A STUDY ON ENERGY GENERATION FROM THE TRAFFIC WIND MILLS FOR SMART ROAD NETWORK

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Key Words: Vertical Axis wind turbine, design, fabrication.

Introduction:

The main aim of this project that transforms highways into renewable energy by using dynamics of the city. A wind turbine is a device that converts the winds kinetic energy into electrical energy. Wind turbines are manufactured in a wide range of vertical and horizontal axis types.

1. The horizontal wind mill is highly used for large scale applications which require more space and huge investment.
2. Vertical wind mill is suitable for domestic application at low cost. Vertical axis wind turbines are less affected by frequent wind direction changes as compared to the horizontal axis wind.

There is a near constant source of wind power on the highways due to rapidly moving vehicles. The motivation for this project is to contribute to the global trend towards clean energy in a feasible.

There are only a few types of energy that do not produce carbon dioxide. These are nuclear power and renewable energy sources such as wind, solar, and water. Renewable energy sources are the cleanest of these sources, as no waste is produced as a by-product of these sources.

Vertical axis turbines (VAWTs) have a main rotor line arranged directly. Another advantage of this arrangement is that the turbine does not need to be pointed in the air in order to operate, which is an advantage in an area where the direction of wind varies widely, for example when a turbine is connected to a structure. Also, a generator and gearbox can be installed near the ground, using a direct drive from the rotor assembly to the ground gearbox, to improve accessibility.

OBJECTIVES

- To analyze the amount of traffic in the study area: Calculated amount of traffic using traffic volume count (speed survey) in the study area and concluded average volume of traffic and is used for the traffic wind mill.

- To design the traffic wind mills for the smart road network: using the data collection that is traffic volume count and velocity the design of wind power is determined.
- To fabricate the traffic wind mills for the smart road network: using the design parts and dimensions, such as height of blade, diameter of shaft , height of wind turbine, number of blades, DC Motor are used in fabricating the wind mill.

Methodology:

The research topic / goal has been selected and explained the problem statement initially by looking at the many published journals and literature research. Thereafter the related data (Total Traffic Movement and Speed of Traffic Movement) will be collected by conducting a Classified Volume Count Survey and a Speed Survey based on the design and development of the model (Traffic Windmill). using the required materials. Later confirmations will be made to evaluate the model based on where the research will be completed and future improvements will be proposed.

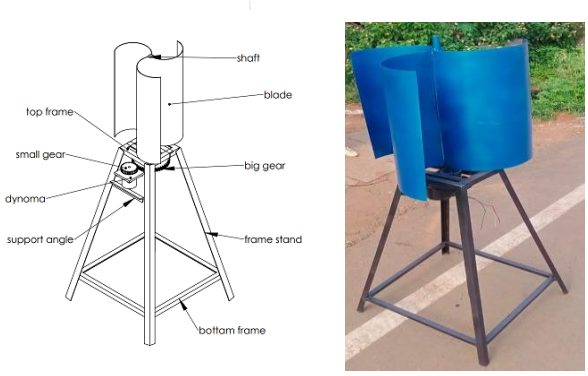
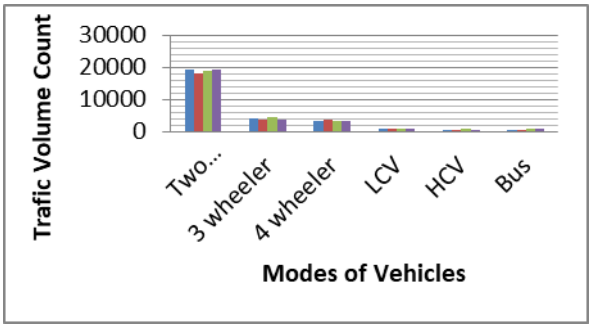


Figure 3.1 Representations of Components of Wind Turbine

- Traffic volume count: The Traffic Volume Count counts the number of vehicles passing through the road over a period of time. It is usually presented in terms of the Passenger Car Unit (PCU) .
- Purpose of Traffic Volume Count: The purpose of traffic volume calculation is to draw an estimate based on the data collected. Provide possible solutions and a proposal for the development of a identified problem. The objective included includes identifying the hourly and hourly traffic distribution.

