

# Study on Hot Molding Press Machine

Mr. Amit A.Guha<sup>1</sup>, Mr. Ramakant Y. Bhosale<sup>2</sup>, Mr. Ammar M. Jhoja<sup>3</sup>, Mr. Sarthak Waghmare<sup>4</sup>,  
Ms. Priyanka S.Bankar<sup>5</sup>

<sup>1,2,3,4</sup> Dept of Mechanical Engineering

<sup>5</sup>Lecturer, Dept of Mechanical Engineering

<sup>1,2,3,4,5</sup> JSPM'S RSCOE IInd Shift Polytechnic, Tathawade, Pune-33

**Abstract-** *The point of this paper is to coordinate the mechanical framework with water powered framework to encourage the simplicity of activity to make the littler part in a large scale manufacturing. In the present condition, time constraint in crucial part for completion of any production process. Thus with the use of atomization, the production time can be reduced as well as higher degree of accuracy can be achieved as the human effort will be mitigate thus an attempt has been made to provide the smooth and rapid functioning of the press work with the help of hydraulic system.*

*The objective of designing the machine are based on developing an affordable and portable machine with hot press as well as cold molding facility that can accommodate a specimen up to 1-inch diameter. Process specification include a pressure of 20MPa, heating temperature up to 150°C along with an optional cooling facility. The machine model is subdivided into 3 domains namely mould block with heating & cooling arrangement, pressurizing setup, stand & peripheral assembly.*

**Keywords-** Specimen, Temperature, compression molding, hydraulic press, pipe

## I. INTRODUCTION

The field of Material science & metallurgy contributes heavily to bring the objectives & goals of a project to reality. Gauging the large spectrum of these sciences, there lies a huge scope of discovering and re-engineering new as well as existent materials. Depending on the aim of research, every experiment defines its own critical component of study. In a research, specimen preparation has a significant contribution in material and process data development. Along with Metallurgical research, sampling may be required for different purposes, such as prequalification, acceptance of consignments, in-process control, or for obtaining a retention sample. A sample are the specimen characteristics, Specimen mounting is a technique used to retain them throughout the testing & examination phases. Molding being a key mounting choice for metallurgical samples, this paper discusses the compression mounting technique and explores the design of a hot press compression molding machine.

## 1.1 PROBLEM IDENTIFICATION-

It needs to gather data of several types: fixed data, opinion surveys, experimental data, & personal observations. The purpose of this project is to modify the design of existing car jack in terms of its functionality & also human factors considerations. General thought of the undertaking is to limit the human exertion while working the jack.

## 1.2 OBJECTIVES –

1. To provide easily mounting of specimen in testing of metal.
2. To make this machine which operate manually for small mouldings.
3. To provide this machine at lowest cost.
4. To provide higher surface finish of the specimen.

## II. LITERATURE REVIEW

**2.1 Johannes Gutenberg-** The press machine Gutenberg a German invented in 1400 was modified one from a wooden screw type press machine for squeezing olive oil and grapes. This was exactly the root of the screw presses and all press (punching, stamping) machines onto sheet with the screw. A hand shape is a basic form utilized for low amount work. It is used in the injection molding & the printing industry. It is made by a hand infusion shaping machine. It is a simple machine which contains a barrel, handle, nozzle, mould & heaters.

**2.2 Joseph Bramah-** A hydraulic press is a mechanical machine used for lifting or compressing large items. The power is produced using hydrodynamics to build the intensity of a standard mechanical level.

This kind of machine is ordinarily found in an assembling domain. Pressure driven frameworks utilize an incompressible liquid, for example, oil or water, to transmit powers starting with one area then onto the next inside the liquid.

**2.3 William Joseph**–The hydraulic jack is a device used for lifting heavy loads by the application of much smaller force. It depends on Pascal's law, which expresses that force of weight is transmitted similarly every which way through a mass of liquid very still.

**2.4 Isaac Bamgboye And Morakinyo T.A-** An improved oil screw press has been designed and constructed having 98.6 % efficiency & a capacity of 0.86 tons/ day. scraped spot pace of screw-shafts has been diminished from 63.3% to 12.6% by utilizing high carbon steel material rather than low-carbon steel. subside beerens in 2007 gives a thought regarding press machine and the outcome is stretched out because of progress in the plate structure in the plan of the machine.

