UNIVERSITI TEKNOLOGI MARA

FABRICATION AND ASSEMBLY OF FORMULA STUDENT RACING CAR (EXTERIOR)

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ABSTRACT

This research the advancements made in the chassis of a race car. The chassis of a car was thought to constitute its structural core. The primary structural component that supports all weights and forces and transfers them to the ground through the wheels and tires is the chassis. The mounting of the parts in the correct locations to ensure that the car was properly balanced is the problem with the chassis. It must be lightweight for optimal performance without jeopardizing the driver's safety at the same time. Torsional stiffness should be high enough to prevent the vehicle from failing, and the chassis should be robust to withstand all bending forces. Several design and analysis approaches have been researched and described in this project. Traditionally, a chassis was the structure that supported everything. It looked like a ladder. Although the chassis of a sports vehicle is still there, it resembles a square tunnel for the spine or backbone rather than a ladder. The term cage refers to the chassis of modern cars that has been designed to resemble a box for the passengers to sit in.

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INTRODUCTION

1.1 Background of Study

The body frame of a formula car is a critical component that serves as the structural backbone of the vehicle, providing support for all other systems and components while ensuring safety, performance, and aerodynamic efficiency. Some of the competitors are trying to build the most efficient formula one car to break the speed record for the fastest formula one car.

The history of Formula One (F1) car body frames has evolved significantly over the decades, driven by advancements in materials, aerodynamics, safety standards, and engineering techniques. Here's a chronological overview of the key developments. In the early days of Formula One, cars primarily used tubular spaceframe chassis. These were constructed from welded steel tubes, providing a basic yet effective structure to support the engine, drivetrain, and suspension components. The chassis were relatively heavy but offered simplicity and durability. Initial F1 cars featured simple bodywork designs aimed at reducing drag and improving stability. Aerodynamics played a minor role compared to later developments, focusing more on mechanical grip and engine performance.

During the early 1970's the introduction of monocoque chassis revolutionized Formula One. Monocoque (French for "single shell") chassis are constructed from a single piece of material, usually aluminium initially and later carbon fibre, forming both the structure and body of the car. This design significantly reduced weight while increasing rigidity and safety. Their intentions are to be able to make the car faster by reducing the weight of the car. In the late 1970's they are more focused on the aerodynamic of the car. Ground effect aerodynamics became prominent. Engineers utilized shaped underbodies and side skirts to generate downforce by manipulating airflow beneath the car, improving cornering speeds and overall performance.