

Power Generation by Venturi Wind Turbine

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Abstract:-Through the following a very long while, renewable vitality advancements, because of their constantly enhancing execution and cost, and developing acknowledgment of their Environmental, monetary and social qualities, will become progressively focused with Traditional vitality innovations, so that by the center of the 21st century, renewable Energy, in its different structures, ought to supply half of the world's vitality needs." We have chosen this as our last year extend in order to start thinking towards power era through clean sources, for example, wind. Power era in our nation is low at present. Modernly created states like, Maharashtra is enduring significant force deficiencies, and this is a sign of real emergencies. Indeed, even in urban areas like Mumbai people groups are experiencing power cuts. We realized that this anticipate does not mirror any new revelation; but rather our aim is that private social orders ought to introduce such twist plants on the porch to handle with the force cuts and get to be autonomous unto certain sum. So we have started it with our school. As our school is almost a rivulet in this way great area for a wind plant. In this anticipate wind turbine charges a 12 volt battery and runs different 12 volt apparatuses. We have created the little scale wind turbine on the premise of outline counts and rolled out improvements in configuration to track it with assembling limitations.

I. Introduction

Through the accompanying many years, renewable essentialness advancements, because of their always upgrading execution and cost, and creating affirmation of their Environmental, financial and social qualities, will turn out to be dynamically forceful with Traditional imperativeness progresses, so that by the focal point of the 21st century, renewable Energy, in its diverse structures, should supply half of the world's imperativeness needs."

The cost of wind-made electric power has dropped altogether. Since 2004, according to some sources, the expense in the United States is quickly lower than the cost of fuel-delivered electric power, even without considering externalities. In 2005, wind essentialness cost one-fifth as much as it did in the late 1990s, and that slipping example is depended upon to go before as greater multi-megawatt turbines are mass-made. Wind power is turning out to be quickly, at around 38%, up from 25% improvement in 2002. Wind power is the snappiest creating kind of force period on a rate premise.

Wind essentialness change systems change over the power in the wind to rotational shaft control and to control by coupling a generator to the unit. Wind "turbines" is wind electric power units, and are used all through the world. Business wind turbines range from several hundred watts to around 20 kilowatts for rural applications. Units proposed for grid affiliation are open in the extent of 20 kilowatts to more than one megawatt. Where yearly ordinary wind

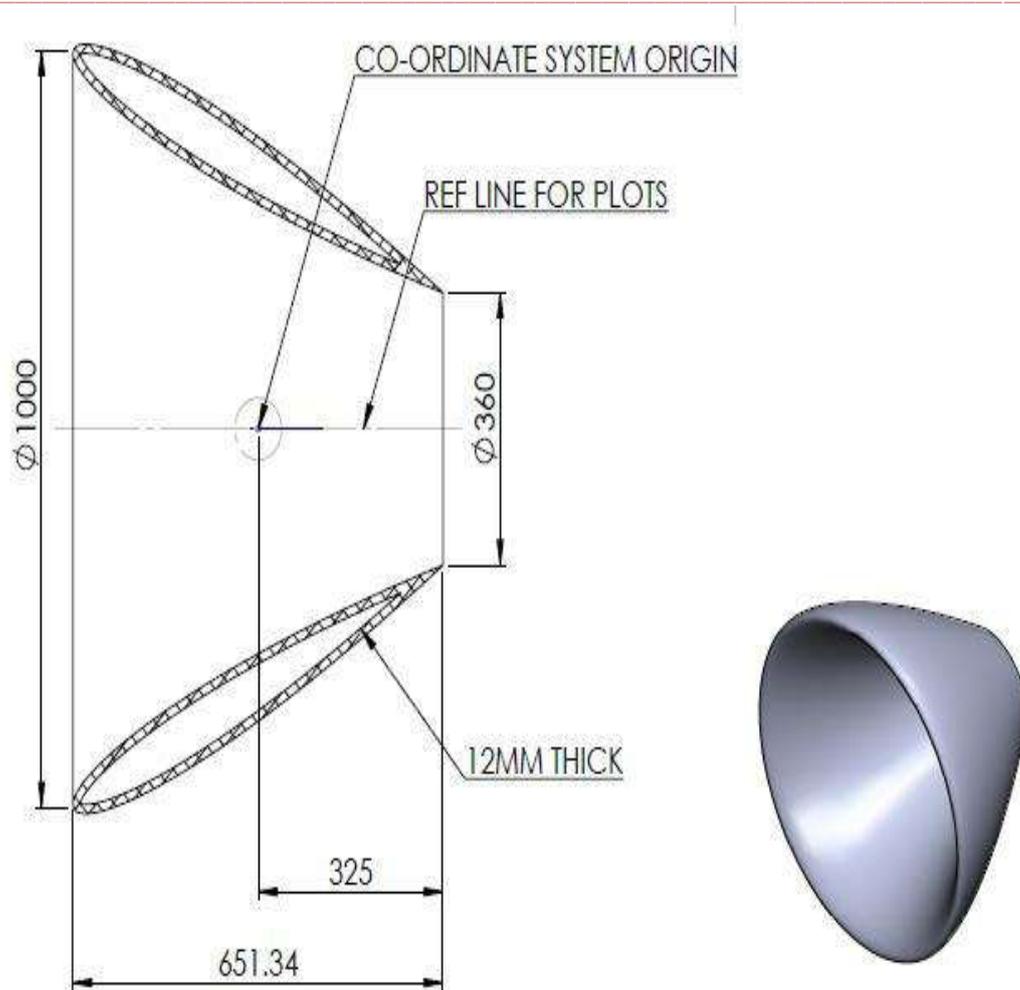
speeds surpass around 5 meters for consistently, private and town scale wind turbines can give power at costs forceful with or underneath those of diesel generators, and can be used as a piece of stand-alone applications not requiring an area power scattering system..

