Design and Manufacturing of Pipe Flaring and Squeezing Horizontal Hydraulic Press Machine

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Abstract - Design and manufacturing of new horizontal hydraulic press machine is implemented for the pipe squeezing and flaring operations. Due to higher flexibility and greater accuracy, the horizontal hydraulic press machine is used for the squeezing and flaring operations, as two vertical hydraulic presses are needed for the same operations. The design of the considered machine is done using computer-aided software NX-CAD and a 20-ton hydraulic press is constructed and tested using a locally sourced material, and fluid. The major components of the press design are included the cylinder, piston arrangement, the frame, hydraulic circuit, die, and punch. In this machinery, hydraulic actuator and clamping device are with dimensions of 200×80×200 mm and 100×60×200 mm respectively, and the stroke length of an actuator is considered as 200 mm (working pressure 200 bar). The squeezing and flaring two different operations are done in one machinery using the developed machine with less expensive. The flaring of the pipe is typically performed using die and punch method. The main aim of this work is to flare and squeeze the pipe and to analyze the performance of the horizontal hydraulic machine. The MOORA analysis is done and Programmable logic controller (PLC) is the small computer used for the real-world process. Also, dynamic characteristics were investigated under the various operating conditions for horizontal hydraulic press.

Key words: Horizontal hydraulic press, Squeezing, Flaring, MOORA, Programmable logic controller, dynamic characteristics

I. INTRODUCTION

In press, the force generation, transmission and amplification are achieved mistreatment fluid besieged. The liquid system exhibits the characteristics of a solid and provides a really positive and rigid medium of power transmission and amplification. in an exceedingly straightforward application, a smaller piston transfers fluid underneath high to a cylinder having a bigger piston space, therefore amplifying the force. there's straightforward transmissibility of huge quantity of energy with much unlimited force amplification. it's conjointly a really low inertia impact.[1]

Main objective of project is to switch major part of “one cylinder four post hydraulic press” therefore rigidity and strength of the parts are increase by mistreatment optimum material. The perform of the foremost part like frame, bottom plate, bed, high box are to soak up forces, to supply precise slide steerage and to support the drive system and alternative auxiliary units. The structural style of the part depends on the pressing force this determines the specified rigidity.[3]

the event of engineering over the years has been the study of finding ever a lot of economical and convenient means that of pushing and propulsion, rotating, jabbing and dominant load, starting from some kilograms to thousands of tons . Presses are wide wont to come through this. Presses, as outlined by Lange, are pressure exerting machine tools. they'll be classified into three principal categories as: hydraulic presses that look after the principles of fluid mechanics pressure, screw presses that use power screws to transmit power and mechanical presses which utilize kinematic linkage of components to transmit power . In press, the force generation, transmission and amplification are achieved Department of Production Engineering, University of Benin, Benin City, Edo State, Nigeria. mistreatment fluid besieged. The liquid system exhibits the characteristics of a solid and provides a really positive and rigid medium of power transmission and amplification. in an exceedingly straightforward application, a smaller piston transfers fluid underneath high to a cylinder having a bigger piston space, therefore amplifying the force. there's straightforward transmissibility of huge quantity of energy with much unlimited force amplification. it's conjointly a really low inertia impact. [7,9]

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A typical press consists of a pump that provides the mobility for the fluid, the fluid itself that is that the medium of power transmission through hydraulic pipes and connectors, management devices and also the hydraulic motor that converts the hydraulic energy into helpful work the purpose of load resistance. the most benefits of hydraulic presses over alternative varieties of presses are that they supply a a lot of positive response to changes in input pressure, the force and pressure will accurately be controlled, and also the entire magnitude of the force is on the market throughout the complete operating stroke of the ram travel. Hydraulic presses are most popular once terribly giant nominal force is needed. The press is a useful instrumentation within the workshop and laboratories particularly for press fitting operations and for the deformation of materials like in metal forming processes and material testing for strength. a glance at the workshop in African nation reveals that every one such machines are foreign into the country. Therefore, it's meant here to style and manufacture a press, that is low value and hydraulically operated mistreatment domestically sourced materials. this cannot solely facilitate to recover the monies lost within the sort of for chemist exchange however will enhance the amount of our native technology in the exploitation of hydraulic fluid power transmission.[16]

The terribly basic operating principles of the press are straightforward and straightforward and rely on variations in fluid pressure. Fluid is pumped up into the cylinder below the piston; this causes the fluid pressure underneath the piston to maximise. At the identical time, fluid is pumped up out of the highest channel, ensuing the fluid pressure on top of the piston to decrease. the next pressure of the fluid below the piston than the fluid over it causes the piston to rise. within the later step, fluid is pumped up out from below the piston, inflicting the pressure underneath the piston to decrease. at the same time, fluid is pumped up forcefully into the cylinder from the top; this will increase the fluid pressure on top of the piston. the next pressure of the fluid on top of the piston, than the fluid below it, moves the piston downward. Presses are one amongst the foremost usually used machine tools in trade for the forming of various materials. within the past, for the pressing tasks in trade, mechanical presses were a lot of oftentimes used, however these days hydraulic presses take precedence because of their various benefits, such as: full force throughout the stroke, moving elements that operate with sensible lubrication, stroke which will be absolutely adjustable that contributes to the flexibleness of application, in-built overload protection, are often created for terribly giant force capacities, silent operation and a lot of compact. therefore a press may be a machine that creates use of the pressure exerted on the fluids to crush, straighten or mould. The thought of the press is predicated on Pascal's theory, that states that once pressure is applied on fluids in an internal system, the pressure throughout the system continuously remains constant.[18] In press, the force generation, transmission and amplification are achieved mistreatment fluid besieged. The liquid system exhibits the characteristics of a solid and provides a really positive and rigid medium of power transmission and amplification. in an exceedingly straightforward application, a smaller piston transfers fluid underneath high to a cylinder having a bigger piston space, therefore amplifying the force. there's straightforward transmissibility of huge quantity of energy with much unlimited force amplification. [2]

