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ARIPET	PNEU	EUMATIC SHEARING MACHINE					KEY WORDS: bending operation, pneumatic component, pneumatic system, shearing operation.			
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b The shearing machine and is most important in sheet metal industry. This machine should be used for straight cutting machine with wide application. But is some industry hand cheet sutter are used. For that machine to superior the burger effect are										

with wide application. But in some industry hand sheet cutter are used. For that machine is operate the human effort are required. The machine should be simple to operate and easy to maintain, hence we tried out to develop the Pneumatic Shearing. In shearing operation as the punch descends upon the metal, the pressure exerted by the punch first cause the plastic deformation of the metal. Since the clearance between the punch and the die is very small, the plastic deformation takes place in a localized area and the metal adjacent to the cutting edges.

1. INTRODUCTION

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In industries the automatic sheet shearing are widely used. Earlier the process was carried out manually. The manual process was time consuming as well as the output of machine was very less. The main aim of the project is to improve the efficiency of the required output and to increase the production with quality output.

In this project we used pneumatic system, "Pneumatics, from the Greek (pneumatikos, coming from the wind) is the use of pressurized gases to do work in science and technology.

Pneumatics was first documented by Hero of Alexandria in 60 A.D., but the concept had existed before then. Pneumatic devices are used in many industrial applications. Generally appropriate for applications involving less force than hydraulic applications, and typically less expensive than electric applications, most pneumatic devices are designed to use clean dry air as an energy source. The actuator then converts that compressed air into mechanical motion. Pneumatic cylinders are generally less expensive than hydraulic or electric cylinders of similar size and capacity.

We have developed the system in which shearing operation are carried out in this machine. In this operation the pneumatic system is installed on the frame body with required attachment. And pneumatic cylinder is placed on frame body vertically with front flange mounting. The model which have prepared to working in 100 psi air pressure, which cuts various sheet metal between 20 to 24 gauge.

1.1. ABOUT PNEUMATIC SYSTEM:

High effectiveness:

Many factories have equipped their production lines with compressed air supplies and movable compressors. There is an unlimited supply of air in our atmosphere to produce compressed air. Moreover, the use of compressed air is not restricted by distance, as it can easily be transported through pipes. After use, compressed air can be released directly into the atmosphere without the need of processing.

High durability and reliability:

Pneumatic components are extremely durable and cannot be damaged easily.Compared to electromotive components, pneumatic components are more durable and reliable.

Simple design:

The designs of pneumatic components are relatively simple. They are thus more suitable for use in simple automatic control systems.

High adaptability to harsh environment:

Compared to the elements of other systems, compressed air is less affected by high temperature, dust, corrosion, etc.

Safety:

Pneumatic systems are safer than electromotive systems because they can work in inflammable environment without causing fire or explosion. Apart from that, overloading in pneumatic system will only lead to sliding or cessation of operation. Unlike electromotive components, pneumatic components do not burn or get overheated when overloaded.

Easy selection of speed and pressure:

The speeds of rectilinear and oscillating movement of pneumatic systems are easy to adjust and subject to few limitations. The pressure and the volume of air can easily be adjusted by a Pressure regulator.

Environmental friendly:

The operations of pneumatic systems do not produce pollutants. The air released is also processed in special ways. Therefore, pneumatic systems can work in environments that demand high level of cleanliness. One example is the production lines of integrated circuits.

Economical:

As pneumatic components are not expensive, the costs of pneumatic systems are quite low Moreover, as pneumatic systems are very durable, and the cost of repair is significantly lower than that of other systems.

2.PRINCIPLES OF PNEUMATIC CONTROL:

Pneumatic circuit:

Pneumatic control systems can be designed in the form of pneumatic circuits. A pneumatic circuit is formed by various pneumatic components, such as cylinders, directional control valves, flow control valves, etc. Pneumatic circuits have the following functions:

1. To control the injection and release of compressed air in the

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cylinders

2. To use one valve to control another valve

Pneumatic circuit diagram:

A pneumatic circuit diagram uses pneumatic symbols to describe its design. Some basic rules must be followed when drawing pneumatic diagrams.

