**Design Development & Analytical Process of Small Vertical Axis Wind Turbine**

**Dr. Mukesh Kumar Lalji**

Vice Principal, Department of Technical Education and Skill Development, M.P. Govt., S.V. Polytechnic College, Shyamla Hills, Bhopal, Madhya Pradesh, India

**ABSTRACT**

The speed of wind in meter per second. Sensor plays an important role in censoring the velocity of wind. The design and fabrication operations, we evaluate the performance of machine through the show experimental setup. Experimental setup consists assembly of various component and equipment already described at initial phase. Blower, Anemometer and sensor are other equipment for facilitation of procedure. When we start the blower, the wind velocity strikes the blades of rotor, which start rotating due to its effect.

**KEYWORDS:** Two blade VAWT, Weighing machine for force measurement, Tachometer/Stroboscope for rpm, Anemometer for wind velocity

**CHARTERISTICS CURVE – 1**

RPM V/S TORQUE

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CHARACTERISTICS CURVE – 2
WIND VELOCITY V/S FORCE

CHARACTERISTICS CURVE – 3
WIND VELOCITY V/S POWER

CHARACTERISTICS CURVE – 4
WIND VELOCITY V/S TORQUE
CHARACTERISTICS CURVE – 5
WIND VELOCITY V/S RPM

CHARACTERISTICS CURVE – 6
ANGULAR VELOCITY V/S BORQUE

CHARACTERISTICS CURVE – 7
WIND VELOCITY V/S ANGULAR VELOCITY
Fig 1 Drawing of Design Development Fabrication and Testing of Small Vertical Axis Wind Turbine

Photo 1 Experimental Setup of Small Vertical Axis Wind Turbine
PHOTO 2 EXPERIMENTAL SETUP OF SMALL VERTICAL AXIS WIND TURBINE

PHOTO 3 EXPERIMENTAL SETUP OF SMALL VERTICAL AXIS WIND TURBINE
<table>
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<th>RPM</th>
<th>Force (N)</th>
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<th>Torque</th>
<th>Power</th>
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**Observations**

Detail Assembly Drawing of Design, Development, Fabrication and Testing of Small Vertical Axis Wind Turbine
Two Blade Vertical Axis Wind Turbines

Section of Two Blade Vertical Axis Wind Turbine
Plan of Rotor Assembly of Two Blade Vertical Axis Wind Turbine

Elevation of Two Blade Vertical Axis Wind Turbine
ECONOMY
The machine can work at very minimum wind velocity i.e. 4-6 m/s, which available throughout the year, but we assume average wind available only 10 months in a year, then 10 months x 30 days x 24 hours = 7200 hrs.

And, expected power generation of machine 25W = 25 / 1000 KW

Then, 3 x 180 = Rs. 540.00
Cost of Machine = Rs 1800.00
So, we can say Payback in four years.
Also, expected life of machine = 8 years
So, remaining 4 years we can do the servicing of machine and change deteriorated parts like bearing, blades etc. and thus use for long time by employing such type maintenance

CONCLUSION:
Before going to conclude the topic it would be necessary to review the brief comparison of horizontal axis wind turbine and vertical axis wind turbine.

REFERENCES:


