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HYDRAULICALLY OPERATED SHEET BENDING MACHINE

Mr.T.V.B.BABU[1], BHUVANESWAR.S[2], DEVA ABRAHAM.J[3], RUBAN.R[4]

[1,2,3,4]*Department of Mechanical Engineering, Vel Tech High Tech Dr.Rangarajan Dr.Sakunthala Engineering College, Chennai, Tamilnadu.*

ABSTRACT

A Hydraulically operated sheet bending machine is a device which enables the single persons to operate it alone and bends the sheet. So special skill is needed to bend the sheet . It can widely used. It is easy to fit on the device. Its made up reservoir, pump, relief valve and cylinder. The transmission of a hydraulic oil from the reservoir by pump through the valves to Ram & Cylinder which converts the hydraulic pressure into mechanical force by means of a Hydraulic Circuit which is nothing but a network of passages in the hydraulic systems. These passages are made with the help of Steel Tubes, Flexible Hydraulic Hoses or into the internal holes or cavities in metal blocks. It is the most importance that the circuit is always leak proof as well as free from obstacles. Each joint or coupling should be securely tightened or replaced forthwith. air lock or foreign particles should not be allowed to interrupt or block the free flow of hydraulic oil.

INTRODUCTION

This is a self – assessment test on the part of the students to assess his competency in creativity. During the course of study, the student is put on a sound theoretical foundation of various mechanical engineering subjects and of course, to a satisfactory extent. Opportunities are made available to him to work on different kinds of machines, so that he is exposed to various kinds of manufacturing process.

As a students learn more and more his hold on production technology becomes stronger. He attains a stage of perfection, when he himself is able to design and fabricate a device. This is the project work. That is the testimony for the strenuous training, which the student had in the institute. This assures that he is no more a student, he is an engineer.

The bending machine is most important in sheet metal industry. This machine should be used for straight cutting machine with wide application. But in some industry hand sheet cutter and hand bender are used. For that machine to operate the human effort are

required. The machine should be simple to operate and easy to maintain. In bending operation the bend has been made with the help of punch which exerts large force on the work clamped on the die. The bending machine is designed in such a way that, it works automatically. The machine is designed by observing the factors to improve the efficiency and to reduce the cycle time by producing quality output. Automation of machine is achieved with the help of pneumatic system. This involves the design of an efficient system which reduces the human effort and help to increase production output.

2.1 OBJECTIVE OF THE PROJECT

1. This concept saves time & energy which leads to effective working of model.
2. This process bends the tube without any buckling (collapsing under pressure), and with as little crimping and flattening as possible.
3. This design of hydraulically operated pipe bending machine is fully portable type as it weighs less.

3.1 SCOPE OF THE PROJECT

1. Single person is enough to operate this efficiently to remove liner.
2. Easy and efficient handling of liner puller without wastage or damage to the puller, cylinder block and to any other parts.
3. Increase the puller life.
4. Least maintenance of the equipment.
5. Need not require any individual work place.
6. Can be worked in the work spot.

4.1 DESIGN OF HYDRAULIC BENDING MACHINE:

Load capacity of Hydraulic Jack (W) = 3 ton (30 KN)
Operating Pressure (p) = 60 Kgf
Lift Range (L) = 15 cm
Man effort put on handle (e) = 10Kg
Permissible tensile stress of mild steel (6t) = 120 N/mm2
No. of stroke for lifting load (n) = 15
Factor of safety = 5
Permissible shear stress of mild steel (τ) = 20 N/mm2

Permissible comp. stress of mild steel (6c) = 20 N/mm2
Permissible comp. stress of cast iron (6c) = 120 N/mm2
Permissible shear stress of cast iron (τ) = 35 N/mm2

4.2 DESIGN OF HYDRAULIC JACK:

The material of hydraulic jack is cast iron and having capacity of 3 ton i.e. 30 KN. Material used for handle and jack plate is mild steel.