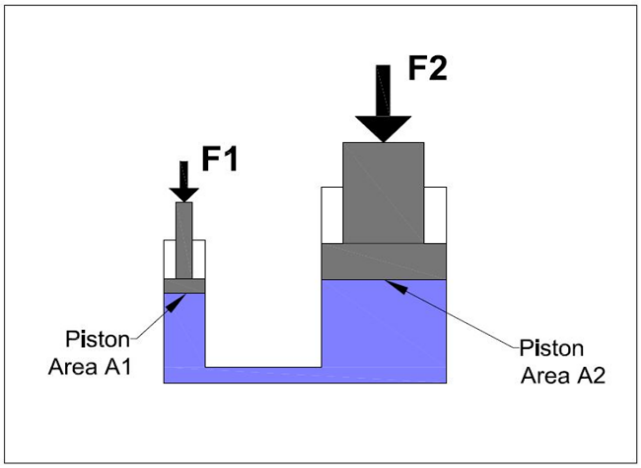

Fig.1 Pascal's law

II. TYPES OF HYDRAULIC PRESS

There are many alternative kinds of hydraulic presses occupation to the varied needs of industries. a number of them are as follows:

1)Arbor presses

These presses are typically used once the work concerned isn't of a heavy- duty nature. These presses are available a range of sizes and specifications. however, compared to different hydraulic presses, they are doing not compress massive amounts of pressure needed to come up with additional output. Arbor presses are utilized in processes like piercing holes into metals, stamping, to flatten metals, tearing, marking inscriptions, etc.

Fig.2 (a)Arbor Press

2) Laminating presses

Unlike different hydraulic presses that are operated mechanically, these presses build use of labour. Laminating presses have 2 openings that are referred to as plates. One is

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employed for heating whereas the opposite is used for cooling. This makes the lamination method relatively quicker. Through these presses, materials like chemical compound may be laminated onto paper and metal. just in case of laminating presses, the plates are typically heated with oil or through electricity. A laminating press is additionally used for common uses like laminating the identity cards, certificates and even book covers. during this approach, laminating presses facilitates quick and straightforward lamination for industrial and domestic desires.

Fig.2(b) Laminating Press

3) C- frame presses

These presses have a 'C' like form, that is specifically designed to maximise the ground house for the staff so as to maneuver around simply at the geographic point. not like different presses that have multi-processes, the C- frame presses solely embody one press application. Its application includes straightening, drawing and principally includes aggregation work. C- frame presses are available a range of weights. The C- frame presses are obtainable with further options like wheel stands and pressure gauges.

4) Pneumatic presses.

These presses are the most basic hydraulic presses used in industries because they compress the air to create a pressure in order to gain movement. The advantage of pneumatic presses is that the operations are performed fast whereas the disadvantage of this press is that it cannot create extremely high pressures, as other hydraulic presses are able to create. The pneumatic presses are often used in car and aircraft brakes system. The industrial uses of pneumatic presses would include assembling, drawing, punching, etc. A pneumatic press usually requires a full time operator and for the sake of his safety, additional safety accessories such as electrical safety devices are also included.

Fig. 2(c) C Type Vertical Hydraulic Press

5)Power presses

These presses are utilized in massive industries that demand the employment of significant machinery and instrumentality. There are two forms of power presses on the premise of the kind of clutch used. they're full revolution and half revolution clutch. just in case of a full revolution clutch, the clutch can not be noncontinuous till and unless the shaft makes a full revolution. just in case of half revolution, the clutch may be noncontinuous at any time, before or once the complete revolution. Power presses involve lots of danger due to the significant operations related to it. lots of safety measures are taken whereas mistreatment power presses.

Fig.2(d) Power Press

6)Assembly presses

These presses use the acute pressure generated by the pistons and therefore the hydraulic fluids to assemble and maintain the components

Fig.2(e) Assembly press

7) H- frame presses

These presses have a peculiar 'H' form and are capable of handling over one press application.

Fig. 2(f) HType Hydraulic Press

problem statement

Fluid power systems are designed by objective. the first drawback to be resolved in planning the system is transposing the specified performance of the system into

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system hydraulic pressure. Stroke Length two hundred millimeter (W. P. 200 bar) Hydraulic Cylinder Dia 200 X 80 X 200 mm. **DESIGN, MANUFACTURING, & SUPPLY OF 20 TON HYD POWER PRESS MACHINE WITH PLC PROGRAMING SUITABLE FOR PIPE FLARING UP TO DIA 100 mm X 02 mm THK.**

OBJECTIVES

Major Objectives

- Design and analysis of horizontal hydraulic press machine.
- To reduce labour time
- To ensure safety of workers

Minor Objectives

- To reduce the cost of labour involved in assembling and dismantling components.
- Easy to maintain
- Enhanced service life

