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Improving the efficiency of Old WTGusing Vortex Generator

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ABSTRACT

Wind energy is an free source of energy which is very few of extract it. Generally wind turbine is placed at place where continuous wind is there all over the year.ie wind zone. In India, 1.7% of total energy is produced by using WTG's. The extraction of electricity is from the turbines is acquired by using blades. The design of the blades isto extract maximum energy from wind. An vortex generator device is used for extracting more power or lift from the wind. The dimensions, placement, position, shape, type of airfoil etc. are also other factors that determine the efficiency of blade. In this project, aim is to increase the efficiency if old WTG.

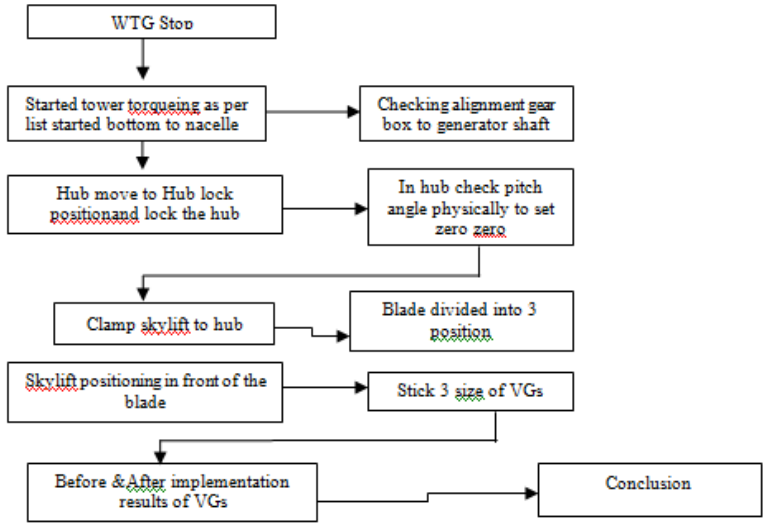
***Index Terms*—vortex generator,WTG, Blade Pitching Angle**

INTRODUCTION

The wind is an natural phenomenon relates to the movement of air passes caused primary by the differential solar warming of earth surface. Wind energy has a great potential to the overcome of excessive dependents on the fossil fuel to meet energy demand of present scenario. India is now became world's fifth prevalent in the electricity sector. The technology evolution of wind turbine is recognized, according to their power generating capacity from 1975 to till date, also shown the corresponding Rotor Diameter, Rotational speed, Pitch, generator and need of power converter. Nevertheless, the wind energy sector is still far too expensive to be profitable, especially the strong growing offshore branch. In India maximum WTG is onshore base. During the past decades, great efforts have been undertaken to make wind power a competitive source for electrical energy. However, a significant part of the cost is related to operation and maintenance (O&M), in particular the failures of the main components (i.e. gearbox and drive train) resulting in long downtimes (breakdown time) and hence high O&M costs also generation loss. Various

studies today discuss if condition monitoring systems, which allow the forecasting of failures at a very early stage, might be the cure to the problems related to the reliability of the gearbox.

METHO DOLOGY



DATA COLLECTION

Data Collection of Power Generation Before and After Implementation of VG's

Before Implementation

Wind Speed m/sec	Rotor speed rpm	Generation per hour	Generation per day
12	1480	1500	36000
10	1400	1300	31200
8	1300	1100	26400

After Implementation

Wind Speed m/sec	Rotor speed rpm	Generation per hour	Generation per day
12	1525	1575	37800
10	1488	1350	32400
8	1395	1190	28560

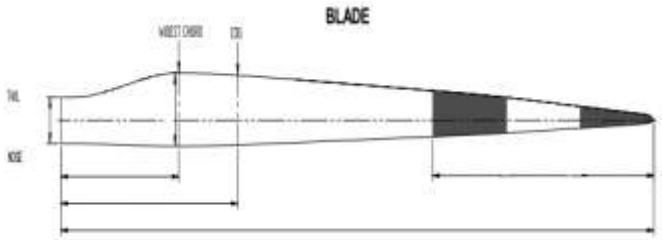


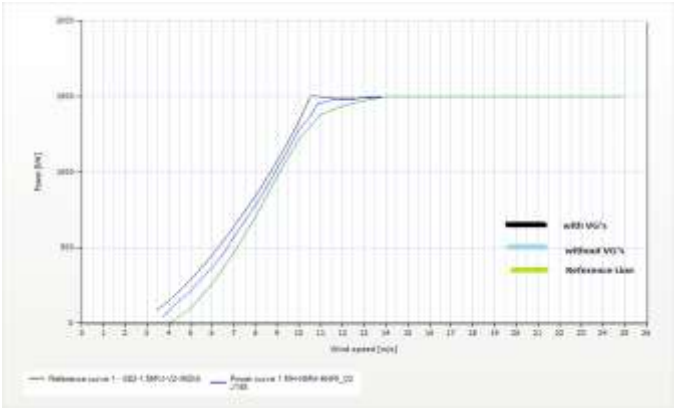
Fig 1: Schematic diagram of blade geometry

Fig 2:Skylift clamp on hub when hub lock is done

Fig 3:Different three type of VGs on blade

Fig 4: 3 different size of VG's

RESUTLS AND DISCLUSION



Graph 1:wind speed V/s Power generation

That all the process with three different size of VG's improving the efficiency of old WTG at 3% to 5% practically with the help of SCADA system software

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