 0.144 m²

Convergent nozzle outlet area = 0.008123 m²

Radius of rotating blades = 0.12m

Nozzle Inlet(area*velocity) = nozzle exit (area*velocity)

$$V1*17.72 = V2 \text{ m/s.}$$

6. VELOCITY CALCULATION

Table 6.1 velocity analysis

Inlet velocity m/s	Exit velocity m/s
2	35.44
2.5	44.3
3	53.16

7. WORKING

The air flows in various directions .The present invention of our project will control the velocity of air in various direction by using convergent nozzles.The fan blades are connected in one end of dc generator.The blades are rotating horizontally and the power is produced in dc generator.The convergent shape nozzle’s inlet is completely opened but the outlet is partially opened in all directions.The dc generator is used to convert the rotational energy into electrical energy by the principle of electromagnetic induction.A stand is provided to hold the dc generator and nozzle.An inverter is used to convert the direct current into alternating current.The area above the rotating blade is completely closed and bottom is opened to provide a exit portion.Finally the power is stored in a battery.

8. POWER PRODUCTION

Table 8.1 external fan applying speed

Speed	voltage
200	0.12
150	0.10
100	0.17

Table 8.2 experimental analysis

Time	Voltage(multi meter measurement)
8.00 AM	0.07
10.00 AM	0.05
1.00 PM	0.04
3.00 PM	0.07
4.00 PM	0.09
6.00 PM	0.12

9.FABRICATED DESIGN

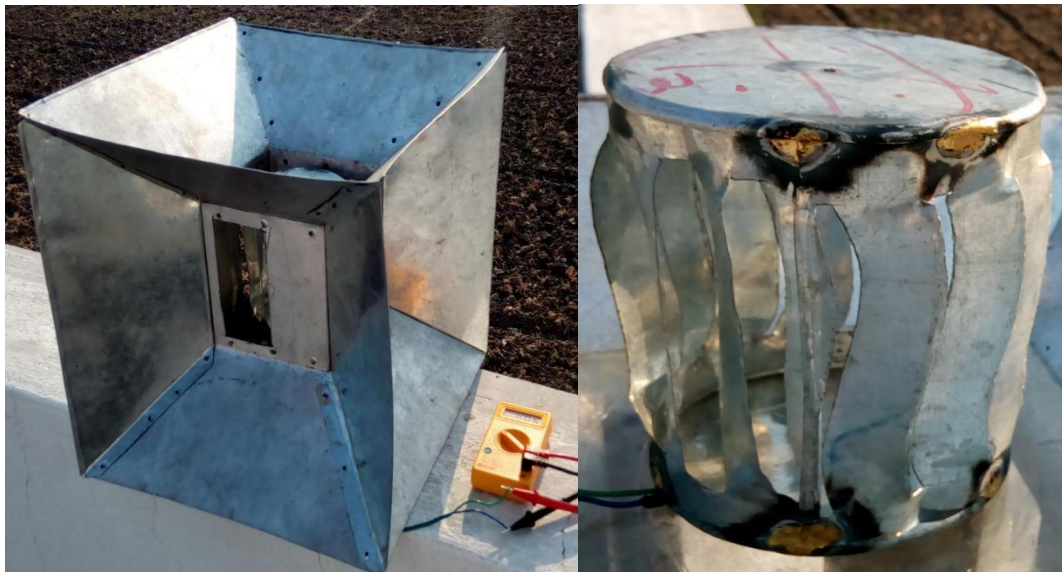
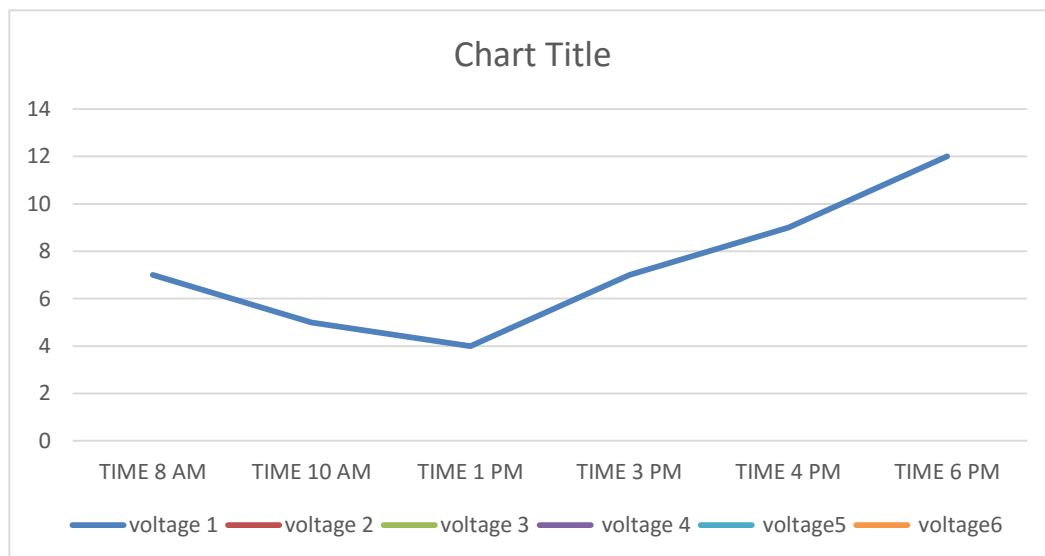


Fig 9.1 fabricated nozzle

Fig 9.2 fabricated fan blades

10.GRAPH



Graph 10.1 output power vs voltage

11.CONCLUSION

Our project will reduce the usage of fossil fuels and increase the performance of existing wind energy based projects.It will fulfill the need of power in both rural and urban areas.It is harmless and pollution free energy producing method.We should utilize the energy properly and conserve the nonrenewable energy for future generation.

12.REFERENCE

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