III. DESIGN METHODOLOGY

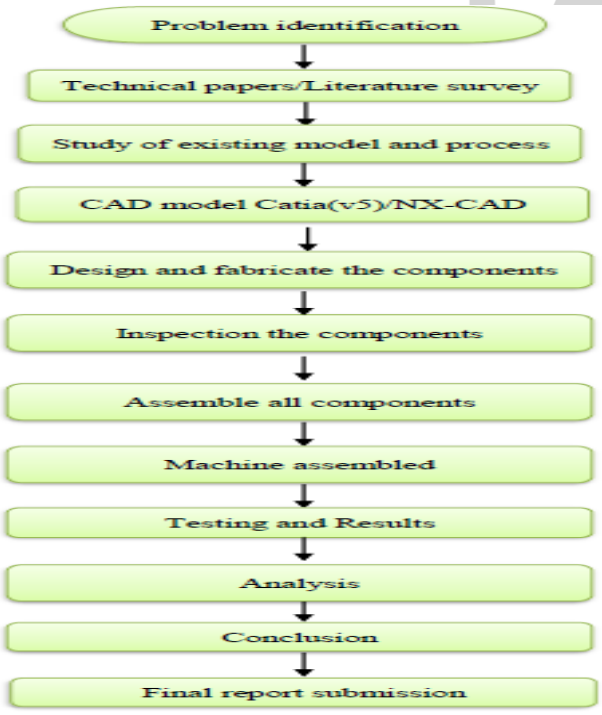
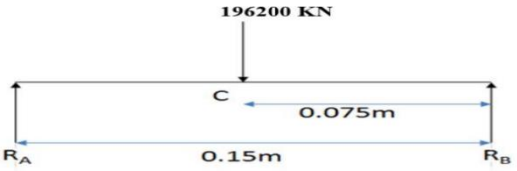


Fig.3 Flow chart of methodology

In this horizontal hydraulic press manufacturing design methodology, we are identifying the problem after that survey done. While completed the survey we are studied the existing method and processes for the hydraulic press then proceeding to the NX-CAD model design completed. The components fabricated and start to the manufacturing completed after this we are inspect the components. We are assembled all components and completed the assemblage of the machine and test thee machine for the results after getting results we are analysing the machine. Further we are concluding the machine this methodology we are used while preparing the horizontal hydraulic press.

Design Calculations



Force = 20000Kg x 9.81 m/s^2

I section attached with main piston of hydraulic

$\sum Fy = 0$

$RA + RB = 196200$ KN

$\sum Fy = 0$

$RA + RB = 196200$ KN

$\sum MA = 0$

196200X0.075-RBX0.15=0

$RA = RB = 98100$ KN

Shear Force Calculation

$SFAL = 0$ KN

$SFAR = 98100$ KN

$SFCL = 98100$ KN

$SFCR = 98100 - 196200$

$= -98100$ KN

$SFBL = -98100$KN

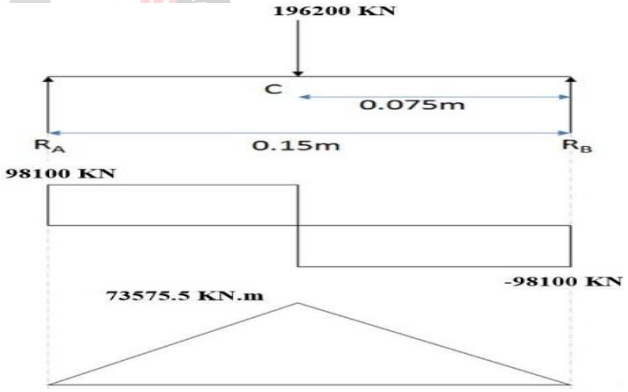
$SFBR = 0$ KN

Bending Moment Calculations

$BMA = 0 = BMB$

$BMC = 98100X0.075$

$= 7357.5KN.m$



$Y = \frac{150}{2} = 75$ mm

$I = \frac{BD^3}{12} - 2X\frac{bd^3}{12}$

$= \frac{110x150^3}{12} - 2x\frac{37.5\ x100^3}{12}$

$= 24687500mm^4$

$\sigma = \frac{M}{I}xY$

$\sigma = 223.51\ N/mm^2$

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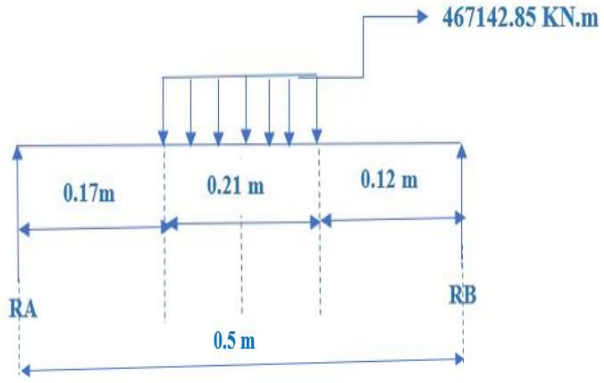
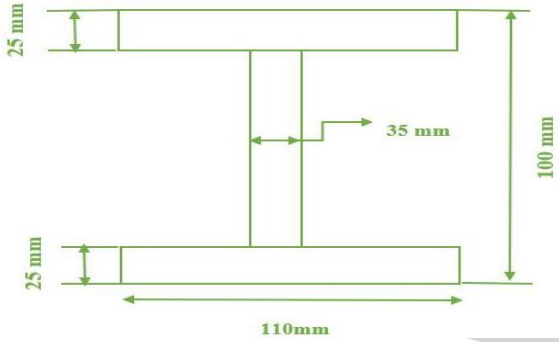