- A pneumatic circuit diagram represents the circuit in static form and assumes there is no supply of pressure. The placement of the pneumatic components on the circuit also follows this assumption.
- ii) The pneumatic symbol of a directional control valve is formed by one or more squares. The inlet and exhaust are drawn underneath the square, while the outlet is drawn on the top. Each function of the valve (the position of the valve) shall be represented by a square. If there are two or more functions, the squares should be arranged horizontally Fig:



Fig: 2.1 directional control valve (Normally closed type)

Fig: 2.2 directional control valve (Normally closed type)

- iii) Arrows " $\downarrow \kappa$ " are used to indicate the flow direction of air current. If the external port is not connected to the internal Parts, the symbol " $_{T}$ " is used. The symbol " \odot " underneath the square represents the air input, while the symbol " \bigtriangledown " Represents the exhaust. Fig 2 shows an example of a typical pneumatic valve.
- iv) The pneumatic symbols of operational components should be drawn on the outside of the squares. They can be divided into two classes: mechanical and manual (fig 3 and 4)



(a) Pulley lever



(b) Unilateral pulley lever

Fig: 3 mechanically operated pneumatic components



Fig: 4 manually operated pneumatic components

v) Pneumatic operation signal pressure lines should be drawn on one side of the squares, while triangles are used to represent the direction of air flow.

3. LITERATURE REVIEW

Singh- He described truck air brake control systems were reviewed and a floor mounted pneumatic application valve acting on a centrally advanced design was developed using dash mounted electrical controls and a floor mounted pneumatic application valve acting on a centrally located electro pneumatic controller. The system performance was demonstrated on an operational truck and tested to the applicable system requirements of federal brake regulations.

Virvalo- He Showed that electro pneumatic servo systems are viable alternatives to hydraulic systems for control of such machines as robots, but most of the research has been carried out on them using comparatively small cylinders. They have studied the problems involved in using heavier versions and have produced a satisfactory method of coping with the somewhat complex problems involved in designing such systems, since with a few simplifications a nonlinear model of a pneumatic servo system can be built and used to time the regulator.

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Vincent- He investigated an alternative approach to the design of controllers for positioning damping. To avoid conflicting requirements problem associated with traditional state variable feedback design, the design is based on energy methods and is not a full state variable feedback design. Electro hydraulic and electro pneumatic servo drives can provide precise position control for a multitude of industries from textile manufacture to machine tools. With the advantages of exact positioning at high speed and the ease of machine programming brought about by microp rocessor control, complicated three dimensional work pieces can be simultaneously cut, milled, drilled and taped, all in one operation.

In gold- He reported another interesting application to pneumatic actuators. An electro pneumatic design was developed and tested to meet the engine characteristics such as start ability, load carrying ability, and engine dynamic performance. As an application of micro-mechanical actuators a new concept for a micro- pneumatically driven actuator has been developed and realized.

Joachim- The quality of the model was verified by implementing it as a torque controller and running experiments on a test bed on the other hand, in intelligent soft arm control (ISAC) robot system the pneumatic actuator was used for the position control of a joint. A physical actuator model was designed and used as the basis for a subsidiary torque control. The research focused on the modification of a physical static model and the extension with a dynamic part

Pavol- He has also developed the pneumatic actuators are extensively used in conveying systems to transport granular materials. A methodology combining theoretical and experimental techniques for characterizing and predicting the friability of granules in a laboratory scale pneumatic conveying systems.

2. CONSTRUCTION AND DESIGN

For this model we are used pneumatic cylinder which has 100mm internal diameter and 50 mm stroke. For body we used mild steel material.

Further information given as follow:

4.1. Dimension: of model:



Fig: 4.1 Front view and side view of c frame body



Fig 4. Top view and front view

1. CONCLUSION

Now we know that Pneumatic Shearing machine is very cheap as compared to hydraulic shearing machine. The range of the cutting thickness can be increased by arranging a high pressure compressor and by adjusting or changing the shear blade. This machine is advantageous to small sheet metal cutting industries as they do not have rely on the expensive hydraulic shearing machine. This machine is easy to operate and eco friendly as no fuel consumption or combustion takes place in it. In accordance to utilize the power of compressor we can adjust pressure output according to the thickness of the metal to be cut.

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