Flying Wind Mill

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Abstract— The present day conventional windmills have many drawbacks. My paper suggests an alternative to overcome the drawbacks. These alternatives are FLYING WINDMILLS. The wind is much steadier at altitudes, so you get even more advantage over conventional windmills in this NEW GENERATION WINDMILLS. Flying windmills have advantages over their land-based counterparts which is because of factors such as contours of the land and daily heating and cooling patterns, often face either inadequate wind or turbulent winds, necessitating expensive designs. No such impediments occur in the jet stream, where air moves near constantly and at several times the speed that it does at 100 feet off the ground, allowing much more energy to be captured from each square meter of wind. Flying windmills are even more advantageous as it has ad- hoc generation: devices with a reasonably simple tether-system do not have to be permanently installed in one place, they could be trucked out to any location that needed them.

Keywords: Flying Wind Mill, Cylindrical Balloon Skeleton, Magnus Effect

I. INTRODUCTION

In the developing science and innovation, renewable vitality put an essential part. The creation of different renewable vitality like Tidal, Wind and Solar has demonstrated a shelter to humankind. In this paper the power era utilizing renewable vitality with ECO agreeable system is examined. The extent of this venture is to dispense with the impracticable of kite-based frameworks and cutting edges by making a recoverable, adaptable, easy to use unmanned flying vehicle (UAV) utilizing Helium inflatable's.

Routine wind vitality authorities which incorporates Horizontal hub machines like Dutch sort wind plant and vertical hub machines like Durres rotor. Disregarding different preferences these machines experience the ill effects of different disservices like self-ruling retraction. My paper recommends about the disposal of fastened wing and it is supplanted with helium filled inflatable.

The Magnus effect or Magnus force is the phenomenon whereby a spinning object flying in a fluid creates a whirlpool of fluid around itself, and experiences a force perpendicular to the line of motion. The overall behavior is similar to that around an airfoil (see lift force) with a circulation which is generated by t mechanical rotation, rather than by aero foil action. In many ball sports, the Magnus effect is responsible for the curved motion of a spinning ball. The effect also affects spinning missiles, and is used in rotor and Flattener aero planes.

A. Air Rotor System

Air Rotor framework depends on the standard of magnus effect has been propose and elevate of Helium gas producing 4kw appraised power. It would be moored by the tether that can broaden up to 1000 feet from ground. A tallness of 400 feet can get the twist at the speed of 3 m/s, The inflatable twists noticeable all around turning the generators. The pivot balances out the inflatable while the vitality is exchanged to the ground through the inflatable, The Air Rotor System is a lighter than air fastened wind swell that pivots about a level hub because of wind, creating electrical vitality. The electrical vitality is to be exchanged down the 1,000 feet tie for prompt utilize, or to an arrangement of batteries for later utilize, or to the power network.

Helium gas manages it and permits it to climb to a higher elevation than customary wind turbines. It catches the vitality accessible at the 600-1000 feet low level and nighttime fly streams that exist all around. Its revolution likewise creates the Magnus impact which gives extra lift, keeps it balanced out.

B. Magnus Effect

When a body (such as a sphere or circular cylinder) is spinning in a viscous fluid, it creates a boundary layer around itself, and the boundary layer induces a more widespread circular motion of the fluid. If the body is moving through the fluid with a velocity V, the velocity of the thin layer of fluid close to the body is a little less than V on the forward-moving side and a little greater than V on the backward-moving side. This is because the induced velocity due to the boundary layer surrounding the spinning body is subtracted from V on the forward-moving side, and added to V on the backward-moving side. If the spinning body is regarded as an inefficient air pump, air will build up on the forward-moving side causing higher pressure there than on the opposite side. Another explanation of the Magnus effect is since there is less (forward) acceleration of air on the forward-moving side than the backward-moving side, there is more pressure on the forward-moving side, resulting in a perpendicular component of force from the air towards the backward-moving side. This layer of spinning air, however, is very thin, and it is more likely that most of the Magnus effect is due to the earlier detachment of the air flow on the forward-moving side, which results in a diversion of the flow (acceleration of air) with a perpendicular component towards the forward-moving side, coexisting with an opposing aerodynamic force with a perpendicular component towards the backward-moving side.

