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CAWANGAN JOHOR KAMPUS PASIR GUDANG

DESIGN AND FABRICATION OF TRANSMISSION AND DRIVETRAIN SYSTEM FORMULA RACING CAR

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ABSTRACT

The purpose of this project was to design and fabricate the transmission system for Formula Student Car competition. The goal of this project was to improve the transmission system to make sure racer feel comfortable when changing gear while driving and useful for racing competition. So, need to improve the transmission system in term of shifting and gear change. To design a transmission system that driver can easily change gear and stay comfort while driving when the competition begins. The design and fabrication of a transmission system for a Formula racing car involves a meticulous and multi-faceted approach, integrating principles of mechanical engineering, material science, and automotive technology. The process begins with the conceptualization phase, where the specific requirements of the racing car, such as speed, torque, weight, and durability, are carefully analysed. Selection of materials is critical, with a focus on lightweight yet robust alloys that can withstand the high stress and thermal conditions experienced during racing. The result of this project is a finished and functioning transmission system for Formula Student Car. So, the racer can easily change the gear without broke any component and make sure safe to use by racer. In conclusion, the design and fabrication of a transmission system for Formula Student Car is a complex iterative process that demands a comprehensive understanding of engineering principles and advance manufacturing techniques.

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TABLE OF CONTENTS

		Page
CONFIRMATION BY SUPERVISOR		**ii**
AUTHOR'S DECLARATION		**iii**
ABSTRACT		**iv**
ACKNOWLEDGEMENT		**v**
TABLE OF CONTENTS		**vi**
LIST OF TABLES		**viii**
LIST OF FIGURES		**ix**
LIST OF ABBREVIATIONS		**x**
CHAPTER ONE : INTRODUCTION		**1-3**
1.1	Background of Study	01
1.2	Problem Statement	02
1.3	Objectives	02
1.4	Scope of Study	02
1.5	Significance of Study	03
CHAPTER TWO : LITERATURE REVIEW		**4-16**
2.1	Benchmarking/Comparison with Available Products	04
2.2	Review of Related Manufacturing Process	10
2.3	Patent and Intellectual Properties	13
2.4	Summary of Literature	14

CHAPTER ONE
INTRODUCTION

1.1 Background of Study

Designing and fabricating a transmission and drivetrain system for a Formula racing car requires an understanding of mechanical engineering principles, vehicle dynamics, and advanced materials. Here's a detailed breakdown of the background knowledge needed.

The knowledge in understanding the power transmitted from the engine to the wheels, including types of mechanical transmission either manual or automatic clutch that have different component. Automatic transmission has additional component so that clutch will auto working to disconnect gear while manual transmission need to push pedal to disconnect the gear. Clutch and Gearbox knowledge is also important specifically of how clutches and gears function such as auto, semi auto or manual clutch, also type of clutch. Awareness of differential types and its role in balancing wheel speeds, especially during cornering whether oversteer or understeer.

Vehicle dynamics and performance analysis like torque and power requirements. Need to calculate the torque and power required to achieve specific performance targets. Then, understanding how weight affects performance, especially for balancing traction and reducing drivetrain losses.

Manufacturing processes and assembly machining and assembly techniques knowledge of manufacturing methods, such as Computer Numerical Control machining, welding, bending, and assembly to create precise drivetrain components. Implementing testing methods for ensuring component integrity and durability, such as load testing and torque testing.

Combining powertrain areas of expertise provides a solid foundation for developing an effective transmission and drivetrain system tailored to Formula racing requirements.