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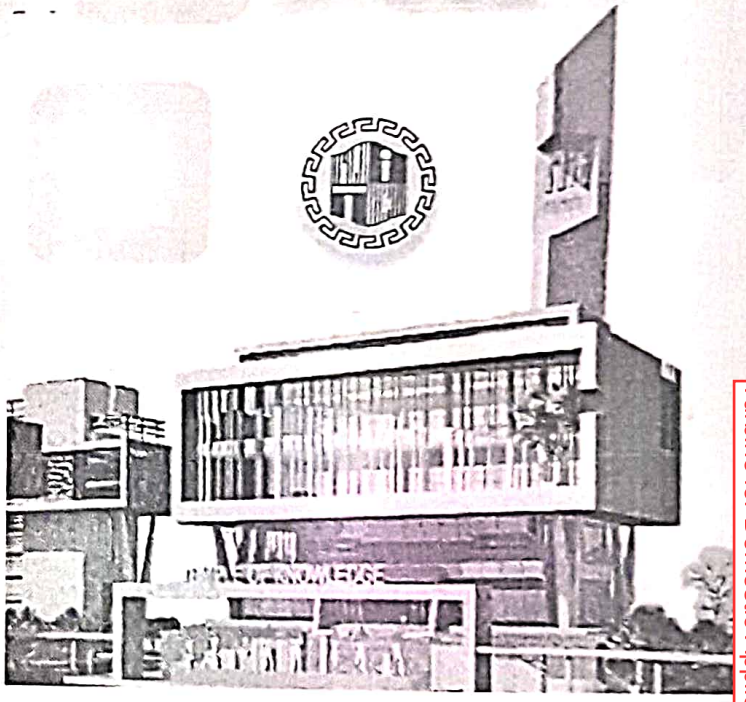

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ABOUT NIT DELHI

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National Institute of Technology Delhi (NITD) is one of the thirty NIT (s) established in the year 2010 by an act of parliament and has been declared as an Institute of National importance.

NIT Delhi is an autonomous Institute which functions under the aegis of Ministry of Human Resource Development, Government of India. It aims to provide instructions and research facilities in various disciplines of Engineering, Science and Technology, Management, Social Sciences and Humanities for advance learning and dissemination of knowledge.

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Peer reviewing will be done by eminent experts in respective research areas. At least one author should register for each accepted paper and it has to be presented in the conference. Only presented papers in the conference will be published in the Scopus indexed / international journal.

Instructions regarding submission of manuscript will be updated shortly over the institute website. Papers can be submitted via email at ncame2019@nitdelhi.ac.in

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Final Camera Ready Paper Submission	10th January 2019
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Manuscript ID: 097

Design, Development of Aero Leaf of Wind Tree Turbine for Domestic Application

Vinay D. Patel*, Ankita Sheoran, Eklavya Nishad, Ganesh Sawaji, Mahesh Ravikumar and Ashish Chaudhari

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Abstract

The paper discusses about the wind tree turbine which is a type of vertical axis wind turbine Savonius model. The turbine will be attached to a manufactured tree that will be installed in and around any public area such as parks, roads, public facilities, or business offices. The initial phase discusses about the theoretical evaluation of available wind power for a single aero leaf wind tree turbine. The second phase evaluates the pressure drop across the aero leaf blade at the various velocity using CFD simulation. The simulation outcome shows that, pressure drop is directly proportional to the wind velocity which causes rise in the power generated at the shaft. The less pressure drop is produced up to some radius of the aero leaf and increases as the radius of aero leaf increased. In third phase of experiment work, design a new single aero leaf for wind tree turbine to measure actual shaft power at different wind inlet velocity. Experiment performance conducted on a single aero leaf at different input wind velocities to measure the aero leaf, entire casing and overall efficiencies. The result shows that power co-efficient increases at beginning and highest reaches at 32% at inlet velocity of 19 m/s.