II. Aim of the project:-

Our point was to fabricate little scale wind turbine which keep running on low air speed and can be introduce on rooftop top of building and charges a 12 volt battery and runs different 12 volt machines without invertors or run home apparatus with the utilization of invertors. By building this anticipate we need drive the consideration of people groups towards power era through renewable sources in order to handle issue of force in our nation which is experiencing power deficiencies. With the assistance of such venture different segments like private, mechanical, business and so on can get to be autonomous from supply of force from power board unto certain degree.

III. Problem description:-

India is a nation which is not appropriate for wind power era with the exception of some costal and uneven area. Normal wind speed accessible in India is in the scope of 0.5 to 6 m/s. this air speed in not adequate for force era. In even hub wind turbine it obliged 8 to 10 m/s air speed for appraised power era underneath this air speed the framework is wasteful of force era.



Lay Out of Venture Wind Turbine

IV. DESIGN OF VENTURI WIND TURBINE

We know

$$V_1 * A_1 = V_2 * A_2$$

$$D_1 = 1 \text{ m}$$

$$A_1 = .785 \text{ m}^2$$

$$D_2 = 0.36 \text{ m } A_2 =$$

$$0.102 \text{ m}^2$$

Inlet velocity = 1m/s So
velocity at throat

$$V_2 = V_1 * A_1 / A_2$$

$$V_2 = 1 * .785 / 0.102 \text{ } V_2 =$$

$$7.85 \text{ m/s}$$

Power generation at A1

$$P_1 = 0.5 * A_1 * \rho * V^3$$

$$P_1 = 0.5 * 0.785 * 1.2 * 1^3$$

$$P_1 = 0.471 \text{ watt / hrs}$$

Power generation at A2

$$P_2 = 0.5 * A_2 * \rho * v^3$$

$$P_2 = 0.5 * 0.102 * 1.2 * 7.85^3$$

$$P_2 = 29.6 \text{ watt / hrs}$$

Increment in velocity = $V_2 / V_1 = 7.85 / 1 = 7.85$ times
Increment in power = $P_2 / P_1 = 29.6 / 0.471 = 62.84$ times
Decrease in area = $A_2 / A_1 = 0.101 / 0.785 = 0.128$ times

V. MATERIAL SELECTION

The best possible determination of material for the distinctive part of a machine is the principle objective in the creation of machine. For a configuration engineer it is must that he be acquainted with the impact, which the assembling procedure and warmth treatment have on the properties of materials. The Choice of material for building purposes relies on the accompanying variables:

1. Availability of the materials.
2. Suitability of materials for the working condition in administration.
3. The expense of materials.
4. Physical and compound properties of material.
5. Mechanical properties of material.

