UNIVERSITI TEKNOLOGI MARA

ENGINE MODIFICATION AND ENGINE MOUNTING FABRICATION FOR A FORMULA STUDENT RACE CAR

DANIAL EIZAZ BIN EFFENDI

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ABSTRACT

Even though internal combustion engines have advanced significantly from the days when a large engine was required to generate the same amount of output power as a contemporary mid-size engine, engines still require an excessive number of parts. Internal combustion engines (ICEs) frequently have many intricate parts, which makes manufacturing them more difficult, requires more maintenance, and raises the risk of failure. It is difficult to find and put into practice cutting-edge tactics and design methods that significantly reduce the number of parts needed for internal combustion engines (ICEs) without compromising reliability, performance, or legal compliance. Manufacturers can increase production speed, increase durability, facilitate maintenance, and possibly even save money on manufacturing, assembly, and aftermarket services by lowering the number of components. The primary goal of this project is to construct an engine that will meet FMEC race regulations by fitting inside a car frame that is regulated by the FMEC. Next, to completely comprehend the built engine's characteristics and be able to adjust it so that it runs more effectively for the duration of the race. A few of the methodologies used in this project are measuring, cutting, welding, grinding, and assembling parts. The outcomes of the project are a well-built prototype with proper engine mounting brackets. To sum up, the engine is well designed to be used in a racing competition. Without any problems, excessive vibration, or odd noises, it was able to reach a high revolution per minute. The engine produces enough power to propel the entire car forward. The engine was securely and precisely mounted in the brackets, which allowed the engine to transfer power to the drive shaft effectively and to be adjusted to make the drive chain tighter or looser.

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CHAPTER ONE
INTRODUCTION

1.1 Background of Study

Internal combustion engines (ICEs) have a long history and have played a crucial role in both industrial and transportation applications. The internal combustion engine was first proposed in the 17th century. Early scientists and innovators like Christian Huygens, Denis Papin, and Robert Boyle lay the groundwork for understanding the fundamentals of combustion and the possibility for using it to power mechanical work. Two important advancements in petrol engines and diesel engines happened in the late 19th century. The four-stroke combustion cycle engine, sometimes known as the Otto engine or petrol engine, was created by Nikolaus Otto in 1876 [1]. The compression-ignition engine, sometimes referred to as the Diesel engine, was created by Rudolf Diesel in the late 1890s [2]. It works on the premise that by compressing air to a high temperature and pressure, gasoline would self-ignite.

By understanding the history of the making of an internal combustion engine, fellow engineers and tuners can have a better overview of what engine they want to build and the type of racing environment that it will endure. For example, when a race car is meant to be used in endurance race such as the 24 hour Le Mans, engineers must build a powerplant that can withstand extreme usage of the engine for 24 hour non-stop. Therefore, knowing what the objective are of building the engine can give an edge towards the racer.

The development of so now called internal combustion engines have branched into many kinds of usage that also includes the division of motorsports. One of the many levels that are available is Formula 1, Grand Prix motorcycle racing and in our own country is FMEC (Formula Motorsports Education Competition).