

A Review over Hydro Pneumatic Pressure Control Mechanism for Hydraulic Pressure

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Abstract: A hydro pneumatic pressure is a pressure that uses air and oil during operation and gives a higher outlet pressure at lower inlet pressures. In this project, the press was designed and manufactured by pressing sliding bearing against a circular casting. The cast is a thick steel cylinder, and the sliding bearing is a cylindrical bearing. The press uses two drives: one for the vertical pressure and one for the horizontal press. In this paper we will discuss the concept of press, development, and analysis and production development.

Keywords: Press Machine, Hydro Pneumatic Pressure, Hydraulic Pressure, cylinder's energy, linear motion.

1. INTRODUCTION

Press Machine are used to produce large quantities of products quickly, accurately and economically from cold work of mild steel and other moldable materials. A press is a machine that supplies energy into a form of forming, stamping or forming a metal or non-metallic material. The chip is small during the manufacturing process for metal production. Use this tool to do this. The workpiece is deformed to the desired size by applying pressure. This is a bed, frame or support plate consisting of columns. The stamp works on the metal plate or workpiece and uses a unique tool attached to the bed or stamped. The pneumatic cylinder's energy in the pneumatic pressure is transferred to the drum to ensure linear motion. The press is considered to be the best way to cast the sheet in the final product. Pneumatic presses are commonly used for stamping, forging, casting, riveting, matting, deep drawing and metal shaping. Pneumatic presses are used to produce large quantities of goods economically, quickly and accurately. The manufactured components have a very wide range of fields and are used throughout the industry. Most of the board's components are made in any form due to the specially developed press and a combination of operations. Correct selection of the press and the correct shape of the mold are very important for all operations to be performed on the Press Machine.

A hydropneumatic pressure is a pressure that uses air and oil during operation and gives a higher outlet pressure at lower inlet pressures. In this project, the press was designed and manufactured by pressing sliding bearing against a circular casting. The cast is a thick steel cylinder, and the sliding bearing is a cylindrical bearing. The press uses two drives: one for the vertical pressure and one for the horizontal press. In this article we will discuss the concept of press, development, analysis and production development. Model the different parts of the press using the Pro-E modeling software. Structure analysis was applied to the components of the press using ANSYS analysis software.

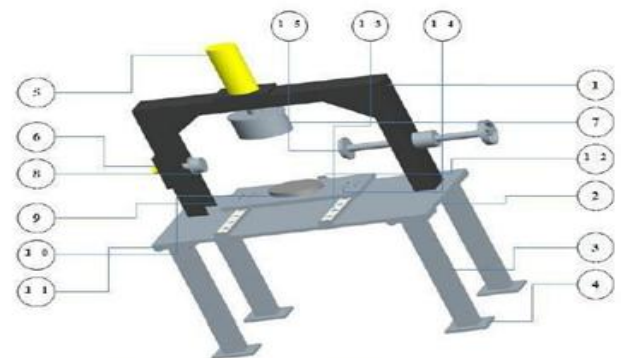


Figure 1.1: Pro-E model of press machine

Systems that use air and oil during operation and use higher hydraulic outlet pressures at lower inlet pressures are referred to as hydropneumatic systems. The hydro-pneumatic system provides a maximum pressure of up to 700 bar. It's a compact device that does not have to worry about using the oil pump and the fuel tank. Since the frame is designed to apply four sliding bearings horizontally and two vertically rounded, consider the following points.

- Arrangement for two actuators, one is horizontal and other is vertical
- Use of arrangement on which hitch yoke is placed for assembly and worker can access it in straight comfortable position
- For achieving positional accuracy some sliding arrangement should be provided so that yoke can easily be placed or lifted with the help of hoists and then slide to the proper position for pressing
- Yoke should be placed on the machining surface to achieve dimensional accuracy

2. RELATED WORK

It will outline a variety of concepts that have been defined in the basic research work to provide a term used in this study, the early development of packaged drinking water in this chapter. In addition, helping researchers, such as an attempt to collect relevant information, is the subject of interpretation of the statistical analysis to compare the results of previous studies and results. In addition, it has been attempted to identify relevant concepts and consider previous studies related to the study.

