CHAPTER 3

METHODOLOGY

3.1 Introduction

The main objective for this project is to develop dynamic model for suspension spring with variable helix radius. This section will presents about the experiment methodology and the analysis to fulfil the objective of the project.

Methodology is a guideline for a developer to structure, plan and control the process of development a system. This chapter will be constant to discuss the process and method for the project development and developmental issues that are need for implementation and development. For this project, the experiment are conducted by finding sheer stress of the spring by using Wahl’s equation. Finite Element Method or FEM by using Autodesk Simulation 2013 software also implement in this project before manufacturing process is done. The summary of research methodology is shown in figure 3.1.
3.2 Methodology Flow Chart

Figure 3.1: Summary of research methodology.
### 3.3 Build 3D Spring Model using Catia V5R16.

Catia V5 or Computer Aided Three-dimensional Iterative Application have their advantage in designing complex 3D drawing. This software are used to draw a variable parameter of 3D spring model since it is convenient to integrate with the Autodesk Simulation (Algor) software. Helix command in the Wireframe and Surface Design platform in Catia V5 software are used for creating a complex part such as the helical suspension spring, which assume to have rotational cylinder feature and variable cross section. In this research, helix command is used to create the three three-dimensional spring models which will be used for the input to Autodesk Simulation (Algor) for static stress analysis.

The following text describes the sequential procedures for building these model: from Catia V5 side menu, go to start, Mechanical design, and Wireframe and Surface design, then select the point feature, insert the radius of the spring at Y-axis, then click ok. After that, click on the helix icon, and insert the desire parameter of the suspension spring. The steps above have completed one section of the sketch. For this current sample spring modeling, different section for every turn of coil of the spring are assigned. When applying the rib or rotational blend, it should be mentioned that the most confusing step is how to positioned the coordinate system for each section. Each section is defined by a set of different parameter of helix radius. All three model of suspension spring are specified in Table 3.1.