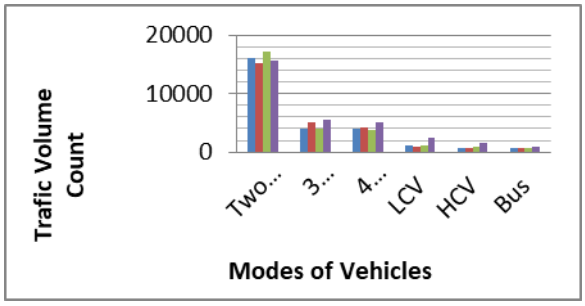
Date	Time	Two wheeler	3 wheeler	4 wheeler	LCV	HCV	Bus
8/01/22	8:00am-8:00pm	19332	3984	3388	824	646	687
8/01/22	8:00am-8:00pm	18248	3848	3525	787	597	666
9/01/22	8:00am-8:00pm	18734	4611	3194	1091	740	711
9/01/22	8:00am-8:00pm	19287	3808	3312	1107	703	771

Table 3.1: Showing the summary sheet of Traffic volume and Graphical representation of Traffic volume countfrom Bogarves circle to Chennamma circle



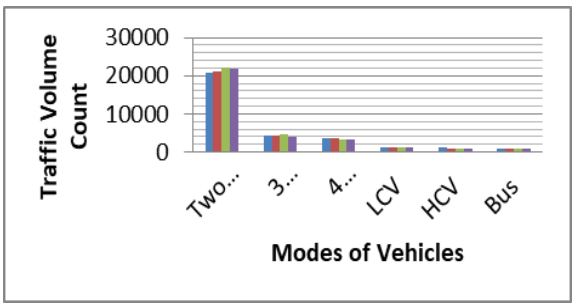
Date	Time	Two wheeler	3 wheeler	4 wheeler	LCV	HCV	Bus
15/01/22	8:00am-8:00pm	16174	3908	4094	1040	655	690
15/01/22	8:00am-8:00pm	15106	5037	4282	848	642	640
16/01/22	8:00am-8:00pm	17250	3908	3838	1228	843	706
16/01/22	8:00am-8:00pm	15735	5473	5030	2465	1497	866

Table 3.2: Showing the summary sheet and Graphical representation of Traffic volume count from RTO circle to Chennamma circle



Date	Time	Two wheeler	3 wheeler	4 wheeler	LCV	HCV	Bus
22/01/22	8:00am-8:00pm	20678	4439	3719	1291	1067	1039
22/01/22	8:00am-8:00pm	20990	4395	3537	1236	936	814
23/01/22	8:00am-8:00pm	22152	4612	3312	1129	984	780
23/01/22	8:00am-8:00pm	21799	3896	3181	1392	900	800

Table 3.3: Showing the summary sheet of Traffic volume count and Graphical representation from Kolhapur circle to Chennamma circle



SPEED SURVEY

Speed surveys are conducted to estimate the distribution of speed of vehicles in a stream of traffic at particular location on a highway. Speed surveys can be carried out either manually by hand held device or by tubes laid across the road known in the profession as 'automatic traffic counters' (ATC's).

SL.NO	2 WHEELER	3 WHEELER	4 WHEELER	LCV	HCV	Buses
Distance (km)	1.4	1.4	1.4	1.4	1.4	1.4
Avg. Time (hrs)	0.0182	0.020	0.0148	0.022	0.020	0.023
Avg. velocity (km/hr)	78.56	67.78	64.893	66.33	70.59	61.14
In m/sec	21.82	18.82	18.02	18.42	19.60	16.98

Table No-3.4 showing the summery sheet of speed survey from chennamma circle to RTO circle

SL.NO	2 WHEELER	3 WHEELER	4 WHEELER	LCV	HCV	Buses
Distance (km)	1.4	1.4	1.4	1.4	1.4	1.4
Avg. Time (hrs)	0.0193	0.020	0.0168	0.020	0.026	0.021
Avg. velocity (km/hr)	78.94	67.70	85.96	72.59	56.97	64.33
In m/sec	21.92	18.80	23.87	20.16	15.82	17.86

Table No-3.4 showing the summery sheet of speed survey from RTO Circle to chennamma circle

