UNIVERSITI TEKNOLOGI MARA

DEVELOPMENT OF A PROTOTYPE IGNITION SYSTEM WITH ELECTRICAL SYSTEM SETUP IN A FORMULA STUDENT RACING CAR

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ABSTRACT

This project presents an Ignition System with an Electrical System Setup in A Formula Student Racing car. This project is to achieve engine reliability and performance, efficient combustion and enhance overall vehicle performance while adhering to safety rules and budgetary restrictions. This project has achieved the main objective which is to design and fabricate an efficient and effective Ignition System with Electrical System Setup in A Formula Student Racing Car. This project has been done step by step which is measuring, cutting, welding, grinding, assembling, and lastly is wiring process. In this setup, 2 batteries have been used for the electrical system setup. The first battery is used for the starter to start the engine. Meanwhile, the second battery is used to switch on the radiator fan which has been placed in the battery casing at the front of the chassis. This system needs 2 batteries because the engine needs more current to start the starter. This setup uses CDI racing, rectifier, fuse, ignition coil, meter, ignition switch, and lastly spark plug. This component is needed to make sure the electrical setup functioning well. The meter panel and ignition switch have been placed on the panel board to allow the driver to start and see the meter indicator. This ignition and electrical setup is fabricated only for formula student racing cars.

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CHAPTER ONE
INTRODUCTION

1.1 Background of Study

Formula Motorsports Education Competition is a tournament organized by the Engineering Department, Faculty of Technical and Vocational, UPSI. This program is a platform for students to create their innovations and learn new technology in the Automotive system. Formula MEC is also open to all participation from the international teams. FMEC is the best place for students and educators to develop new ideas and skills from the theories taught and learned in Formula car products. Starting in 2023, SIC (Sepang International Circuit) will be the main partner and sponsor of Formula MEC 2023. With cooperation with SIC (Sepang International Circuit), hopefully, we will be able to further improve the quality of the tournament over time. FMEC 2023 also received sponsorship from Menteri Besar Perak Corporation, which will be together with this championship.

An internal combustion engine's ignition system is a crucial part that starts the combustion process in the combustion chamber. It supplies the high-voltage electrical spark needed to ignite the mixture of air and fuel which in turn creates the power to the engine. There are a few limitations of the ignition system to put in the Formula One student racing car. Sometimes the ignition system may have trouble creating enough spark energy, especially in situations with heavy intensities or pressures. Weak sparks, misfires, and incomplete combustion may affect the result and could decrease power output and increase emissions.

The ignition system plays an important role in Formula Student racing cars for providing dependable engine performance and power delivery. The main reason I chose to invent an ignition and electrical system is to improve the performance and try to maximize the engine power output of the racing car. In this racing car also I will add an electronic ignition system such as an Electronic Control Unit (ECU) to provide precise control over ignition timing and performance. The key to an ignition system is reliability. The ignition system should be constructed with appropriate insulation and