Micha Tal I, Stephen Tal [1] - "Static Analysis 2 Horizontal Hydraulic Piston Reporter Joint Conference Manganese Linear Hydraulic Piston Engine" -2010 Item Punching Compression Analysis TEM (FEM) - Hydraulic Hydraulic Machine - 2 MN linear hydraulic piston engine. Analysis of stamped piston assembly, determining factor stress, shear and strain distribution security. Based on the design data, the piston has a complex shape - a three-dimensional model of the piston assembly is manufactured. Finite element analysis was performed using SolidWorks 3D CAD design and COSMOS Works software. The simulation results were evaluated and compared to experimental data. The results show that the established model FEM provides useful information for the optimal construction of the piston assembly.

M.Fulland [2] - "Analysis of Fatigue Crack Propagation Within the Hydraulic Machine" by -18, January 2007 this document, fatigue crack growth in a hydraulic press, as described in the frame. Explosion begins with a shrink cavity

in the groove in the center of the frame. In the state of the main stress jump, the cut affects the mixed load caused by the bursting process. Crack growth will be analyzed ADAPCRACK3D cracking simulation, developed at the Department of Mechanics of the University of Paderborn. This program, as well as cracks on the road, and life along the three-dimensional structure of the crack in front is fully automated, can be demonstrated strength.

Rakesh.A.Oza&SPPatel [3] - Because there is a tendency to reject gray in today's market, -2011, is used to optimize the drive main part of the production line or means of production and the eccentric shaft mechanical press analysis. The drive shaft is a rotating shaft that transfers power from the engine to the gearbox. According to the requirements for mechanical eccentric punching, it is necessary to operate the drive shaft with high productivity and low yield load. Due to this type of variable load, the drive shaft is defective. To avoid this problem, it is important to build bridges based on the required load. In the present document, the model is then manufactured in a first software Pro / ENGINEER, bending voltage, ANSYS analysis to compare different, such as axle deflection and shear stress situation, the new design according to the shape and position of cracks. As a result of the FEM analysis is the developed starting position clearly recorded. To analyze the reinforcement of the press frame, the final element method is used to ensure further work with the printing error. This element method stress analysis, the maximum value corresponding to the lower power rail, and instructs the connection unit 273 MPa to 180 MPa steel column, complete with 40 mm radius position corner portion, which is approx. 35%. Presses are used to produce large quantities of products quickly, accurately and economically from cold work of mild steel and other moldable materials. A press is a machine that supplies energy into a form of forming, stamping or forming a metal or non-metallic material. The chip is small during the manufacturing process for metal production. Use this tool to do this. The workpiece is deformed to the desired size by applying pressure. This is a bed, frame or support plate consisting of columns. The stamp works on the metal plate or workpiece and uses a unique tool attached to the bed or stamped. The pneumatic cylinder's energy in the pneumatic pressure is transferred to the drum to ensure linear motion. The press is considered to be the best way to cast the sheet in the final product. Pneumatic presses are commonly used for stamping, forging, casting, riveting, matting, deep drawing and metal shaping. Pneumatic presses are used to produce large quantities of goods economically, quickly and accurately. The manufactured components have a very wide range of fields and are used throughout the industry. Most of the board's components are made in any

form due to the specially developed press and a combination of operations. Correct selection of the press and the correct shape of the mold are very important for all operations to be performed on the press.

Weerd R. et al (1995) describes the calculation of the induction motor with short-circuit rotor FEM final pulse parameters. Analysis of the final parameters for two-dimensional asymmetry using a finite element method (resistance and inductance of loop).

R.J. Cruz et al. (1999), in the linear synchronous motor of the interaction between the edges of the main core of the teeth due to the permanent magnet, we discuss the influence of harmonic disturbances fields teeth. Different approaches to power fraud, magnetic length to optimize, i.e. change in the use of air gap length and semi-locked slot is skewed to reduce. Using the final element method (FEM), the linear synchronous motor of this paper is an evaluation of various methods for reducing tooth resistance.

