



DESIGN AND FABRICATION OF HAND SHEARING MACHINE

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Abstract - We are using scissors for simple sheet metal cutting. It is a manual method so that sheet metals are to be wasted sometime because of mistakes happened such as wrong dimensions etc., and also even a simple cutting may take long time. Hydraulic machines are also available for sheet metal cutting. But this method is used for only heavy metal cutting and its cost is very high. We are using a pneumatic system for sheet metal cutting in an easy way. It is operated by a pneumatic hand lever of two ways control valve. Control valve is operated by a compressor.

Keywords – DESIGN, PNUMETIC SYSTEM ON MACHINE, FEBRICATION.

I INTRODUCTION

The sheet cutting machine is the heart of sheet metal industries. In some industries, hand sheet cutter is used which is operated manually. In these machine, we are using pneumatic cylinder for sheet metal cutting.

These machine should be easy to operate and maintain also. Hence, we are introducing a pneumatic sheet metal cutting machine which will reduce manufacturing cost and minimize industrial labor problems which is the biggest headache for human. The main objective of our project is to perform job holding operation effectively with less human efforts by using a machine with the pneumatic power. This will also reduce the time required for metal cutting. By using these machine we can increase the production rate and automatically the industry will be in profit. Automation plays an important role in mass production.

Automation can be achieved through pneumatic form. The main advantage of pneumatic system is economically cheap and easy to handle.

II LITERATURE SURVEY

shearing or cutting operation as or blade descends upon the metal, the pressure exerted by the blade first cause the plastic deformation of the metal. Since the clearance between the two blades is very small, the plastic deformation takes place in a localized area and the metal adjacent to the cutting edges of the blade edges becomes highly stressed, which causes the fracture to start on both sides of the sheet as the deformation progresses and the sheet is sheared. In dentistry applications, pneumatic drills are lighter, faster and simpler than an electric drill of the same power rating, because the prime mover, the compressor, is separate from the drill and pumped air is capable of rotating the drill bit at extremely high rpm. Pneumatic transfer systems are employed in many industries to move powders and pellets.

Sheet metal bending is one of the most widely applied sheet metal forming operations. The understanding of the bending mechanics is aimed at obtaining two kinds of information important for industrial applications. The first one is the spring back prediction for die design and shape control. The second is an estimation of the bend force for selection of press capacity, strength analysis and design of dies. Vallance and Matlock (1992) studied the friction behaviour of zinc-based coated sheet steels and laboratory scale friction analysis techniques that involve sheet sliding over cylindrical dies. Wenzloff et al (1992) introduced a new test procedure for the bending under tension friction test. Mai Huang and Garden (1994) presented a literature review of the spring back of doubly curved developable sheet metal surfaces and provided a bibliography on the spring back in sheet metal forming. Reviewing the literature, it is found that researchers have been studying the phenomenon of spring back for nearly

six decades. There have been diverse efforts to evaluate and/or decrease spring back in the sheet metal forming industry for a long time. Pertain and Hoogenboom (1995) derived a simple explicit bending couple curvature relation for small and larger curvatures and they verified the model with experimental results. A simple approach for calculating bendability and spring back in bending based on the normal anisotropic value, strain hardening exponent and sheet thickness has been presented as described elsewhere by Daw Kwei Leu (1997).

III

OBJECTIVE & METHODOLOGY

To reduce human efforts B. To increase production rate C. To increase efficiency of industry D. To reduce the work load E. To reduce production time.

To reduce the power consumption during machining. 2) To maintain the accuracy & reduced the scrap of HSS blades. 3) To develop automation unit for the Shearing, so that m/c can easily be adopted in today's automated plants. 4) This type of m/c provides work practically at low cost, low maintenance, low capital investment in less space. 5) To perform the most rigid operation with high speed.

You-Min Hang and Daw-Kwei leu (1998) described the effects of process variables like punch radius, die radius, punch speed, friction coefficient, strain hardening exponent, normal anisotropy on V-die bending process of steel sheet. Sanchez (1999) focused on a systematic analysis of testing equipment as a measurement system of the friction phenomena on sheet metal under plane strain. It provides experimental references in order to optimize the usage of lubricants and sheet metal. Weilong Hu (2000) proposed anisotropy hardening models with simple loading conditions that include exponential hardening model, linear hardening model and multi linear hardening model. Samuel (2000) analysed the spring back in axisymmetric U-bending processes with a finite element program and discussed the effect of tool geometry and blank holder force on the final shape after spring back.

Aleksy et al (2001) conducted experiments on spring back for dual phase steel and conventional high strength steel for a hat channel section with varying cross sections. They described the methodology of experiments and discussed spring back.

