

# Ship with Windmill

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**Abstract-** The use of wind power and conversion into energy, methodology regarding implementation of the idea, Advantages and Disadvantages and the scope for future.

**Index Terms-**Power generation by a ship with windmill for green energy revolution.

## I. INTRODUCTION

A wind turbine, windmill or wind generator is a device for converting wind power to mechanical rotation with a low velocity.

The power on the wind can be extracted by acting on a moving wing, which converts the some of the power into torque on the rotor. The amount of power transferred depends upon the wind speed and mass of air swept by the wing.



Fig 1: Offshore Windmill

### Offshore Windmill

- This is Offshore windmill
- This gives wind 97% Of time
- But this is not negligible when total loss calculated per year.
- The total loss is 643.4GW annually
- This loss can be overcome by using Ship with windmills
- To avoid the loss of energy, all the countries are trying to develop this technique

### IDEA

This idea is not yet developed but, some countries like u.s.a and Germany are running behind it to make it successful so that they can produce large amount of energy which can be useful afterwards as per the high amount of population, every country should try this instead of wasting money in unnecessary energy creators. The profit in ship with windmill is, we can use it for all the seasons cause wind in the mid see is always available and the wind speed is also too high.

## II. POWER DEVELOPED BY A WINDMILL

Wind posses energy by virtue of its motion. Any device can capable of slowing down the mass of moving air like a sail or propeller, can extract the part of the energy and convert it into useful work. These factors determine the output from a wind energy convertor.

$$\text{Kinetic energy in wind} = \frac{1}{2} * \text{mass} * \text{velocity} * \text{velocity} = \frac{1}{2}mv^2$$

$$\text{Mass} = \text{Area swept}(A) * \text{velocity}(v) * \text{density}(p) = (A * v * p)$$

$$\text{Power in the wind} = \frac{1}{2} * A * p * v^3$$

For average atmospheric conditions of density, wind speed and moisture content

- Density(p)= 1.225(kg/m<sup>3</sup>)

- Diameter of wing = 100(m) i.e, area, A= 7854(m<sup>2</sup>)

Average wind velocity= 15(m/s)

Under the above conditions, a high speed propeller will produce power of 0.68 MW

### Ship with Windmill

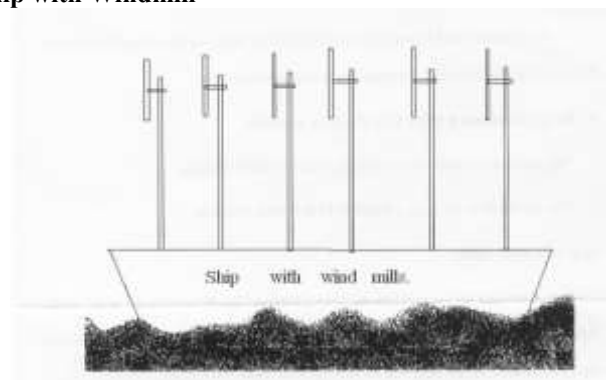


Fig 1.2: Ship With Windmill

The ship consist of a series of rows of windmills placed on it, in the same fashion as it is placed on land. The ships job is to take the wind mill to open oceans. As the ship will be moving with some velocity and the wind will be blowing the opposite side the speed with which, the wind will be touching the turbine will be more and continuous. These results increase in power developed due to increase in wind speed.

#### **Power Calculation of Ship**

A ship needs 35 MW power to run at a speed of 90-150 kmph. When ship runs with the speed, the power generated by single propeller turbine is 8.07MW

So, with the help of five windmills we can run the ship and remaining power we can save in large batteries to use afterwards.

#### **Advantages and Disadvantages**

##### **Disadvantages**

- To run the ship, we are losing fuel
- The maintenance of the ship is added to the investments

##### **Advantages**

- We generate more power than it is done otherwise
- On one hand we are losing fuel for the ship, on other hand we are gaining more power
- When windmills start producing power, fuel supply can be stopped and energy can be taken from windmills directly.
- As turbine is running with high speed, gear system can be reduced
- Density of water is more on water than land.
- As temperature decreases, density of air increases which will be added to power developed.

#### **Scope for Future Work**

- When the windmills are being exposed to a higher velocities the design of the rotor blade is an important point, so research can be done to get an optimum design of the rotor blades.
- The material used for the construction of wings can also be the topic to study

### **III. CONCLUSION**

To reach the high demands of the rapidly developing generation. We have to be efficient as possible. If we are not able to use the freely available air, staying on land, then we will have to go to sea, face the wind and grab the energy from it. If we are gaining by using a ship then why should not we use it. We will have to do it and generate power.

### **REFERENCES**

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