

# **Die Modification of Power Pressing Machine for Productivity Improvement**

**M. Hariprasath<sup>1</sup>, M. Muralisurya<sup>1</sup>, T. Yogesh kumar<sup>1</sup>, Mr.T. Rajesh<sup>2</sup>**

<sup>1</sup> UG Student, Final Year Mechanical Engineering, Mangayarkarasi College of Engineering, Madurai

<sup>2</sup> Assistant Professor, Mechanical Engineering, Mangayarkarasi College of Engineering, Madurai

Keywords: Boot caps, clamps, washers, Mild steel, Sheet metal

## **ABSTRACT**

Every industry Profit depends upon the production rate. In that industry they manufacture the U-Clamps, Hinge Clamps, Boot caps, Washers, they produces 1400 pieces of boot caps by using Normal single piece die. We planned to improve the overall productivity of that industry through the reduction of production time with the help of modifying die. It can produce more products at the same production time. The die will be modified, the production of boot caps also increases, and it results 1400 pieces into 2300 pieces per shift.

## **INTRODUCTION**

The sheet metal industry involves working with thin metal sheets to create various products through processes like cutting, bending, and shaping. Common applications include automotive parts, HVAC systems,

and roofing materials. The sheet metal industry encompasses the fabrication and manipulation of thin metal sheets, typically less than 6mm thick. This sector involves processes like cutting, bending, and assembling sheets to manufacture diverse products ranging from household items to industrial components. The sheet metal industry is fundamental to many sectors. In construction, it provides materials for roofing, siding, and structural components. In manufacturing, it produces essential components for various industries, including automotive and aerospace. The versatility of sheet metal allows for the creation of custom and standardized products, making it a cornerstone in modern production and infrastructure development. The sheet metal industry is a crucial sector involved in the fabrication and manipulation of thin metal sheets for diverse applications. This encompasses manufacturing components for

automotive, aerospace, construction, electronics, and more. Common processes include cutting, stamping, bending, and assembling, contributing to the production of a wide array of products ranging from automotive parts to household appliances. The industry's versatility and importance in various sectors make it a key player in manufacturing and construction. The outlook for the sheet metal industry remains positive, driven by increasing demand from sectors like automotive, construction, and electronics. Advancements in technology, such as automation and precision machining, continue to enhance efficiency and product quality. Sustainability concerns are also influencing the industry, with a focus on lightweight materials and eco-friendly manufacturing processes. Despite challenges, the sheet metal industry is poised for growth, aligning with the evolving needs of modern manufacturing across different sectors.

## **INTRODUCTION TO POWER PRESS**

A power press is a cold metal stamping machine designed to shape, cut, form, and punch metal. The different types of power presses are fast and efficient mass production pieces of equipment used for the manufacturing of metal parts and

components. The two forms of power presses are hydraulically and mechanically powered. The operating principles for power presses are mechanical, hydraulic, and servo motor. A mechanical power press changes circular motion into linear motion using a clutch, flywheel, crankshaft, and fixed and moving plungers. Servo power presses are powered by a servo motor that drives the eccentric gear that moves the slider of the press. With all three forms of presses, the shape of the workpiece is determined by the meeting of the upper and lower halves of a die as they are pressed together under the force of the press. Power press machines work on the principle of an electric motor. The rotating flywheel is joined to the crankshaft by a clutch. Upper and lower dies are joined to the ram, one workpiece on the bed is fed into the machine, and the process is initiated. Previously, the job of giving shape to metal sheets was done manually with great force and effort. The invention of power press machinery changed the process with the addition of mechanical force and accuracy. Construction of Mechanical Power Press: The major components for power transmission on a mechanical power press are the clutch, crankshaft, flywheel, moving ram, and stationary ram. The slide is joined to a crankshaft with connecting rods. The

crankshaft is coupled with the flywheel, which is constantly rotating while the motor is running. A clutch connects the spinning flywheel with the crankshaft. If the machine has insufficient flywheel energy, it will come to a halt and won't be able to finish the operation. The same applies to the remaining cycle period. The drawing process takes a significant portion of the cycle. Since time is adequate, excess energy can be tapped from the motor and lacking energy provided by the flywheel. These brakes have a power-off switch with normal strong braking to bring all movements to rest quickly. Normally, two parameters are configured by controlling mechanisms: the power of the stroke and the length of stroke of the ram. Nowadays, computer-controlled presses are used where control is guided by a microprocessor. The die used in press working might have more than one component, which is why the name "die assembly" is being used in place of the die. Manually fed presses are cycled by either foot or by two hand controls or trips. With foot control, the press is triggered by pressing down on a foot pedal or switch. This free hand movement puts operators using foot control at a higher risk of getting an injury while operating.



