A REVIEW ON DIFFERENT TYPES OF IC ENGINES AND THEIR PERFORMANCE

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ABSTRACT
An internal combustion engine (IC) is a type of heat engine in which the combustion of a fuel takes place with an oxidizer which is usually air in a combustion chamber. In an internal combustion engine, there is an expansion of high-temperature and pressure gases which are produced by combustion which then applies direct force to some of component of the engine. Generally the force is applied to pistons, turbine blades, rotor or a nozzle. Internal combustion engine usually refers to an engine in which combustion is intermittent. This paper presents the work done on various Internal combustion engines, their types and their performance characteristics. In this paper a review has been done on various IC engines and shows different parameters and characteristics taken by different researchers in enhancing the performance of these engines. Keywords: Internal combustion engine, Turbochargers, Fins.

INTRODUCTION

The term internal combustion engine refers to an engine in which combustion is taking place intermittently. The most familiar among all are four-stroke and two-stroke piston engines. There are some other variants too like the six-stroke piston engine and the Wankel rotary engine. Some other types of internal combustion engines generally uses continuous combustion like in case of gas turbines, jet engines or rocket engines, each of these are internal combustion engines which works on the similar principle. Whereas, in external combustion engines, such as steam or Stirling engines, energy is delivered to a working fluid which is not consisting of mixed or contaminated by combustion products. Working fluids for external combustion engines include air, hot water, pressurized water or liquid sodium. Internal combustion engine are typically powered by fossil fuels like natural gas or petroleum products such as gasoline, diesel fuel or fuel oil. There are different components of Internal combustion engines, and the working of all these components measures the engine performance and its characteristics. Also, with the use of Turbochargers and Superchargers, the performance can be enhanced within appreciable limits. Various researchers have done researches on the performance charaxteistics of Internal combustion engines and shows how to enhance its properties. The work of some of the resaerchers in this field have been given below.

S.no	Year	Researcher	Work/Parameters	Findings
1	2012	Swapnil et al. [1]	In this paper they present about the laser ignition system in IC engines and their performance.	They concluded that the Laser ignition system allows easy choice of the ignition location in the combustion chamber.

				Also, there is significant reductions in fuel consumption as well as reductions of exhaust gases in it. They also concluded that it shows good minimum ignition energy requirement as compared to the electric spark systems with all the A/F mixtures.
2	2013	Jacqueline et al. [2]	In this paper researchers presents the effect of exhaust gas recirculation on the heavy-duty diesel engine.	They concluded that, high intakeoxygen levels of the order of 18% and 21%, close coupled post injections can reduce engine-out soot in the post injection duration.
3	2014	Alka Mata [3]	In this paper researcher has done work on the Nano technology-based IC engines.	It is concluded from the paper that as this nano-technology is still an emerging science, a lot can be done in this field as nano technology slowly and steadily assuring the next Industrial Revolution
4	2014	V. K. Manglik [4]	In this paper researcher presents the development of High Efficiency Engine by combining I. C. Engine and E C Engine	He concluded that the ideal thermodynamics cycle provides more power significantly by combined engine, yet expected increase in power shall be about 40 %. Also, the use of waste heat recovery can also be integrated in the system to further enhance its performance.
5	2015	Rajendra et al. [5]	This paper presents a review on a noise reduction system in Internal combustion engines.	They conclude that the noise in IC engines is controlled by properly designing machines and appliances of the engine. Generally, mufflers are used to increase the engine efficiency and to reduce the noise.
6	2016	Ravi et al. [6]	This paper presents the review of the performance of IC engines which is taking place due to the change in cylinder geometry	They concluded that the shape and thickness of the material has an important impact on the rate of heat transfer from the fins. They also concluded that the elliptical shape fins are better than the rectangular and triangular fins

7	2016	Vikash et al. [7]	This paper presents the review of the performance of IC engines which is taking place due to the change in cylinder geometry	They concluded that the shape and thickness of the material has an important impact on the rate of heat transfer from the fins. They also concluded that the elliptical shape fins are better than the rectangular and triangular fins.
8	2017	Abhishek et al. [8]	This paper presents the effect of Increasing efficiency of IC engine using Electrolysis process	They concluded that by using this technology the harmful emissions are almost reduced when compared to gasoline and other fossil fuels.
9	2018	Joshi Neel et al. [9]	They worked upon the hydrogen IC engines and its characteristics. The main aim of this paper is to provide means of renewable hydrogen based fuel utilization	They concluded that due to the nonuniform fins, the turbulence increases thereby increasing the rate of heat transfer.
10	2018	Mayur et al. [10]	In this paper, the researchers have done review on the performance enhancement techniques of IC engines by the use of turbochargers	They concluded with the use of this technology; the performance of IC engine gets enhanced to appreciable limits.
11	2019	S. Prabhu et al. [11]	This paper tells about the Performance and Emission of IC Engine using Porous Medium on the Cylinder Head	They concluded that Mechanical efficiency is raised up to 8%, NOx level gets decreased to 53% and CO2 level gets reduced up to 46% from no load to full load operations.

CONCLUSION Internal combustion engines are among the most important and useful engineering applications. The application generally depends on either Diesel or Otto cycles. They are categorized either according to the operating cycle, or the mechanism of working they are using. By looking at the contributions done by various researchers it can be concluded that by changing the design parameters, operating conditions of Internal combustion engines and with the integration of Superchargers or turbochargers, the performance of the internal combustion engines can be enhanced within appreciable limits.

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