Manuscript ID: 099

Recent Trends in Friction Stir Welding

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[2]*Delhi Institute of Tool Engineering, Delhi-110020, India*
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Abstract

Welding technology has brought a milestone change in metal joining processes and its applications and almost eradicated some other metal joining processes (riveting etc). Friction stir welding is a solid state welding technique comparatively recent than others. This study intends to elucidate the

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This is to certify that Dr./Mr./Ms. Ankita Sivaram of NIT, Delhi has presented a paper titled Design, Development of Acro Leaf of Wind Tree Turbine for ::: / Participated in the I[st] NATIONAL CONFERENCE ON ADVANCES IN MECHANICAL ENGINEERING - 2019 organised by National Institute of Technology Delhi, India held on March 16, 2019 .

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Design, Development of Aeroleaf of Wind Tree Turbine for Domestic Application

Vinay D. Patel*, Ankita Sheoran, Eklavya Nishad, Ganesh Sawaji, Mahesh Ravikumar, and Ashish Chaudhari

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The paper discusses about the wind tree turbine which is a type of vertical axis wind turbine Savonius model. The turbine will be attached to a manufactured tree that will be installed in and around any public area such as parks, roads, public facilities, or business offices. The initial phase discusses about the theoretical evaluation of available wind power for a single aeroleaf wind tree turbine. The second phase evaluates the pressure drop across the aeroleaf blade at the various velocity using CFD simulation. The simulation outcome shows that, pressure drop is directly proportional to the wind velocity which causes rise in the power generated at the shaft. The less pressure drop is produced up to some radius of the aeroleaf and increases as the radius of aeroleaf increased. In third phase of experiment work, design a new single aeroleaf for wind tree turbine to measure actual shaft power at different wind inlet velocity. Experiment performance conducted on a single aeroleaf at different input wind velocities to measure the aeroleaf, entire casing and overall efficiencies. The result shows that power co-efficient increases at beginning and highest reaches at 32% at inlet velocity of 19 m/s.

Keywords: Aeroleaf, Wind Tree Turbine, Savonius Wind Turbine, 3D Printing, Overall Efficiency.

1. INTRODUCTION

Due to shortcoming and depleting fossil fuel resources and rising energy demand forces to utilize nonrenewable sources for mitigating the energy demand. There are various sources of renewable energy available on earth surface include biomass, solar, hydroelectric, geothermal and wind. One of the cheaper and through year available alternative energy resource is wind energy. The wind energy has been utilized for producing electricity generation [1]. Another concept of sustainability lies in the way in utilizing this renewable energy efficiently, and environmentally friendly. The Figure 1 shows the world over electricity generation through wind energy showing increment from 25000 MW to higher than 200000 MW in a decade as reported by World Wind Energy Association.

The idea to present this paper is to convert this wind energy by using Vertical Axis Wind Turbines (VAWT) to a useful energy by using it as a power source that can serve these consumers. Like streets, public parks, schools, and public facilities are considered as main power consumers. Therefore, convert wind by using VAWT to a useful power [1]. The author Mahmoud et al., Maldonadoa et al., Kacprzak et al., reported that Savonius type vertical axis wind turbines have higher initial torque as compared to that of horizontal axis [2–4]. The CFD analysis for Savonius type wind turbine shows that the concave and convex blade profile have been subjected to high pressure and low pressure respectively as studied by Sai and Rao [5]. The author Kekezoglu et al., focuses on optimum blade angle for maximum efficiency of the turbine. The author investigated the two bladed Savonius wind turbine blade angle using the method of transient CFD. The blade angle from 150° to 200° were analyzed and it was found that 160° blade angle is optimum which generate the highest power coefficient 0.283.

Kekezoglu et al. also examined the effect of variation in wind speed on output of the vertical axis wind turbine (VAWT) where the output found increased with increase in wind speed from 1.19 m/s to 10.68 m/s [6]. The study of input and output velocity variation in VAWT was discussed

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