IV

DESIGN AND CALCULATION

CAD Drawing

The assembly of tyre inflation system has been made in solidworks modelling software. Solidwork is a family or suite of design software supporting product design for discrete manufacturers and is developed by dassult system. Solidwork is 3-dimensional CAD/CAM/CAE feature-based, associative solid modelling software. It is one of a suite of 10 collaborative applications that provide solid modelling, assembly modelling, 2-D orthographic views, finite element analysis, direct and parametric modelling, sub-divisional and nub's surfacing, and NC and tooling functionality for mechanical designers.

The features used in solidwork for modelling of tyre inflation system are:

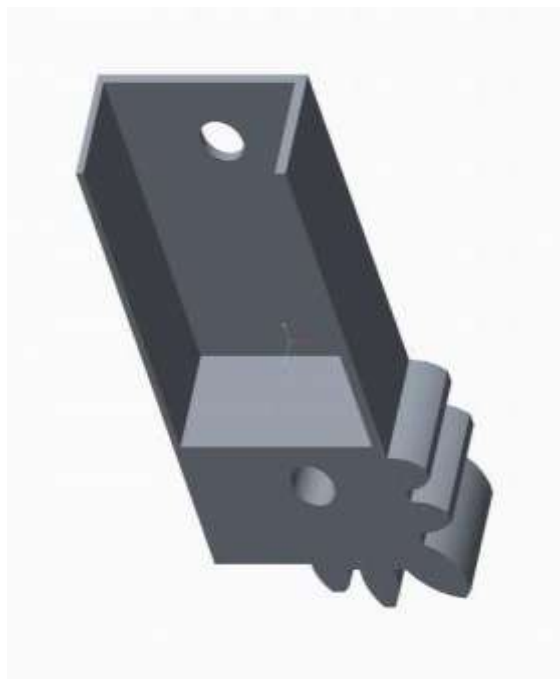
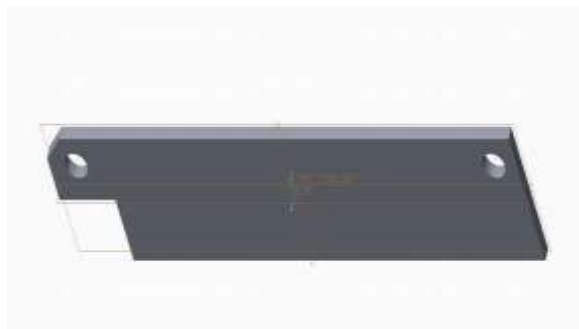
Sketch: A sketch is a 2-D entity that graphically captures an idea with lines, constraints and dimensions. The tools used in sketch are line, arc, and circle

Sweep: Sweeping is a modelling feature in which a closed planar shape is translated or revolved it form a solid. A sweep with a variable section is one of the most powerful feature in solidwork. A sweep utilizes a single section, which can be constant or variable, and that is swept along one or more trajectories. A sweep uses one or more trajectories and a single section that can change shape and orientation along the features. The main components of sweep tool are section and trajectories.

Mirror: Mirror is a feature which is used to perform mirror or copy of a part with respect to centre plane (top or bottom plane, front or back plane, right or left plane), Mirror eliminates modelling of same part in a given model, and it reduces time and makes work easy. It is very much useful in modelling complex part. **Datum planes:** Datum planes are 2-D reference geometry that is used to build feature geometry. It is used to create default datum planes. Datum planes are individual features that can be redefined, suppressed, hidden, or deleted. It is a planar reference that has no mass. It is infinite in size, but its display size can be edited.

Extrude: Extrude a 2D sketch is developed along a linear path to a specified distance to create a 3D form. The cross-section of solid model is drawn in sketcher of solidworks and it is extruded in direction perpendicular to sketching plane. It is used to add or remove material from the given model. You can either select the sketch first or then start the extrude tool, or you can start the extrude tool and then select the sketch. It is also used to create a hole in a given model.

Revolve: Revolve is solidwork feature tool which is used to create solid 3D model around an axis. One can resolve the sketch around an axis to add materials to it. Using this feature one can create solid ring, hollow cylinder, pressure vessel, solid and hollow sphere etc.



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 installing more hardened blades. This machine is advantageous to small sheet metal cutting industries as they cannot afford the expensive hydraulic shearing machine.

Future scope: Since old age man is always trying to gain more and more luxurious. Man is always trying to develop more and more modified technique with increasing the aesthetic look and economic consideration. Hence there is always more and more scope. But being the Diploma Engineers and having the ability to think and plan. But due to some time constraints, and also due to lack of funds, we only have thought and put in the report the following future modifications-

1. It can be made hydraulically power operated by installing the gear oil pump at the place of air compressor and pneumatic cylinder arrangement.
2. It can be made rack and pinion operated or spring and lever operated, by replacing the pneumatic circuit by rack and the pinion arrangement by the square threaded screw and Nut arrangement. The place where there is scarcity of the electricity the electric motor operate compressor is replaced by an I.C. Engine installed compressor.
3. Thus in future there are so many modifications, which we can make to survive the huge global world of competition.

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