The mechanical properties of the metals are those, which are connected with the capacity of the material to oppose mechanical powers and load. We should now examine these properties as takes after:

1. **Strength** : It is the capacity of a material to oppose the remotely connected powers
2. **Stress**: Without breaking or yielding. The inner resistance offered by a section to a remotely connected power is called stress.
3. **Stiffness**: It is the capacity of material to oppose twisting under hassles. The modules of versatility of the measure of firmness.
4. **Elasticity**: It is the property of a material to recover its unique shape after misshapening when the outside powers are expelled. This property is attractive for material utilized as a part of instruments and machines. It might be noticed that steel is more versatile than elastic.
5. **Ductility**: It is the property of a material empowering it to be drawn into wire with the utilization of a ductile power. A flexible material must be both solid and plastic. The malleability is typically measured by the terms, rate prolongation and percent lessening in territory. The flexible materials normally utilized as a part of designing practice are gentle steel, copper, aluminum, nickel, zinc, tin and lead.
6. **Malleability**: It is an uncommon instance of malleability, which licenses material to be rolled or pounded into slim sheets, a flexible material ought to be plastic yet it is not fundamental to be so solid. The pliant materials ordinarily utilized as a part of building practice are lead, delicate steel, created iron, copper and aluminum.
7. **Hardness**: It is an imperative property of the metals and has a wide verity of implications. It grasps various properties, for example, imperviousness to wear scratching, distortion and mach powerlessness and so on. It likewise implies the capacity of the metal to cut another metal. The hardness is typically communicated in numbers, which are reliant on the strategy for making the test. The hardness of a metal might be controlled by the accompanying test.

- a) Brinell hardness test
- b) Rockwell hardness test
- c) Vickers hardness (also called diamond pyramid) test and
- d) Share scaleroscope.

Manufacturing Process:-

The following are the various manufacturing process used in mechanical Engineering.

1) Primary Shaping Process:

The process used for the preliminary shaping of the machine component is known as primary shaping process.

2) Machine Process:

The process used for giving final shape to the machine component, according to planned dimensions is known as machining process. The common operation drilling, boring etc.

3) Surface Finishing Process:

The process used to provide a good shape surface finish for the machine components are known as surface finishing processes. The common operation used for the process are polishing, buffing, lapping etc.

4) Joining Process:

The process used for joining machine components are known as joining process. The common operation used for this process are soldering, brazing, welding etc.

5) Process Affecting Change In Properties:

These are intended to import specific properties to material e.g. heat treatment, hot working, cold rolling etc.

Welded Joints:-

Definition:

A welded joint is a permanent joint, which is obtained by the fusion of the edges of the two parts, to be joined together, with or without the application of pressure and a filler material.

Welding is intensively used in fabrication as an alternative method for casting or forging and as a replacement for bolted and reverted joints. It is also used as a repair medium.

Advantages:

- 1) The welded structures are usually lighter than riveted structures.
- 2) The welded joints provide maximum efficiency which to impossible innervated joints.
- 3) Alteration and addition can be easily made.
- 4) As the welded structure is smooth in appearance, it is good looking.
- 5) In welded structures, tension members are not weakened.
- 6) In a welded joint has high strength often more than parent metal.

Disadvantages:

- 1) Since there is uneven heating and cooling during fabrication therefore the members may get distorted as additional stresses may develop.
- 2) It requires a highly skilled labour and supervision.
- 3) No provision for expansion and contraction in the frame, therefore there is possibility of cracks.
- 4) The inspection of welding work is difficult than riveting work.

Maintenance:-

No machine in the universe is 100% maintenance free machine. Due to its continuous use it is undergoing wear and tear of the mating and sliding components. Also due to the chemical reaction takes place when the material comes in the contact with water, makes its corrosion and corrosion. Hence it is required to replace or repair. This process of repairing and replacing is called as maintenance work.

Autonomous maintenance activity

- 1) Conduct initial cleaning & inspection.
- 2) Eliminate sources of dirt debris excess lubricants.
- 3) Improve cleaning maintainability.
- 4) Understand equipment functioning.
- 5) Develop inspection skills.

- 6) Develop standard checklists
- 7) Institute autonomous inspection
- 8) Organize and manage the work environment

Cleaning

Why cleaning?

Prevent or eliminate contamination.

Find ways to simplify the cleaning process.

Facilitates through inspection when done by knowledgeable operators and/or maintainers.

VI. CLEANING INSPECTION

What to look for when cleaning.

- Missing part
- Wear
- Rust and corrosion
- Noise
- Cracks
- Proper alignment
- Leaks
- Play or sloppiness

VII. CONCLUSION

During working on this project we came to know about the various renewable sources of energy and their importance in power production in the world. We came to know that importance of the power through wind mills. In future, further development in the direction of wind energy will make the power cheaper. India stands fifth in rank of power produced by wind energy.

The building of this project has helped us to develop good amount of confidence as we were able to tackle very interesting problems like,

1. Transmission system for converting the wind force into rotational speed of shaft.
2. Mechanism to rotate the head assembly so as to access the use of wind from any direction, which increases the efficiency of the system.

It also gave us opportunity to realize ourselves as we were subjected to different problems and were compelled to take self-decisions which really develops our problem tackling skill

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