Case 2

Vertical member of attached support 2 members

Load $= \frac{196200}{2} = 98100\text{KN}$

Load intensity $= \frac{98100}{0.21} = 467142.85\ \text{KN.m}$

$\sum FY = 0$

$RA + RB = 98100\ KN$

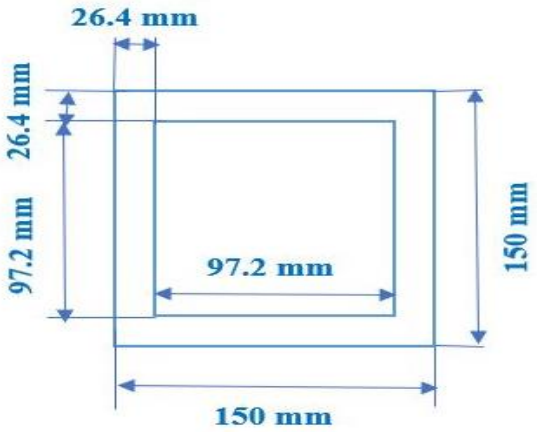
$\sum MA = 0$

$98100 \times 0.275 - RB \times 0.5 = 0$

$RB = 53955KN$

$RA = 98100 - 53955$

$RA = 44145\ KN$



Shear force calculation

$SFAL = 0$

$SFAR = 44145\ KN$

$SFCL = 44145\ KN$

$SFCR = 44145\ KN$

$SFDL = 44145 - 98100$

$SFDL = -53955\ KN$

$SFDR = -53955KN$

$SFBL = -53955\ KN$

$SFBR = 0\ KN$

Point of zero shear

$\frac{44145}{x} - \frac{53955}{0.21 - x}$

$x = 0.0945\ m$

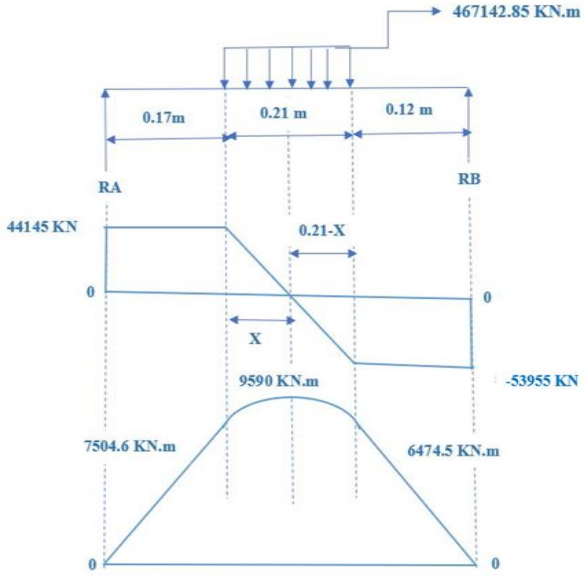
Bending moment calculations

BMA=BMB=0 KN.m

$BMC = 44145 \times 0.17$

$BMC = 7504.65KN.m$

$BMD = 53955 \times 0.12$



$BMD = 6474.6\ KNm$

$BMX = (53955 \times 0.2355) - \left(467142.85 \times 0.1155 \times \frac{0.1155}{2}\right)$

$BMD = 9590\ KN.m$

$Y = \frac{150}{2} = 75\ mm$

$I = \frac{BD^3}{12} - \frac{bd^3}{12}$

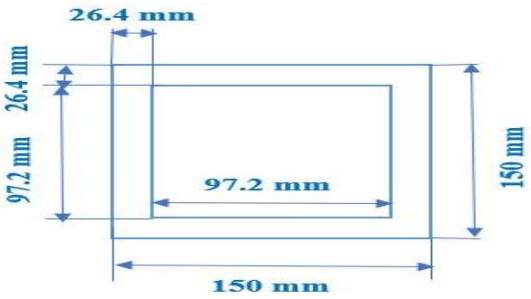
$I = \frac{150 \times 150^3}{12} - \frac{97.2 \times 97.2^3}{12}$

$I = 34749026.61\ mm^4$

$\sigma = \frac{M}{I} \times Y$

$\sigma = 206.97\ N/mm^2$

Case 3



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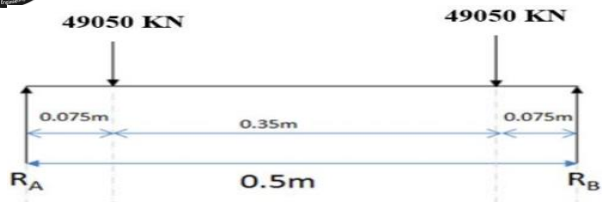