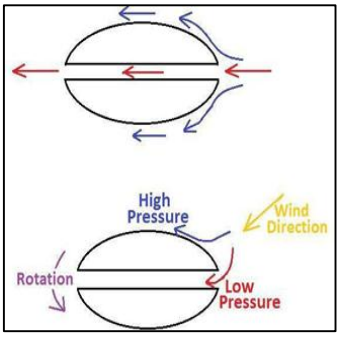

Fig. 1: Magnus effect

C. Usage of Helium Gas:

The air rotor is loaded with He gas, which is dormant and non-combustible. The lifting Helium gas makes a lift compel that is in overabundance of the aggregate weight of the framework. The He gas gives at any rate double the positive lift contrasted with the general weight of the unit. The turning of the rotor makes an extra lift. The streamlined impact that delivers extra lift is the Magnus Effect. To keep rotor at an altitude, the helium gas assumes a noteworthy part. The gas is likewise copious, cheap and ecologically protected.

The consolidated lifting impact from the light He lift and streamlined Magnus lift settles the air rotor against inclining in the wind. In view of the test done, an air rotor went straight up and held a close vertical position in different twist speeds, as the Magnus impact increments as the wind speed increments. Most extreme lean is required to be under 45 degrees from the vertical.

The 4 kW appraised control unit would requires marginally more than 6,000 cubic feet of He. Helium spills at a rate of 0.5 percent for every month or 6 percent for every year, hence the air rotor units should be finished up with He each four to six months.

D. Balloon Design:

Inflatable is planned in a manner that it ought to tend to change its shape with the stream of wind. Here we utilize the inflatable with carbon skeleton framework above which polyester sheets are connected as the envelope, we have given a different layer of same material to keep spillage of helium gas from the balloon. Even after this various layers of course of action, there is a probability of leakage. To forestall it pressure sensor is fitted which will screen the weight Once the weight comes to beneath the maximum furthest reaches of the lift, the helium pressurized gas container will be encouraged with an order by the weight sensor and after that helium will be refilled in the inflatable. For around 30 - 50 days, this whole framework will keep the inflatable noticeable all around. This inflatable is composed in such way that it can be refilled and reused.

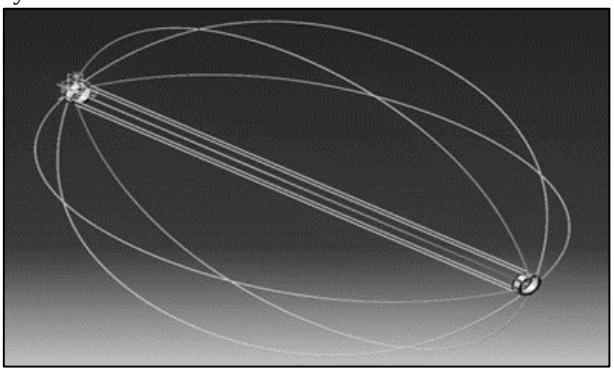

Fig. 2: Cylindrical balloon Skeleton

II. Construction and Working

The wind turbine is a lighter-than-air tethered wind turbine that rotates about a horizontal axis in response to wind, generating electrical energy. This electrical energy is transferred down the tether for consumption.

A. Cylindrical Balloon:

The balloon is cylindrical in shape and is filled with helium air which is lighter then air, hence it could be placed above 300m height.

1) Wind vane stabilizer:

It is one of the important parts of the air borne turbine. It restricts the turbine in horizontal direction, and gives stability to the balloon.

B. Axel

It acts as a frame of turbine which is a single shaft connecting the balloon, and aluminum tube to the generator shaft, hence it is the power transferring element of the air floating turbine.

C. Generator

It the actual machine which converts the rotary motion into electrical energy. There are two conventional generator used for power generation. And transfers power to the base station unit.

D. Pressure Sensors: (inside the balloon)

Pressure sensor will keep a track of pressure drop and reduction in the gas quantity within the balloon. Once the weight comes to underneath the maximum furthest reaches of the lift, the helium pressurized gas bottle will be fed with a command by the pressure sensor and then helium will be refilled in the balloon. For approximately 30 - 50 days, this entire system will keep the balloon in the air. This balloon is designed in such way that it can be refilled and reused.[5]

E. Locking System:

Once the pressure has reached below the upper limit, The pneumatic brake system will be activated to stop the balloon rotation. The position of the balloon will be retained by .inflating the balloon.

EQUIPMENT	WEIGHT
Balloon	4 kg
Helium Refilling System(27CF, 1800psi)	3 kg
Tethered rope (Kevlar, 450Kg tensile strength)	4.46 Kg per Km
Startup wind speed	1m/s
Rated wind speed	12.5 m/sec
Rated Power	4000 Watts

Table 1: Specifications of 4kw Air Turbine

III. Conclusion

In case of flying windmills the MARS system is very simple to install, requiring minimal on-site work. Despite its large size, no cranes or oversized vehicles were required to deploy the system, nor are they expected to be required for larger units. High-altitude wind power using tethered wind turbine devices has the potential to open up a new wind resource in areas that are not served by conventional turbines.

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