Hydraulic Press Machine

A Review paper on Hydraulic press Machine

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***Abstract*: The aim of this paper is to integrate the mechanical system of hydraulic press with hydraulic system to facilitate the ease of operation to manufacture the smaller parts in a bulk. In the present scenario, time constrain is a crucial part for completion of any production process. Thus with the aid of atomization, the production time can be reduced as well as higher degree of accuracy can be achieved as the human efforts will be alleviated. Thus an attempt has been made to provide the smooth and rapid functioning of press work with the help of hydraulic system.**

Index Terms: Knowledge Management, Press work, hydraulic press, Automation

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I. INTRODUCTION

Hydraulic press is a tool to produce compressive force by means of fluid. It depends upon Pascal's principle that the pressure throughout an enclosed entity is constant. By means of hydraulic system larger force scan be produced in contrast with mechanical and electrical systems. Such forces can be used for the press work application such as blanking, punching, piercing, coining, trimming etcetera. Press work is a method of mass production involving the cold working of metals, usually in the form of thin sheet or strip. Press working is one of the extensively employed methods of fabricating parts of intricate shapes with thin walls. Press working processes make use of large forces by press tools for a short time interval which results in cutting or shaping the sheet metal. Since, press working does not involve heating of the parts, close tolerances and high surface finish can be obtained on the part. Since presses can produce components at fairly fast rates, the unit cost of labor for operating the press is fairly low.

TYPES OF HAND PRESS MACHINE

A forming press, commonly shortened to press, is a machine tool that changes the shape of a work-piece by the application of pressure.[1] The operator of a forming press is known as a press-tool setter, often shortened to tool-setter.

Presses can be classified according to

- Their mechanism: hydraulic, mechanical, pneumatic;
- Their function: forging presses, stamping presses, press brakes, punch press, etc.
- Their structure, e.g. Knuckle-joint press, screw press
- Their controllability: conventional vs. servo-presses

II. PART OF HYDROULIC MACHINE

5 ton bottle jack and springs, We used 5 ton bottle jack to make this hydraulic press., Also I used 2 mechanical springs to allow the hydraulic jack in its first position. Both the hydraulic

Figure 1.1 original frame

Figure 1.2 part of hydraulic manual press machine

WORKING PRINCIPAL

Hydraulic press is a system where a liquid, usually crude oil, is pumped down hole under high pressure to operate a reciprocating pump or a jet pump. This is very flexible pumping system and can be used to produce low- to high-volume wells. This system is capable of producing a higher volume of fluid than the mechanical lift pump. Hydraulic lift uses a pump and pumps oil very high pressure. The pump pressure is usually between 300-400 pounds per square inch and pushes the liquid to the bottom of the piston to lift it from its seat which relatively lifts the load connected to the head of the piston-cylinder assembly.The required power oil or produced water is reclaimed and reused to continue operating the wells.The pump produces oil on both the upstroke and the The amount of increase depends on the ratio of the sizes of the pistons. The ratio of the areas of the two pistons is multiplied by the amount of force applied to the small piston to determine the amount of force that the large piston can produce. For example, if the ratio of the sizes of the two pistons is 10, and the amount of force applied to the small piston is 50 N, the amount of force that the large piston will produce is 500 N. Hydraulic presses can be used in any task that requires a large amount of force. These can include any type of lifting as well, since the hydraulic press can work as a type of lever. These presses are the most efficient contemporary press, as well as the most common Since the hydraulic press works on the basis of Pascal's Law, its working is similar to the one of the hydraulic system. A hydraulic press consists of basic components used in a hydraulic system that includes the cylinder, pistons, the hydraulic pipes, etc. The working of this press is very simple. The system comprises of two cylinders, the fluid (usually oil) is poured in the cylinder having a small diameter. This cylinder is known as the slave cylinder. The piston in this cylinder is pushed so that it compresses the fluid in it that flows through a pipe into the larger cylinder. The larger cylinder is known as the master cylinder. The pressure is exerted on the larger cylinder and the piston in the master cylinder pushes the fluid back to the original cylinder

Mythology

Achieving the aim of this work, component parts of the machine were designed using various design equations. The design results were used to select materials for various components. The detailed drawing of the developed hydraulic press machine was done using SOLIDWORKS software. In fabricating the machine, mild steel was used as the locally sourced material. The use of mild steel is due to the fact that its strength, rigidity and mach inability falls within the design specifications. It is also available and cost effective

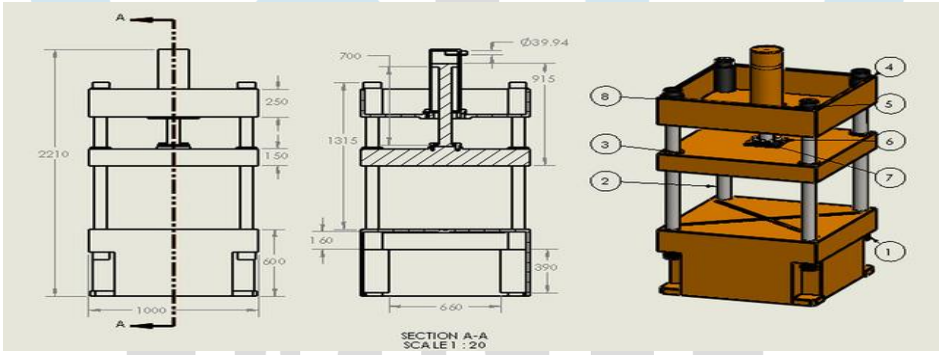

Figure 1.1 [6] solid work model

Advantage

As compared to the manual machine the hydraulic press machine has a lighter weight with a small number of parts used forming the shapes of sheet metal. The main advantages of Hydraulic press machines are the following:

Weight reduction and material conversation, Reduce the number of Parts at a lower cost of molds, Low Initial and production cost, Capacity for High ton nage,It is safe compared to Mechanical press, Built-in overload protection Less noise
Generates immense amount of pressure, Less floor space required for this machine, A machine having simple design
Greater adaptability, The tools used in this machine have a longer lifespan., Increase the strength and rigidity

Limitation

- The Pressure is regulated at a certain level and can not exceed more than that.
- Some hydraulic fluids are flammable.
- More maintenance is required.
- There is a carbon footprint.
- There is a possibility of Hydraulic fluid leakage.
- The operational speed is low.
- They consume high energy

Conclusion

The developed manually operated hydraulic press was achieved by following the stated objectives of this work. The machine developed was made from locally sourced materials. Mild steel was used in fabricating majority of the components of the machine. One important feature of this press machine is interchangeability of mould and die without dismantling the ram assembly

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