Vertical member attached to cylinder

$$Load = \frac{196200}{4} = 49050\ KN$$

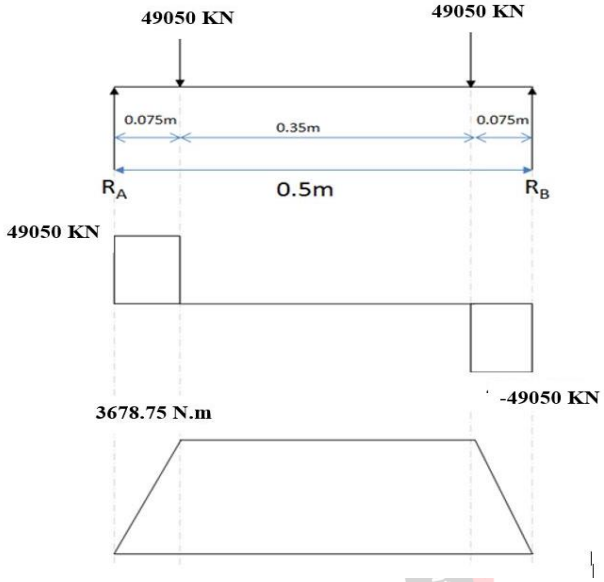
$$\sum FY = 0$$

$$RA + RB = 98100\ KN$$

$$\Sigma MA = 0$$

$$49050 \times 0.075 + 49050 \times 0.425 - RB \times 0.5 = 0$$

$$RB = RA = 49050\ KN$$



Shear force

$$SFAL = 0\ KN$$

$$SFAR = 49050\ KN$$

$$SFCL = 49050\ KN$$

$$SFCR = 0\ KN$$

$$SFDL = 0\ KN$$

$$SFDR = -49050\ KN$$

$$SFBL = -49050\ KN$$

$$SFBR = 0\ KN$$

Bending moment calculation

$$BMA = BMB = 0\ KN.m$$

$$BMC = 49050 \times 0.075 = 3678.75\ KN.m$$

$$BMD = 49050 \times 0.075 = 3678.75\ KN.m$$

$$Y = \frac{150}{2} = 75\ mm$$

$$I = \frac{BD^3}{12} - \frac{bd^3}{12}$$

$$I = \frac{150 \times 150^3}{12} - \frac{97.2 \times 97.2^3}{12}$$

$$I = 34749026.64\ mm^4$$

$$\sigma = \frac{M}{I} \times Y$$

$$\sigma = 79.4\ N/mm^2$$

Design of cylinder body

Capacity of force =196200 N

Hydraulic Press is 200 bar=$20N/mm^2$

$$P = \frac{F}{A}$$

Where,

P=pressure N/mm^2

F=Force in N

A=Area in mm^2

Therefore ,

$$20 = 196200 \times \left(\frac{\pi}{4} \times D_i^2\right)$$

$$D_i = 111.76\text{mm}$$

We are select the standard diameter 100 m

Hydraulic Power Pack Calculations

Maximum force = 20 ton

Stroke length = 200mm

Cylinder 150 × 100mm

Ram speed

Fast approach = $6\ m/min$

$$Pressing\ speed = 0.9\ m/min$$

$$Retun\ speed = 12\ m/min$$

$$Working\ pressure = 163\ kg/cm^2$$

$$Q_{fast} = Area \times Velocity$$

$$Q_{fast} = 0.0176 \times 6 = 102.00LPM$$

$$Q_{Pressing} = Area \times Velocity$$

$$Q_{Pressing} = 0.01767 \times 0.9 = 15.90LPM$$

$$Q_{Return} = Area \times Velocity$$

$$Q_{Return} = 0.0078539 \times 12 = 94.24\ LPM$$

Machine power selection is also depends on machine operations and sequence and cylinder mounting position.oil pressure $35kg/cm^2$ but pessing speed slow with full load.we used oil pressure 163 kg/cm^2

$$P = \frac{(LPM \times Working\ Pressure)}{(612 \times Efficiency)}$$

$$P_{Pressing} = \frac{15.90 \times 163}{612 \times 0.80}$$

$$P_{Pressing} = 5.29\ KW$$

$$P_{Return} = \frac{94.24 \times 35}{612 \times 0.80}$$

$$P_{Return} = 6.73\ KW$$

Finally we select the standard motor of 7.5 HP. And we select the pump model PVR-50150-FF-13-70 (Yuken Make).

Oil tank capacity is 300 liter given by the industry.

Frame Design

The structural style of the frame depends on the pressing force this determines the specified rigidity, the size of dies influencing the size of the tool space, work space accessibility that determines on the form of the press frame, the degree of steerage preciseness

1design Procedure For Frame

The frame is that the base machine component in mechanical press. it's designed by the subsequent steps.

1. Specification of operate

The main operate of the frame is to resist the force developed by the hydraulicccylinder. Frame is employed mounting and housing the press accessories like hydraulic cylinder, die block, ejection system etc.

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2. Determination Of Forces

The weight of the cylinder and the cylinder load is the major forces acting on the frame structure.

Press capacity P = 196200 N

3. Selection of materials

The mild steel (IS2062) is selected for the frame because it is soft and ductile they can be easily welded and machined.

IV. DETERMINATION OF DIMENSIONS

The frame consists of the many variety of plates fictitious to support the structure. The dimensions of the plates are listed below

Frame Plate Dimensions

Theroritical Design Of Frame

Assumptions

The material of the beam is perfectly homogeneous. And isotropic (That is, it is same material throughout and of equal elastic properties in all the direction).

The material of beam obeys Hook's law.

The Young's modulus E is same in tension and compression.

