

CHAPTER I

INTRODUCTION

1.1 Background

Stability is very important for the performance of a vehicle. The point of stability of a vehicle is affected by many aspects both in the domain of the operation and design. Center of gravity is one of the many aspects affecting the point of stability of a vehicle. This is particularly obvious when the vehicle is turning, in which the center of gravity changes because of the centrifugal force. The amount and position of the centrifugal force will affect the angle of slip tolerance, which in turning can be affects the performance of the vehicle. Vehicle is said to be stable if all the wheels are still touching the ground, and does not occur skid (shifted laterally) or slip (longitudinal direction shifts). The stability of a vehicle it can be seen when the vehicle is turning. When the vehicle turns often provide an unexpected response that can lead to accidents.

Instability caused by the moment or force that begins with the acceleration, both acceleration of translational or acceleration of rotation. Lifting one of the wheel resulted in the state began to roll (toppling). slip or skid condition occurs when the wheels are still touching the ground, but the wheels are shift laterally or longitudinally and it cannot be controlled.

It is very closely related to smart driving, the speed of the driver while driving a vehicle during a turn. Because when vehicles get turn at high speed

and the driver can control how fast the vehicles should be run, it will cause toppling and skidding of the vehicles.

1.2 Problem Statement

Most people do not really aware about smart driving while drive a car, they just estimate how fast the car and do not know actually how fast the car should go on when turning corners. This situation sometimes makes the scene of the accident to the rider their self.

1.3 Objective

The purpose of this final project is to know the stability of a car when turning in a certain radius of road, know about critical speed when the vehicles begin toppling and skidding. Especially for skidding case, we try to analysis in dry and wet condition of road. This problem very related to support smart driving program when running of vehicle.

1.4 Methodology

This final project report done by several methods, namely:

- a. Observation methods: by observing, analyzing, and searching the data directly in the subject.
- b. Literature methods: to obtain the basic of theory using equations or formulas from an existing references.
- c. Interview method to obtain information and data by asking directly to the workshop or related resources.

1.5 Assumption and Problem Limitation

Vehicles that will be study in this final project is Daihatsu Xenia 1.3 Xi M/T, the type of passenger car. On this project writer is probably necessary restrictions on the problems and making some assumptions, namely:

- a. The vehicle moves with good performance.
- b. Using track with dry and wet asphalt road with a flat surface.
- c. Using hydraulic brake system front and rear.
- d. Suspense is considered rigid and conducted a theoretical analysis.
- e. Tires in good condition with standard air pressure and always in contact with the surface asphalt.
- f. Radius of road has taken with standard from DPU.
- g. Critical speed when toppling and skidding as reference of driver when drive their vehicles on turning of road.

1.6 Systematic Writing

This final project consists of five chapters, with systematic as below:

CHAPTER I INTRODUCTION

Contain: background, objectives, assumption and problem limitation, and systematic writing.

CHAPTER II LITERATUR REVIEW

Contain: Study of literatur, Fundamental theory, Kind of care movement, Phenomenon of car turning, Toppling and skidding, Turning Radius Vehicle, Smart Driving, Braking System, Center gravity and roll center, Inertia force and Centrifugal force.

CHAPTER III RESEARCH METHODOLOGY

Contains: Flow chart of research, Determining the Location of Center Gravity, Toppling to the longitudinal direction, Skidding to the longitudinal direction, Toppling to the lateral direction, Skidding to the lateral direction, Critical speed when lateral skidding, Critical toppling and Critical skidding.

CHAPTER IV CALCULATION ANALISYS

Contains: Vehicle dimension, Calculation of Center of Gravity, Calculation of critical speed when toppling and skidding, Calculation and analisys.

CHAPTER V CONCLUSION

Contain: Conclusion and Suggestion