UNIVERSITI TEKNOLOGI MARA

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MEC299

Frequency response and transient analysis of a component in motor vehicle.

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ABSTRACT

The final year project consists of the automotive part, sprocket that will be discussed for dynamic analysis. This project should determine the dynamic analysis which is frequency analysis and transient analysis of the sprocket. The final discussion should be able to achieve the objectives to relate the magnitude of the sprocket to its frequency of occurrence through a probability distribution. The result will be discussed at the end of this project. Throughout the process, the product will be discussed if it complies with all the objectives and meets the expectation of the project. Several processes of research will be done to make this project a success which involve what materials should be used, what kind of data collection method will be used, and what kind of datavariables should be used to achieve the final result.

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CHAPTER 1

INTRODUCTION

1.0 Introduction

This project is to study the dynamic analysis of the automotive part of the vehicle. A self-contained motor or engine, or anything related to autos, propels the vehicle. There are various types of automobiles and for this project, a single part of the bike will be used which is the sprocket. The sprocket is one of the important parts in automotive that also relates to dynamics analysis. Vehicle dynamics is the motion of the vehicle generated by the steering action, which is capable of independent motion. Dynamic analysis for a sprocket, undergoing the extreme forces in dynamic conditions is a prime factor.

This project will create two different types of dynamic analysis which are frequency analysis and transient analysis. Both analyses will be discussed on a sprocket which will determine the final results of this part wherever it is suitable or important for the automotive industry. Apparently, this project will make huge changes for sprockets in the automotive industry in terms of mobility and safety. Moreover, all the processes regardingthis project will be used CAD software for project design and analysis software for studying the analysis of the dynamics.

1.1 Background of Study

This project is basically focused on the dynamics analysis of the automotive part of the vehicle in the industry. This project will be using CAD software to design the component and analysis software to discuss the dynamics analysis of the sprocket. Therefore, this project will achieve the objective due to the analysis results.

1.2 Problem Statement

The industry of automotive needs the dynamics analysis of the vehicle parts to ensure the quality and makes some improvements to the automobile parts. Sprocket is also one of the important parts of the automotive industry. A sprocket tooth profile is also investigated by some researchers to minimize the meshing impact. It is built to take the linear force of the drive chain and produce rotational energy from it to rotate the differential further connected to the wheels. So, with the additional data from the dynamics analysis, the industry can improve some of the sprocket ability to its fullness.

1.3 Objectives

The main objectives of this project are:

1. To design an automotive sprocket using Solidworks 2020.
2. To obtain frequency response and transient analysis of an automotive sprocket.

1.4 Scope of Work

1. One automotive part is used in the final year project.
2. The dynamics analysis is frequency response and transient analysis.
3. Automotive manual catalogue is used to decide the size of the sprocket