CHAPTER 1

INTRODUCTION

1.1 PROJECT BACKGROUND

Springback commonly happens in manufacturing industries especially in the automobile and aircraft industries. It is occur when existing plasticity in sheet metal. One of the experiments to determine the process is bending process. Bending of sheet metal is one of the widely used processes in manufacturing industries especially in the automobile and aircraft industries. This bending operation is about shaping of sheet metal by straining the metal around a straight axis. A bending operation compresses the interior side of the bend and stretches the exterior side. Bending is most common operations to change the shape of a material by plastically deforming it and depends primarily on the materials type, strength, thickness and part complexity.

Springback is an issue in sheet metal forming processes. The springback is a principle problem when precise components are produced. Elastic energy stored in sheet metal in bending operation is released during unloading and the sheet metal tends to return to its initial state. Thus the dimensions and the shape of component are changed.

Basically, this project deals with experimental and finite element evaluation of bending for galvanic iron. In this project, bending analysis will take spring back as one of the part of bending analysis.

Through this project, bending analysis can be made in term of knowing about springback of galvanic iron material. Many factors affect springback such as types of material, types of bending, and thickness of material and sheet anisotropy.
1.2 PROBLEM STATEMENT

Bending is a process in which a sheet metal is plastically deformed to a curve by predicting the precision in angle. When the material has a tendency to partially return to its original shape because of the elastic recovery of the material, it is called springback. The springback is generally defined as the additional deformation of sheet metal parts after the loading is removed and the influenced factor not only by the tensile and yield strengths, but also by thickness, bend radius and bend angle. Springback is a phenomenon of elastic nature determined by the distribution of stress on the section of the form part. In the manufacturing industry, it is still a practical problem to predict the final geometry of the part after springback and to design the appropriate tooling in order to compensate for springback.

1.3 OBJECTIVES

1. To determine the springback angle in sheet metal bending for Galvanized Iron.
2. To determine the influence of anisotropy, R on springback.
3. To determine reliability of Finite Element Method (FEA) in sheet metal by comparing with the experimental results.

1.4 SCOPE OF WORKS

1. To study the basic understanding of springback behaviour from the past researchers (Literature Review).
2. To conduct experiments of tensile test to determine mechanical properties of Galvanized Iron.
4. To conduct experiments of sheet metal bending.
5. To analyze and compare the simulation and experimental result.