**Power press machine**

About twice as many press injuries come from foot-controlled presses. With two hand controls or trips, when a workpiece is positioned on the press, both hands should be removed from the operation point to depress the buttons.



increased from 1400 to 2300 per day therefore the increasing production rate is 900 per day.

## **CONCLUSION**

Using modified Die, the productivity can be increased much beyond the stated results. The AUTOCAD software play a very important role in this project for 2D diagram. Several techniques being explored to find the best method to improve production. After completing the major project on Die modification in oil seal industry.

- The overall production of boot cap is improved and the cost of electricity is very low. So, electricity is saved
- When we reduce the production time, time is saving more than the old die
- This new modified die can produce the more products at the same production time

## **REFERENCE**

[1] Mr.Amit ,D.Madake, Dr.Vinayak, R.Naik, Mr.Swapnil, S.Kulkarni, "Development of a Sheet Metal Component with a Forming Die Using CAE Software Tools (Hyper form) For Design Validation and Improvement", International Journal of Modern Engineering Research(IJMER) ,

Volume 3, Issue 3, May-June, 2013 , pp-1787-1791,ISSN: 2249-6645.

[2] K. Kishore Kumar, Dr. A. Srinath, M. Naveen, R.D. pavan kumar, "Design of progressive dies", International Journal of Engineering Research and Applications (IJERA), ISSN: 2248-9622, Volume 2, Issue 3, May-Jun 2012, pp.2971-2973.

[3] Gasper Gantar, Andrej Glojek, Mitja Mori-BlazNardin, MihaelSekavcnik, "Resource Efficient Injection Moulding with Low Environmental Impacts", Strojnicki Vestnik-Journal of Mechanical Engineering, 59(2013)3,copy right 2013,Journal of Mechanical Engineering, All rights reserved.DOI:10.5545/sv-jme.2012.661 pp:193-200.

[4] Sachin Ramdas Jadhav, Sunil Hiran More, Swapnil S. Kulkarni," Die Design for Formed Component using inputs from FEA for determining the most suited values for the Design or Process parameter", International Journal of Advanced Engineering Research and Studies E-ISSN2249-8974 /April-June,2014/95-98.

[5] Vishwanath M.C, Dr. Ramni, Sampath Kumar L, "Design of progressive draw tool", International Journal of Scientific and

Research Publications, Volume 3, Issue 8, August 2013 ,1 ISSN 2250-3153.

[6] Prof. T. Z. Quazi, R.S.Shaikh, "An Overview of Clearance Optimization in Sheet Metal Blanking Process", International Journal of Modern Engineering Research (IJMER) Volume 2, Issue.6, Nov-Dec 2012, pp-4547-4558 ISSN: 2249-6645.

[7] Amol Totre, Rahul Nishad , Sagar Bodke, "An Overview Of Factors Affecting In Blanking Processes" International Journal of Emerging Technology and Advanced Engineering, (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 3, Issue 3, March 2013).

[8] Samadhan D. Bhosale, S.C.Shilwant, S.R. Patil , " Quality improvement in manufacturing processes using SQC tools" International Journal of Engineering Research and Applications (IJERA), ISSN: 2248-9622 Vol. 3, Issue 3, May-Jun 2013, pp.832-837.

[9] Jai hindus S. "Design and development of stamping dies for online maintenance" Vol. 9, No. 4, APRIL 2014, ISSN 1819-6608, ARPN Journal of Engineering and Applied Sciences, ©2006-2014, Asian

Research Publishing Network (ARPN), All rights reserved.

[10] Hairulliza Mohamad Judi, Ruzzakiah Jenal and Devendran Genasan "Quality Control Implementation in Manufacturing Companies Motivating Factors and Challenges" ISBN: 978-953-307-236-4, (2011).

[11] Dr. Taylan Altan, "Selection of die materials and surface treatments for increasing die life in hot and warm forging" Paper no 644-FIA Tech Conference, April 2011. [12] Hakim S. Sultan Aljibori, Abdel Magid Hamouda "Finite Element Analysis of Sheet Metal Forming Process" European Journal of Scientific Research. ISSN 1450-216X Vol 33 No.1 (2009), pp.57-69© Euro Journals Publishing, Inc. 2009.

[13] Parikshit K patel, Prof. Vidya Nair, Ashish Patel, "PFMEA(Product failure model effect analysis) of Air duct and Manufacturing process to improve product quality," International Journal of Engineering and technology and Advanced Engineering(ISSN 2250-2459,ISO 9001:2008 Certified Journal, Vol 3, Issue 5, May 2013)