**2.5 Dick Morley-** Temperature controller will send signal in the form of voltage ( 0-10v DC ). If RTD detect 0 degree temperature, it will send 0v DC & if maximum temperature detected, it will send 10v DC to PLC. Temperature controller is directly connected to the PLC will read voltage.

### III. METHODOLOGY

The steps in the design process proposed As follows:

1. Problem identification
2. Analysis
3. Material Selection
4. Part Design
5. Machining
6. Joining (Welding, Mechanical Fasteners, Epoxy, etc)
7. Surface Finishing
8. Testing

### IV. WORKING PRINCIPLE



Fig. 1 Actual model of Hot Molding Press Machine

The specimen, to be tested, is placed on the movable die of press. Which is surrounded by hollow pipe and Bakelite powder is inserted inside the hollow pipe. Bakelite powder is inserted on full length of pipe which is approximately 4 cm. The heater is placed outside the hollow pipe close to the surface of cylindrical pipe. Now the hydraulic jack is used to compress the Bakelite powder with movable diepushing upwards. The powder get compress by this force. When die reaches to its uppermost position heater is switch on. When the heater gets to 120- 150 degree Celsius heater is switch off by releasing the pressure of jack movable die with the help of compression spring lowered down. Heater is removed from pipe and with the help of tongue hollow pipe is removed from the die. The pressure driven jack is a gadget utilized for lifting substantial loads by the use of a lot littler power. It depends on Pascal's law, which expresses that force of weight transmitted similarly every which way through a mass of liquid very still.

### V. COMPONENT

Sr. No.	Name of Component	Quantity
1.	Support Structure	1
2.	Base Plate	1
3.	Die Cavity	1
4.	Column	2
5.	Spring	2
6.	Hydraulic Jack	1
7.	Temperature Sensor	1
8.	Heater	1

### VI. CONCLUSION

From the trial taken of fabricated mechanism we come to conclusion that the hydraulic operated press works effectively on previous drawback and with using this machine quality of surface finish can be improved with reduction in time. This machine we have fabricated is available at very affordable cost.

The machine structure is prone to high stress values; hence it is wise to select a ductile material & preferably from the low carbon steel family such as Mild Steel. Considering the method of compaction, hydraulic jack is a logical choice. The hydraulic jack is a compact, easily operational and reliable unit with no auxiliary and peripheral requirements as in case of pneumatic and other mechanical methods.

Moreover it works on following factors –

- 1) Productivity of mounting is increases.
- 2) Problem of strength is solved by the mechanism.

- 3) Empty space produced due to uneven compression is minimizing by the mechanism.

## VII. ACKNOWLEDGEMENT

We would like to express our deepest gratitude to our guide, Ms. Priyanka S. Bankar for giving us the opportunity to work on this project. We would like to thank her for the valuable guidance, keen interest, and encouragement during various stages of the project. Her suggestions have immensely contributed to the evolution of our ideas on this subject of hot molding press machine & documentation of the process. Furthermore, we would like to thank all the members & staff of the Mechanical Engineering Department of Rajarshi Shahu College of Engineering who cooperated and helped us learn & made this project possible.

## REFERENCES

- [1] Design and fabrication of hydraulically operated specimen mounting press, Ananta Mahale, Madhuri Pethkar, Ankita Kulkarni, Gaurav Galphade, Sarika Chaudhary, Prof. Dinesh Ugle, International Journal of Interdisciplinary innovative research and development (IJIIRD), Vol01 Issue02, April 2017,pg 133-137, ISSN 2456-236X
- [2] Plastic product Material & Process Selection Handbook, Dominick Rosato, Donald Rosato, Matthew Rosato, Vol01 Issue01, 4<sup>th</sup> August 2004, ISBN 9781856174312
- [3] Johannes Gutenberg : The Man & His Invention, German Kapr, edition 03, 1996, pg 100-138, ISBN 9781859281147
- [4] Joseph Bramah: A Century of Invention, Iah McNell, Vol01 Issue01, March 1968, ISBN 9780715342114
- [5] TIDA-0095 Temperature Transmitter for 2-Wire, 4 to 20-mA Current Loop Systems, TIDU182 Application Report