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VNC - 2020 TASU

VIDYAVARDHINI'S
NATIONAL CONFERENCE ON
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VNC - 2020 TASU
4TH APRIL, 2020

Organized by:
Vidyavardhini's College of Engineering & Technology
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About us:

Vidyavardhini means a Body committed to enhancement of Knowledge. Vidyavardhini was established as a registered society in 1970 by late Padmashri H. G. alias Bhausaheb Vartak for the noble cause of education in rural areas.

Vidyavardhini's College of Engineering and Technology, Vasai is located on the sprawling campus of Vidyavardhini, spread over an area of 12.27 acres. It is a short, two minutes walk from Vasai Road (W) Railway Station. The college is also accessible by road from Mumbai.

Vidyavardhini Society received approval from AICTE to start the new college of Engineering & Technology with effect from July, 1994. The college is affiliated to the University of Mumbai for the four year degree program leading to the degree of Bachelor of Engineering in six branches.

Objective of VNC 2020 TASU

Technology has always been potential tool for simplifying the way we do things. Present time demands directing the technological advancements towards addressing societal challenges such as improving health care, education environment, sanitation, agriculture, smart city, etc., VNC 2020 TASU aims to provide an opportunity to researchers, academicians, Industrialist and students to interact and share their ideologies and contributions made for social upliftment with the aid of technological advancements.

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Any other relevant topics

Publication Information

Proceedings of VNC - 2020 TASU will be published with ISBN number

1. Selected Papers will be published in International Journal of Information Technology, Published by Springer Nature, ISSN: 2511-2104 (Print Version), ISSN: 2511-2112 (Electronic Version)
2. All papers will be published in IJERT, ISSN: 2278-0181

Important Dates:

Submission of full length paper
15TH Feb 2020
Paper Acceptance Notification
22ND Feb 2020
Submission of Final Version of Paper
29TH Feb 2020
Registration Deadline
5TH March 2020
PPT Submission
20TH March 2020
Conference
4TH April 2020

Registration Fee Details:

Category of Delegates / Authors	Indian Authors & Delegates (in INR)
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Proceedings of the 2nd VNC; VNC-2020;
2020 2nd National Conference on "Technical Advancements for Social Upliftment", 04th April, 2020
Vidyavardhini's College of Engineering & Technology (VCET), Vasai (INDIA)

Design, Manufacturing and Analysis of Integrated Motor and Fan Assembly

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***Abstract*— the paper deals with optimization of the overall efficiency of a high mass-flow rate axial Fan meant for cooling purpose of electronic devices by shifting the motor assembly towards the rim (making it a rim driven Fan) and reducing the size of the hub. The design procedure aims to improve the blade geometry for reducing the losses due to swirls and vortex thus increasing the overall efficiency of the Fan. The design procedure follows an inverse method where in the air foil sections are derived from the mean-line profiles. The CFD Analysis reveals that the vortex and swirls were reduced to a certain extent as compared to the normal axial Fan with motor mounted in the hub.**

Keywords—axial Fan, cooling, optimization, swirls, vortex , *Rim motor, BLDC motor*

I. PROBLEM DEFINATION

A fan can be thought of as a low-pressure air pump that utilizes power from a motor to output a volumetric flow of air at a given pressure. An axial flow fan moves fluid parallel to the axis of rotation. Axial fans can have wide operating characteristics depending on the blade width, chord length, shape, number of blades and tip speed. Axial fans are generally used when a higher air flow rate is required in the system. So, depending on the application for which the fan has to be used for, the designer has to develop their own design technology so as to attain maximum efficiency. The analysis needs to be done by modifying various design variables, so the efficiency of the fan depends on design parameters.
There are two methods for designing a fan direct and indirect method.
Direct method assumes the profile generation through systematic geometrical technique and series of geometries that results in determining the most efficient aerodynamic performance. It involves air foil shapes with analytical polynomials and it shows that continuous curvature and slope are necessary to improve blade design, other direct method describes of the parametric fourth order which results in continuous slope of curvature with smooth Mach number and pressure distributions. Also, a mixture of analytical polynomials and mapping the air foil surfaces from a desirable curve distribution will provide an improved blade surface. But we have used the inverse design methodology where the air foil sections are being developed using the mean line profile and specifying various inlet and outlet angles for different sections. Mean line profile is one dimensional. During the designing process a set of different inlet and outlet angles were obtained and so the combination of these different angles has been used for iterations and blade profiles have been created. After the analysis of these various iterations the best of the iteration has been chosen for the development of the model. For driving the Fan BLDC motor was selected and designed for the use. A Motor construction selected was such as to encompass the fan so as to make maximum use of area for air flow and reduce any obstruction for air flow.

II. DESIGN METHADOLOGY

A. List of Symbols

q_v Volume Flow Rate (m^3/sec)
D outer diameter of the Fan (m)
p_{sf} Static Pressure of the Fan (Pa)
p_t Total Pressure of the Fan (Pa)
p_{df} Dynamic Pressure of the Fan (Pa)
Φ Flow Coefficient
ψ Pressure Coefficient
δ_{sp} Diameter Number
σ_s Speed Number
n rotor speed (rpm)

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