1. Outer diameter of jack (Do) = 30 mm
2. Inner diameter of jack (Di) = 15 mm
3. Oil capacity in reservoir at bottom of jack = 200 ml
4. Handle attached to jack (l*b*t) = (280 mm*10 mm*8 mm)
5. Plate attached to jack (l*b*t) = (200 mm*60 mm*6 mm)
6. Central hole on plate for jack = 20 mm

CONSTRUCTION AND WORKING PROCEDURE

This device is worked by the principle of hydraulic lifting system.This is operated by hydraulic power without use of man power. This unit consists of

a) M.S. Fabricated stand
b) Hydraulic jack with bending plateand V support
c) Handle

A) M.S .FABRICATED STAND;

This stand is used to hold the hydraulic jack and v support guide plate. The work to be bend is placed at the bottom of the V support guide .

B) HYDRAULIC JACK;

A Hydraulic Jack or for that matter any device using Hydraulic Power in its simplest possible shape consists of five fundamental components.

1. The Hydraulic Reservoir storing the Hydraulic Oil (Oil is used as the medium to transmit force and motion-such fluids are called Hydraulic Oils) should be thoroughly clean, whether integrally built-in or used as a separate tank.
2. A pump by itself would be useless without a system of VALVES to govern the flow of hydraulic oil to perform the desired function.
3. The transmission of hydraulic oil from the reservoir by the pump through the valves to Ram & Cylinder which converts the hydraulic pressure into a mechanical force is by means of a Hydraulic Circuit which is nothing but a network of passages in hydraulic systems. These passages are formed with the help of Steel Tubes, Flexible Hydraulic Hoses or through internal holes or cavities in metal blocks. It is of the utmost importance that the circuit is always leak proof as well as free from obstacles. Each joint or coupling must be securely tightened or replaced forthwith. No air lock or foreign particles should be allowed to interrupt or block the free flow of hydraulic oil.
4. All hydraulic cylinders consists of two basic elements – the outer housing is called the Cylinder body and the inner sliding elements is called the Ram (or piston or plunger) which actually converts the hydraulic pressure into mechanical force and transmits to the desired point for performing the function. The movement of Ram is always in line with cylinder under pressure.

RESULT AND DISCUSSION

We make this project entirely different from other projects. Since concepts involved in our project is entirely different that a single unit is used to various purposes, which is not developed by any of other team members. By doing this project we gained the knowledge of fabrication work and how the welding is doing and material selection for particular components etc.

CONCLUSION

It is concluded that any fabrication work can be done with the help of welding. We have successfully completed the project work on using welding work at our Institute.

REFERENCES

[1] V. Senthil Raja, Maguteeswaran R, Karthik C., Rajarajan S and Vadivel D. S., A New Model in Design and Manufacturing of Mobile Hydraulic Pipe Bending Machine in Industry, International Journal of Engineering Research & Technology ISSN: 2278-0181, Vol. 3, Issue 1, PP 2706-2713.

[2] Olafimihan. E. O., Development of A Hydraulically operated Bending Machine, International Journal of Management, Information Technology and Engineering ISSN 2348-0513, Vol. 3, Issue 10, PP 53-58.

[3] AnkitVyas, Tiwari, Chandrakant, Tulsian, Arnav, Patel, Ankit, Wangikar, Kiran and Anerao, Prashant, Design and Development of Hydraulic Pipe Bending Machine, International Journal of Advent Technology ISSN 2321-9637, National Conference NCMMM Special Issue, PP 01-06.

[4] Vikashpatial, Choudhary, Kiran, Rane, Prathamesh, Inamdar, Vijay olikarD. A., Design And Manufacturing Of Pneumatic Pipe Bending Machine, International Journal of Recent Scientific Research ISSN 0976-3031, Volume 6, Issue 6, PP 4472-4476.

[5] Mohan Krishna S. A., Experimental Design and Fabrication of Portable Hydraulic Pipe Bending Machine, International Journal of Development Research ISSN 2230-9926, Vol 4, Issue 12, PP 2681- 2684.

[6] Girish Gharat, Patil, Aniket, Mhatre, Harshal and Satvi, Sandesh, Design and Fabrication of Pneumatic Punching and Bending Machine, International Journal for Scientific Research & Development ISSN 2321-0613, Vol. 3, Issue 02, PP 283-285.