3. PRESS MACHINE WORKING

Typically, three types of compressors are mechanical, hydraulic or pneumatic. The control system can then be mechanical or electromechanical. These three main types of energy presses have more common features, the most widely used and studied mechanical presses. Press heavily on two large fixed beds and a moving frame. The mechanical press operates in accordance with the principle of front and back movement. The main elements of energy transfer are the coupling and crankshaft. The motor shows the rotational motion of the flywheel and the coupling is used to connect the rotary flywheel to the crankshaft. The crankshaft transforms the rotational motion of the flywheel to a downward and upward movement. The workpiece is placed automatically or manually in the lower form and the machine cycle begins. During the downward movement, the frame moves in the direction of the work area. When the upper and lower dies are pressed onto the substrate, a reforming part is formed. When the shutter button is completed, the object is removed and the new machine is processed and repeated.

4. TOUCH THE CALCULATION

Then the prerequisite for the frame structure was established.

- The frame material is uniform and isotropic.
- The base is attached to the base deviation of all base plates and the solid is zero.
- The frame has a symmetrical cross sectional area.

The frame is the most important machine component in the press. It was developed by the following program.

Function

The main function of the frame is to withstand the forces generated by the RAM. The frame is used to collect and house pressure accessories such as drums, mold blocks, motors, flywheels, sprockets and more.

Determination of power

Pressure capability determines the main force acting on the structure of the press frame.

Material Specifications

Specification of Material

- Designation:S275.
- Tensilestrength:370to530MPa.
- Density:7850kgf/m³.
- Young'sModulus:2x10⁵N/mm².
- PoisonsRatio:0.3.
- FactorofSafety:4.

Attempts to analyze and optimize the 10-ton printing using ANSYS software. The work completed project is designed to meet the requirements that comply with the limits. Pressure frame has been carefully designed and tested to ensure it meets the requirements. Press machine is designed with the best materials to avoid excessive weight gain. Optimal design software tools using the project have improved the scope of the press (ANSYS), and compared to existing designs. ANSYS showed that identifying lighter weight of the same design load ratio less material costs, restrictions, intended for design purposes.

The maximum voltage caused by the machine is 66.95 N / 2 mm, the material is less than the permissible load. The machine played an important role in recording die. Further reducing the material for punching and bending of the metal sheet processing industry, which allows its unsafe machine base not deform and dissolve, the higher the load and stress. As illustrated in the maximum distortion analysis detected is 0.0042 m, which is such an operation is acceptable. After optimizing 63 kg, reduce the total weight of the machine.

In this project it has been shown to reduce weighing 487 kg by weight, by changing the design of the frame structure damaged while the structure of the machine is not balanced with realized. Safety factor of persons working through the manual operating mechanism.

Air and oil during operation and use at the outlet at a lower inlet pressure on the hydraulic system are called high

hydraulic and pneumatic systems. The hydro-pneumatic system provides a maximum pressure of up to 700 bar. It's a compact device that does not have to worry about using the oil pump and the fuel tank. Air compressions compressed only for liquid foods, or can be combined with the use of hydraulic components to make full use of two forms of fluid forces. This project is ideal for hydraulic and pneumatic technology, it works very efficiently, faster and more powerful because it uses two interfaces: 1. Hydraulic, this technology 2. Air pressure because we do not use hydraulic pump. The pressure is delivered via a water reservoir with air water. Therefore, this technique is called hydropneumatic pressure. The hydraulic and pneumatic system is an upgraded version of the old water supply tank. Its main purpose is to adjust or increase the limit or even higher values of the delivered pressure to the system to ensure a sustained and satisfactory supply of all devices means two drives, one horizontal and the other vertical.