Specification of machine frame

$Press\ capacity\ =\ 20\ tonnes$

$Tensile\ strength\ =\ 410 \times 10^6\ N/mm^2$

$Density\ =\ 7850\ kg/m^3$

$Young's\ Modulus\ =\ 2.1 \times 10^5\ \ N/mm^2$

$Poisons\ Ratio\ =\ 0.3.$

$Factor\ of\ Safety\ =\ 4.0$

$Max\ Allowable\ Stress\ \sigma\ = 410/4$

$\sigma\ =\ 102\ \ N/mm^2$

$Formulas\ and\ calculations$

$The\ frame\ subjected\ to\ direct\ tensile\ stress\ and\ bending\ stresses$

$total\ tensile\ bending\ \sigma_{total} + \sigma_{bending} = \sigma_{tensile}\ N/mm^2$

$$\sigma = \frac{P}{A} + \frac{M_b Y}{I}\ N/mm^2$$

$Where,$

s = Permissible stress in N/mm^2

P = Applied load/ Force in N

A = Area of the plate section in mm^2

b M = Bending moment in N. mm

x = Perpendicular Distance in mm

y = Distance from the neutral surface to the extreme fiber in mm

I = Moment of inertia in mm^4

P =20 tonnes

$Applied\ load\ P =\ 20000 \times 9.81N$

P = 196200 N

Breadth b = 325mm

Thickness d= 50 mm

$Area = b \times d = 325 \times 50 = 16250mm^2$

Table 1 frame design dimensions.

$$\sigma_{tensile} = \frac{196200}{16250} = 12.0738\ \ N/mm^2$$

RM Size In mm.				Finish Size In mm.		
Thk.	Width.	Length.		Thk.	Width.	Length.
50	330	540		50	325	535
50	330	540		50	325	630
50	230	330		50	220	325
30	225	585		30	220	580
30	350	355		30	345	350

x= 1155 in mm

$$\sigma_{bending} = \frac{113305500 \times 30}{143033854.2}$$

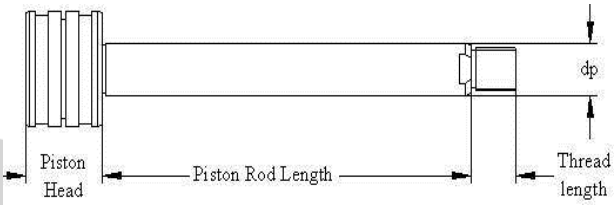
$\sigma_{bending} = 79.23\ N/mm^2$

$\sigma_{total} = 91.23\ N/mm^2$

$Max\ Allowable\ Stress\ \sigma\ = 410/4\ =\ 102\ \ N/mm^2$

Piston rod design

Material: Steel, EN–8



Assumptions made

1) Bar is straight and homogenous material.

2) Rod is continuous and no abrupt changes occur.

3) Line of force acting coincides with the axis of ram/rod.

For pressure of 200 bar

$F = A \times p$

$F = \left(\frac{\pi}{4} \times 150^2\right) \times 20 = 157079.6N$

Force = Area x stress

$F = A \times \sigma_t$

$For\ EN - 8\ material\ tensile\ strength\ is\ 541.985\ \ N/mm^2$

$For\ FOS\ of\ 4, then$

$$\sigma_t = \frac{541.985}{4} = 135.5\ \ N/mm^2$$

$$157079.6 = \left(\frac{\pi}{4} \times d_p^2 \times 135.5\right)$$

$= 38.41mm\ it\ is\ minimum$

We selected the standard $d_p = 60\ mm$

PLC Control

A programmable Logic controller may be a controller that controls the varied output devices as per the given inputs supported the logic which has been programmed into PLC by the user. Thus, it's managementler which might control variety of output devices as per any given logic. This logic that is employed to manage the output devices, will be modified by the user by programming. That is, the logic is

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programmable. Thus, the name came as "Programmable Logic Controllers". several makers refers thereto as Programmable Controllers or computer. however the term PLC is found to be additional acceptable, as, it avoids the confusion with pc (PC).

This can be shown by schematic diagram as given below in fig.

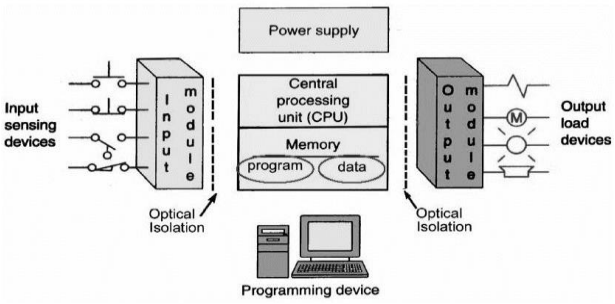

Fig.4(a) Block Diagram of PLC

PLC

Make - Siemens S7-1200.

Digital Input-16. Nos.

Digital Output -06. Nos.

Presses are one of the most commonly used machine tools in industry for the forming of different materials. In the past, for the pressing tasks in industry, mechanical presses were more frequently used, but nowadays hydraulic presses take precedence due to their numerous advantages.

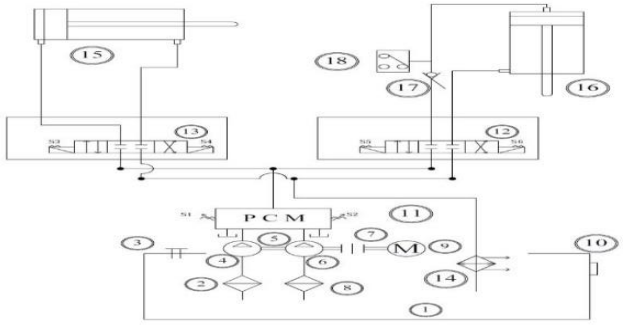

Fig. 4(b) Ladder Diagram for HHPM

The system computer code was completed in four steps. Step one is to edit the ladder diagram. Step two is to input SFC management directions. Step three is to convert the program. Step four is to transfers the program to the mainframe. Finally, the computer code is tested for input standing, program execution, and output standing. Figure is that the program correct interface in GX developer.

