CHAPTER 1

INTRODUCTION

1.1   Introduction

This project is study about changing the speed of Air Press machine during punching process. The components of electropneumatic control systems have been constantly improved in recent years. A great many new products, such as valve terminals, Electropneumatic & Smart Positioning, Safety Relief Valves, Pressure Regulating Valves, and Pneumatic Actuator are very important objectives in all developments in electropneumatics, whether of new or existing products, are these:

- Reduction of overall costs of on electropneumatic control system.
- Improvement of the system's performance data.
- Opening up of new field application.

The overall costs of an electropneumatic control system are affected by many factors. Accordingly, the opportunities for reducing cost are also highly diverse. The design of present-day electropneumatic control systems is primarily aimed at reducing the cost of project planning, aimed at reducing the cost of project planning, installation, commissioning and maintenance. Considering on that factor, the excellent agreement by predicted to design a pneumatic accelerator as an energy source to develop the variety speed of punching in this project. Do you think why the punching machine does not have a function to change the level of punching speed? It is the speed of punching is not a major factor to increase the quality of product produced?

1.2 Project Background

High speed forming is an important production method that requires specially designed HERF (high energy rate forming) machines. Most of the HERF machines are devices that consist of a system in which energy is stored and a differential piston mechanism is used to release the energy at high rate. In order to eliminate the usage of specially designed HERF machines and to obtain the high speed forming benefits, the accelerator which on the conventional presses has been applied and tested in this study. The one way flow controller can be used to change the low speed operation into high-speed operation of a hammer. Expectations from this work are reduced distortion rates, increased surface quality and precise dimensions in metal forming operations. From the performance test, the pneumatic accelerator is able to achieve high speed and energy which require for punching process of thick sheet metals and it is the product produced is in high surface quality. This project requires using SOLIDWORKS and ALGOR software and also needing knowledge of punching machine.

1.3 Problem Statement

There are many kinds of sheet metal forming such as stamping, punching, deep drawing, bending and so on. Punching process is one of the wide fields using in industrial to form sheet metal and in educational subject at any engineering institution. In industrial and educational field, economic is large influent and important item need to consider. So they are always though how to reduce costing and also increase the advantages of punching machine applications.

In real life of our university is want to use the conventional punching machine, we take a close advantages to use the punching machine to punch the variety thickness of sheet metal due to change and increase the speed of punching.

So the problem is it the increasing the speed of punching can produce high surface quality of product. This study can analyze the application of speed and the product produce after all.

1.4   Objectives

1.   To study and verify when increasing the speed of punching would to increase the surface quality of product.
2.   Analyze and study the characteristics of product produced by punching process.

1.5   Project Scopes

There are 6 scopes determine to make sure all the objectives can achieved. These scopes are:

1.   Literature review of a pneumatic accelerator for punching machine.
2.   Developed methodology of the proposed machine.
3.   Split and assemble the components and part of the punching machine to set complete machine ready to use.
4.   Rewiring the circuit of the automatic function for punching process
5.   Do experimental using variety thickness of Aluminum 0.2, 0.3, 0.6, 1.0, 1.7, and 2.0 mm for Punching process.
6.   Analyze the product produce by observation.
7.   Comparing product produced with ALGOR simulation to prove that satisfactory results have obtained.

1.6   Conclusion

This chapter described about overall introduction of this project. Background of this project will discuss after defining problem statement. Then, scopes and objective of this project are too determined as guidelines of the project. Structure of thesis described about synopsis of every chapter of this thesis.