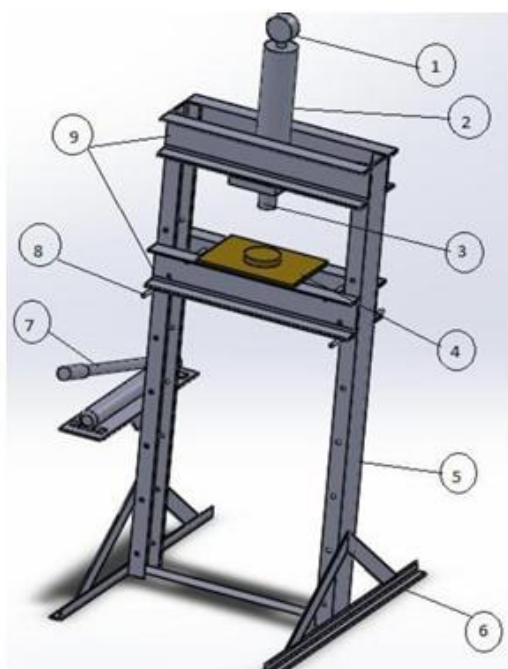


Figure 2: diagram of the press

The hydraulic and pneumatic system is divided into two main components: pneumatic pumps and cylinders. The main components of the hydraulic pump are air motor, gearbox, eccentric camera, pump, fuel tank. A spring controlled control valve is located at the pump inlet. Connect the pump to the compressor's pneumatic connection. The air motor rotates through the air and rotates the gearbox shaft. The

reduction gear reduces the speed at which the exhaust shaft of the eccentric camera is mounted. The camera moves the two pistons of the piston pump and the continuous flow of hydraulic fluid into the cylinder to make a smooth turn. The pump is connected to the quick coupler center cable and drives the valve, which gives it the first two storage preparation routes. The oil enters the pump cylinder at a controlled speed, which gives a slow forward stroke. After clicking on the first leakage valve, it acts again to discharge the cylinder pressure and pull through the spring. Similarly, connect the pump with the side cylinder and press the side layer. Figure 2 shows the diagram of the press.

5. CONCLUSION

The pneumatic system is considered to be more efficient than the hydraulic system than the hydraulic system, the press develops after having undergone the pneumatic, hydraulic and hydraulic systems. The system has shown significant improvements in various sectors, such as uptime and operating costs. It has been noted that runtime for each component has been reduced from 3 hours to 30 minutes, and operating costs are reduced by approx. 90%. Another advantage of the system is the safety of the user, which makes the operation more convenient (less fatigue) and improves the dimensional accuracy associated with the positioning components. By using compressed air as an energy source you can get cheap and cheap components and pipelines. This helps to complete the hydraulic components and the use of expensive large tanks containing a large amount of expensive hydraulic fluid.

REFERENCES

- [1] Muni Prabakaranand V.Amarnath, Structural Optimization of 5 Ton Hydraulic Pressand Scrap Baling Press for Cost Reduction by Topology, International Journal of Modeling and Optimization, Vol.1, No.3, August 2005, pp.,180-181
- [2] H.N. Chauhan and M.P. Bambhania, Design & Analysis of Frame of 63 Ton Power Press Machine by Using Finite Element Method, Indian Journal Of Applied Research, Volume:3 Issue:12, July2013, ISSN-2249-555X,pp.285-289
- [3] Ankit H.Parmar, Kinnarraj P.Zala, Ankit R.Patel, Design and Modification of Foremost Element of Hydraulic Press Machine, International Journal of Advanced Scientific and Technical Research, Issue4 volume3, May-June 2005
- [4] Gaurav Pradip Sonawane, Gaurav Shashikant Udgirkar, Shailesh Vijay Shirsath, Manish Sudhir Deshpande, Design, Analysis and Manufacturing of Hydropneumatic Press Machine, International Journal of Computational Engineering

- Research, ISSN(e):2250–3005, Vol,04 Issue-16, November–2004.
- [5] Santosh kumar S. Mali patil, Prof.Yogita N.Potdar, Prof.A.C.Mattikalli, Analysis And Structural Optimization Of 5 Ton H-Frame Hydraulic Press, International Journal of Innovative Science, Engineering & Technology, Vol.1 Issue15, July2012, ISSN2348–7968
- [6] D. Ravi, Computer Aided Design and Analysis of Power Press, Middle-East Journal of Scientific Research, pp.1240-1246, 2016, ISSN1990-9233
- [7] Abhijeet SKhandekar, Conventional Design Calculation & 3D Modeling of Metal Forming Heavyduty Hydraulic Press, Abhijeet SKhandekar, International Journal of Engineering Research and Applications, ISSN:2248-9622, Vol. 25, Issue16, (Part-15) June2014, pp.100-103
- [8] Umesh S Badakundri, Santosh Kullur, Prof. A.A.Kulkarni, Finite Element Analysis of Hydraulic Press Machine, International Journal on Recent Technologies in Mechanical and Electrical Engineering, Volume:2 Issue:5, ISSN:2349-7947.