

CHAPTER 1

INTRODUCTION

1.1 Project Background

Chassis forms the structural backbone of a vehicles. For a passenger car, the main function of the chassis is to rigidly support the car components and payload mounted upon it including engine, body, passengers and also luggage. Chassis function's also to maintain the desired relationship between the suspension and steering mechanism mounting points. When a vehicle travels along the road, the chassis is subjected to stress, bending moment and vibrations induced by road roughness, weather and components that mounted on it. Stress that acting on chassis is varies with the displacement and each part on the car chassis. Because of the behavior of the chassis that always subjected to stress (moving or not), a weak of structurally designed part will collapse.

Computer based numerical stress analysis methods such as finite element analysis have permitted the complex distributions of stress in engineering to be more deliberate. These allow linear stress and non-linear stress analysis to be performed for static and dynamic loads. In finite element analysis, behavior of structure is obtained by analyzing the collective behavior of the elements. The FEA provided a better solution to analyze impact of load on the chassis body including the critical part which experiences a high value of stress/load on it.

Structural analysis comprises a set of physical laws and mathematics predicts the behavior of structures and to evaluate structural ability of the structure to withstand the loads. The structural analysis provide the deformations, internal forces, and stresses in the structure. To perform an accurate analysis a structural engineer must determine such information as structural loads, geometry, support conditions, and materials properties. The results of such an analysis typically include support reactions, stresses and displacements. This information is then compared to a criteria that prescribed the conditions of failure.

1.2 Objective

The general objective of the study is to build an automated guided vehicle. The specific of objectives are :

- To compute the structural characteristics of finite element model for vehicle chassis.
- To evaluate the structural behavior of the chassis when subjected to static loadings.

1.3 Scope of Study

- Structural analysis for static loading up to 60kg for assuming linear elastic modulus for vehicle chassis.

1.4 Problem Statement

During the development of chassis model, the analysis of each chassis element need to be considered so that the magnitude of internal stress and displacement can be comprehend. The details of type of material used also must consider in order determining the strength of the chassis.