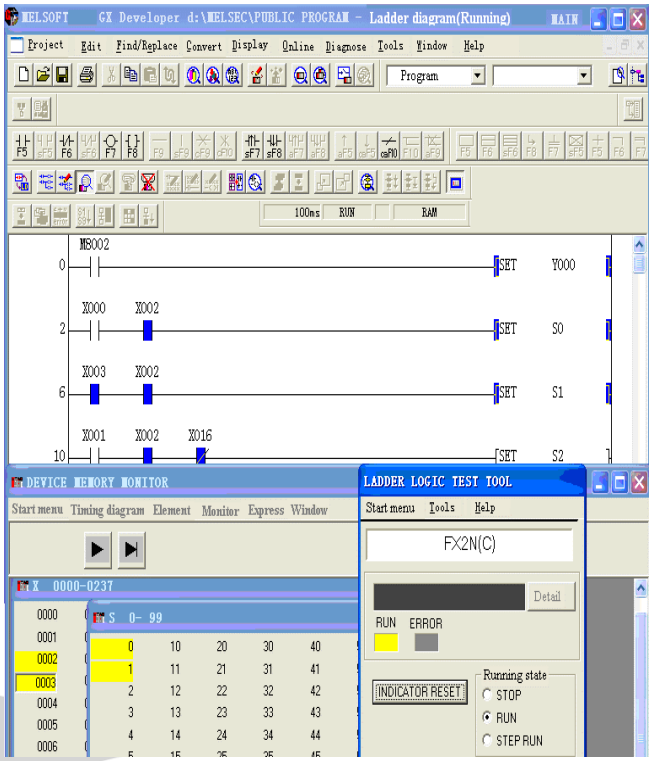

Fig.4(c)Program Debug Interface In GX Developer

Experiment Methodology And Working

V. EXPERIMENT METHODOLOGY

Experiment Methodology

The methodology used for the preparation of the horizontal press for compression and flaring operation is,

Study Of Previous Machining method

In this study i used to be study the various forms of the presses like c-type hydraulic press etc. additionally studied the operating of that machining method.

Material Used For Machining

Material used for experimentation of various press studied additionally material used for producing elements and for finishing the experiment material of the workpieces also studied.

Study Of style method

For the preparation of the press, studied the assorted design method used from the researchers and techniques used for the preparation of the planning.

Study Of Experimentation

In this study I learnt the assorted experimentation techniques used from researchers for the hydraulic presses. Most of the peoples studied the vertical hydraulic presses for the various operations. The experimentation done on this machining.

study of research and results

For the hydraulic presses largely analysis done on the

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Ansys however they solely analyse the bottom structure in most cases and in another cases, researchers are used the shaping method on vertical press. Some Ansys but they only analyse the base structure in most cases and in another cases, researchers are used the forging process on vertical hydraulic press. Some results are compared in the Ansys software with theoretical one.

These things I studied for the experiment methodology and after that I'm preparing my machine for squeezing and flaring operations which is horizontal hydraulic press and control by PLC controller.

Working of Horizontal Hydraulic Press

The hydraulic press consists of the horizontal cylinder and the vertical cylinder and one horizontal sliding unit in that the pipe is putting in horizontal unit and vertical unit to avoid the misalignment of the pipe there is bush. Bush is made up of the gun metal and at the left-hand side stopper is mounted. When the pressure applied through the vertical cylinder the cylinder pushes the die and die holder is consisting at the base plate the pipe is hold in it. When this pressure is applied on pipe from upper side and horizontal sliding unit they obtained the squeezing and when the pressure is increases the pipe get flare and the whole system is controlled by the PLC programming and HMI (Human Machine Interface) if any error occurs it display on this screen. The folder shows the actual dimensions of the machine. The machine is operator use the operator unit for the setting of the programming and controlling the machine. The power supply of this machine AC power is use. The power pack unit is fully air-cooled unit. The hydraulic press ladder diagrams the programmer set the program for squeezing and flaring operations and we got the accurate result of pipe. For the large production Zelio PLC system is used. With the help of the Zelio soft software programmer modify the PLC program and we got the large number of productions of the pipe. After this we are work on the dynamic effect on horizontal hydraulic press for vibrational test purpose. The experiment used the machine data acquisition and PLC interface and power pack this system LMS SCADA mobile the data acquisition used to measure the acceleration. Also, the FFT Analyser and STFT is used for the acceleration signal and STFT test effect of amplitude, frequency and time measured. This way machine worked.

Advantages

- Two operations worn out one machine
- Instrumentation handling is straightforward.
- The press machine less large compare to a different machine.
- The simplicity and simple to repair style make it very low-cost
- Time intense
- Maintainace is a smaller amount
- additional accuracy

Safety Measures And Benefits Of The Hydraulic Press

- Safety Measures As of nowadays, hydraulic
- presses are obtainable in each the classes, i.e., automatic and operated by hand.
- Benefits of the mechanical press not like their mechanical counterparts, hydraulic presses will compress any material to a full extent. Also, hydraulic presses take solely half the area that the mechanical ones take as a result of they need the flexibility to compress an outsized pressure in a very cylinder having a less diameter.
- The perform of The mechanism Hydraulic systems convert electricity into hydraulic energy, that successively is reworked into energy with the help of the individual hydraulic cylinders within the press. The hydraulic fluid within the cylinders actuates the press slide as follows:
- Forces are generated through the action of the hydraulic fluid.
- Displacements are achieved by the provision of hydraulic fluid.
- Press (slide) speed is proportional to volumetrical flow rates.
- Forward and reverse motions are controlled by the direction of fluid flow.cylinders among the press. The hydraulic fluid among the cylinders actuates the press slide as follows:
- Forces are generated through the action of the hydraulic fluid.
- Displacements are achieved by the availability of hydraulic fluid.
- Press (slide) speed is proportional to volumetric flow rates.
- Forward and reverse motions are controlled by the direction of fluid flow.