Detailed Drawings

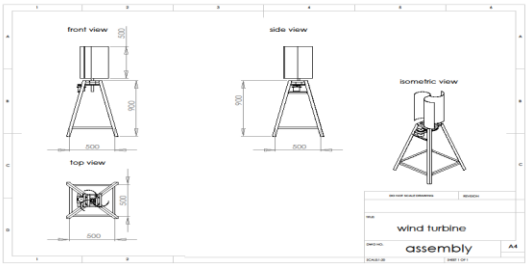


Figure 3.4 Showing the dimensions of wind turbine

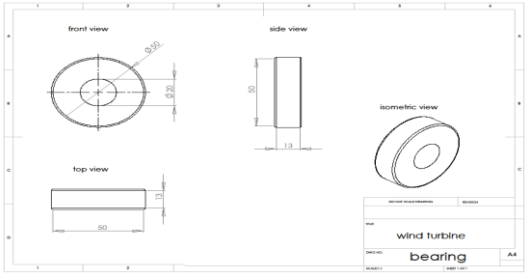


Figure 3.5 Showing the dimensions of blade

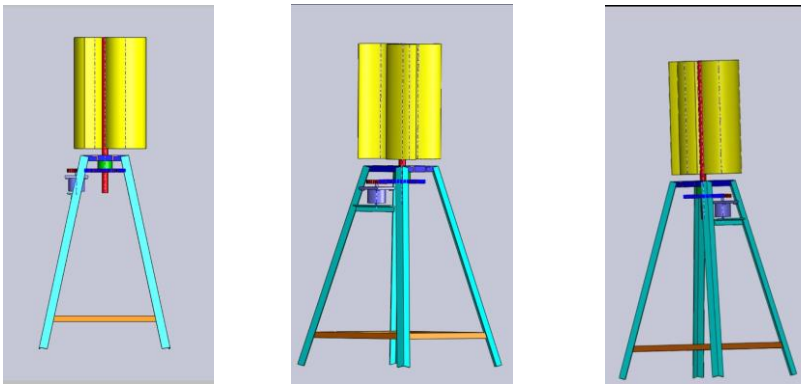


Figure 3.6 Showing the 3D views of wind turbine

SCOPE FOR FUTURE WORK

1) To Produce the Energy for the Commercial Uses.

Small wind turbines used in residential applications, depending on the amount of electricity you want to generate and considering the few conditions that is amount of wind at your site, finding the best location for your system, estimating the systems annual energy output and choosing the correct size turbine and tower.

2) To Create More Number of Opportunities for Industry Setups and Jobs.

Since wind turbines themselves run strictly on the power of wind generated, there is no need for fuel. Once the turbines are installed it doesn't need fueled or connected to power to continue working. This also reduces the overall cost to continue to run large scale wind farms in comparison to other forms renewable energies. As technology improves, so do the functionalities of the structure itself, creating designs that will generate even more electricity, require less maintenance, and run more quietly and safely.

3) To Make Sure of Strong Economic Background of the Country.

Wind energy doesn't pollute the air like power plants that rely on combustion of fossil fuels, such as coal or natural gas, which emit particulate matter, nitrogen oxides and sulphur dioxide- causing human health problems and economic damages. This

greatly benefits the economy in rural areas, where most of the best wind sites are found. Wind power plant owners make rent payments to the farmers for the use of land, providing landowners with additional income.

3. RESULT AND CONCLUSION

1. Based on the traffic surveys, data collected and data analysis Amount of Traffic in the Study Area found per day as -56532 numbers of vehicles.
2. Traffic Wind Mills for the Smart Road Network is designed with following specification.
    - Height of wind turbine=1400mm
    - Height of blade = 500mm
    - Velocity of wind = 7m/s
    - Diameter of shaft = 25mm
    - Numbers of blade = 3 no's
3. Fabrication of the Traffic Wind Mills for the Smart Road Network is

    done with the following specifications.
    - Height of wind turbine=1400mm
    - Height of blade = 500mm
    - Velocity of wind = 7m/s
    - Diameter of shaft = 25mm
4. By referring our whole study on ENERGY GENERATION FROM THE TRAFFIC WIND MILLS FOR SMART ROAD NETWORK'' we conclude that a sufficient amount of mixed traffic is found using which traffic wind mills can be operated effectively with 71 watt by using multi meter device which can be used for the light poles for public use which intern decreases burden on service providers of power supply to the public.