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VIDYAVARDHINI'S NATIONAL CONFERENCE ON TECHNICAL ADVANCEMENTS FOR SOCIAL UPLIFTMENT

VNC - 2020 TASU

4TH APRIL, 2020

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153_Optimisation of power and torque with reduction of exhaust noise of FSAE car

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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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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)
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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

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Optimization of power and torque with reduction of Exhaust noise of FSAE car

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Abstract—This is a totally advanced muffler which aims at optimizing the power and torque of engine by having a relatively lower backpressure in exhaust system compared to OEM mufflers. This is obtained by providing the exhaust gases with a calculated flow path in order to reduce the exhaust gas backpressure. This also in turn improves the sfc (specific fuel consumption) and efficiency of the engine. Ricardo WaveBuild 3D is used for modelling of the muffler. This paper is intended as back ground about the work. The muffler which is designed, is manufactured, tested and validated in the FSAE car of Vidyavadhini's College of Engineering and Technology.

Keywords- Ricardo Wavebuild3D, Noise level norms, KTM Duke 390, Power, Torque.

I Introduction

The Muffler is an important component in exhaust systems of an internal combustion engine. It can be considered an acoustic noise reducing device designed for reducing sound levels.

The principle used is acoustic quieting where the sound pressure waves are either cancelled out by distractive interference by series of resonating chambers baffles which are harmonically tuned for wave cancellation or absorbed by a sound absorbing material like glass wool or Rockwool. But there is also a side effect of using muffler as there is an increase in backpressure and reduction in engine efficiency. This is due to the intricate path designed for noise reduction, which is also the pathway of exhaust gases flow. Due to the increase in the obstruction of exhaust gases flow from the engine to the atmosphere, there is an increase in backpressure and hence a reduction in power. The effect of length variation on noise transmission loss is seen and the study concluded that a smaller resonator-size has a better noise attenuation.[5]

II Literature Outcome

Design and simulation of four stroke engines , Author: Gordon P. Blair , This book provides design assistance with the actual mechanical design of an engine in which the gas dynamics, fluid mechanics, thermodynamics, and combustion have been optimized so as to provide the required performance characteristics such as power, torque, fuel consumption, or noise emission .Four Stroke Performance Tuning by Author: A Graham Bell .Friction losses in tail pipe , tail pipe angle ,diameter length is better selected with the help of this book .Graham Bell combined his knowledge in the field of exhaust system and set list of frequency value for performance noise level as well as derived formulae which is further used in following report .Performance Exhausts System by Author: Mike Mavrigian by Performance exhaust system gives proper guidance on how to design, fabricate and install exhaust system .exhaust header material ,absorbing material various bend in exhaust system .

III Aim and Problem Formulation

From sections I and II it very well may be said that the absorptive muffler is the nearest possible type to satisfy the requirement of minimum flow restriction, but it has least noise attenuation. Therefore, the aim of the work is to design a modified type of absorptive muffler which will have a specified noise attenuation and will improve the engine brake power as well as meet the noise pollution standards. This incorporates the observation and investigation of engine brake power from 0 to 10000 engine rpm and the noise transmission loss over a frequency range from 0 to 500 Hz, for various mufflers

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