VI. RESULTS AND DISCUSSION

In this research we are done the squeezing and flaring of pipe as shown in the figure. Now, we are squeeze and flare the pipe up to Dia 100x02 mm thickness.

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Fig.5(a) Flaring pipe

Fig.5(b) flaring and squeezing pipe

Fig.5(c) flaring and squeezing of outlet pipe

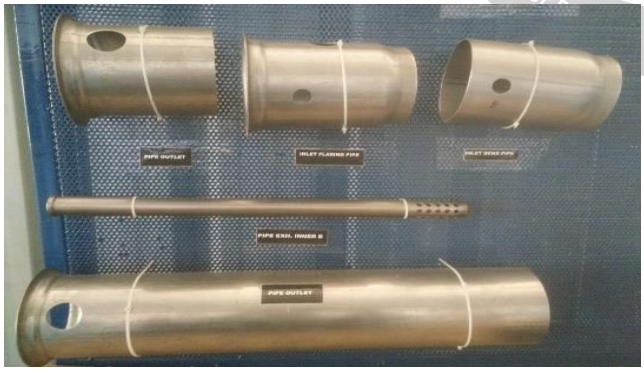

Fig.5(d) squeezing and flaring pipes.

Table 2 Pressure applied and time require for operations

Pressure Applied(bar)	Squeezing Time(s)	Flaring Time(s)
100	15.23	22.41
125	12.54	20.58
140	10.45	17.36
163	6.39	9.25
180	3.51	5.01
200	2.0	3.11

From this above table we are concluded that the pressure applied on the horizontal machining process for squeezing and flaring of pipe it takes less time than the vertical hydraulic press. The accuracy of this pipe is more than vertical squeezing and flaring of pipe. Also if production increases this pressure takes same time for the pipe squeezing and flaring. This is the significance of this machine.

Here, in this research we are considering the linguistic criteria for the triangular fuzzy number for comparing the which machine is more suitable for squeezing, flaring operation and for that we considered the ten criteria's from that criteria. MOORA method is very easy and simple for implementation than other like MODM, GRA methods. MOORA method is very stable method for decision making problems. We got the result the Horizontal hydraulic machine is most suitable machine for the squeezing and flaring operations than vertical hydraulic press machine. And we also got rank of this machine

Table 3 Best solution with Ranking

Best Solution	Hydraulic Press	Ranking	Percentage
0.419676	Horizontal Hydraulic Press	1	52%
0.390811	Vertical Hydraulic Press	2	48%

we got the two BNP ratio values for the vertical and horizontal hydraulic press using the criteria for MOORA method we ranked that values and concluded the best solution given in the graphical (Pie Chart) as well as above tabular form with the ranking and percentage.

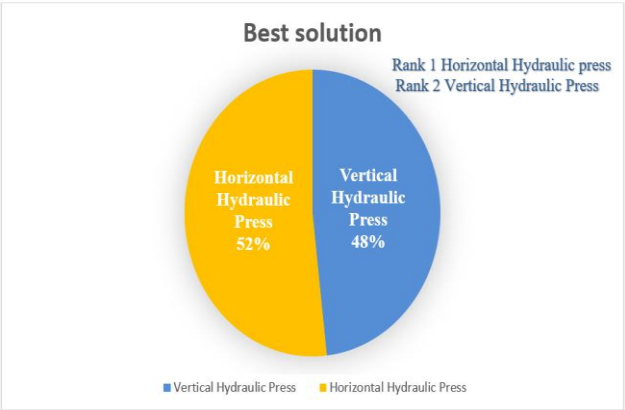

Fig.6 Best solution with Ranking

From the PLC programming is very easy programming using the ladder diagram that ladder diagram helps to programmer for programming and programmer run the program for squeezing and flaring process.in this research program is done in the two steps first step pipe is squeeze and further step the pipe is flare. From this programming system the labour is decreases and the production rate is increase. The pipe production rapidly increased.

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From the vibrational test we studied dynamic characteristics of motion processes through experimental test.and the interaction between system dynamic and tribological effects were presented.

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VIII. CONCLUSION

20-ton hydraulic press was designed. It is manufacture and calibrate. The machine tested to ensure conformability to design objectives and serviceability. The machine was found to be satisfactory at a check load of ten kN. Further testing to the design load be carried out. And this machine combines the flaring, squeezing operation. Which reduces the cost of separate operation. Thus, here a hydraulic press will be useful for mass production of pipe. This may increase the productivity and increases the accuracy of the production. Even the hydraulic press can be completely automize. And using MOORA optimization technique we concluded that the horizontal machine is best than vertical machine.

our prime concern was the event of demonstrating however industrial parameters automation may be created potential employing a programmable logic controller. Here, We can simply control any load in our system to get better system operation, system reliability and efficiency. And PLC mainly work on the Ladder diagram and for more production the Zelio Soft and programmable software in FBD language allowed us to develop and adjust the control system quickly. And help to increasing the production rate. Also the dynamic characteristics studied for horizontal hydraulic press.

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