

A Review on: Design and Modification of Washer Die

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Abstract: This research article presents the advanced method design and development of washer making die. Design analysis also done by using auto CAD software. The washer used in automotive engine component is of split or spring lock washer. The Hardness profile variation observed between good and bad spring samples. This result is observed for the stress and the Longitudinal on punch and die the blanking tool the basis of result D₂ material taken for the design is said to be as the best suitable for material for punch and die.

Index Terms: Blanking; D₂; Washer Special; Tool

I. INTRODUCTION

The modification of washer dies, a washer die performs a series of fundamental sheet metal operations at two or more stations during each press stroke in order to develop a workpiece moves through the dies as a strip stock. The work piece on progressive dies travels from one station to another, with separate operations being performed at each station. Usually the work piece is retained in the stroke until it reaches the final station, which cuts off the finished piece the linear travel of the strip stock at each press stroke is called the progression, advance or pitch and is equal to the interaction distance. The unwanted parts of the strip are cut-out as it advances through the die, and one or more tabs are left connected to each partially completed part to carry it through the stations of the die. Sometimes parts are made from individual blanks, neither a part of nor connected to a strip in such cases mechanical fingers or other devices are employed for the station to station movement of the workpiece. The selection of any multi-operation tool, such as progressive die, is justified by the principle that the number of operations achieved with one handling of the stock and produced part is more economical than production by a series of a single operation.

II. CONVENTIONAL METHODS

Conventional ways in typical technique material is The Size, shape & material & Operations to be performed on the component. Selection of the tool such as simple, progressive, compound, combination etc. Selection of proper strip layout considering the rigidity of the die in mind. Necessity of the Tonnage & calculations related tool, such as economy factor, plate thicknesses. Try to build the tool that can be easily modified in future. Shank location should be given at centre of the tool. Tool should be rigid considering its involvement in the type of production such as mass, batch etc. Re-sharpening allowance must be added to punch and die cutting edges. Tool must withstand all the lateral thrust acting on it during operation.

III. METHODOLOGY

Earlier in industrial sector heavy and bulky machines used to washer making. So, authors use pneumatic machine to cut the washer. Available machines having less efficiency compare to high initial cost. Pneumatic machines have low cost as compared to mechanical operated machine. First in industry time required to produce washer is more. By using this machine, we can save time. Sheet metals are widely used for industrial & consumer parts because of its capacity for being bent and formed into complex shapes. Galvanized iron, tin plates, copper, brass, zinc, aluminium etc. metals are mostly used. Sheet metal parts which include automotive, agricultural machinery, and aircraft components as well as consumer equipment. Sheet metal forming processes which are Shearing Bending, Drawing, Squeezing. Above process is useful for specific purpose & according to need of shape of the final product. Materials handling is the movement and storage of materials at the lowest cost through the use of proper methods and equipment. stock material for Blanking operation the shear angle is provided on die member to prevent distortion. The shear angle is provided on punch member for Piercing operation.

IV. LITERATURE SURVEY

The authors Kumbhar Rohit Bhimrao, Mahadev G. Reddy [1] there were many works performed on the design of washer die by different investigators using various mechanism or techniques. Present literature review gives the overview off some researchers work on washer die. This paper work mainly includes the main components of designs of pneumatic operated washer making machine such as: design of aluminium sheet, plastic sheet, tar felt sheet and pneumatic circuit design. Design analysis also done by using AUTO CAD software. Nandish Harti [2] Blanking is a process of producing a flat piece part from sheet metal. In entire process, the entire periphery is cut and the cut piece is called blank. The blanking process was occurred by the force applied by the punch on the sheet metal which causes shearing action of the sheet metal. The two-dimensional illustration below shows the blanking punch when applied force, the punch is forced into the die. On application of force on the metal sheet, the sheet metal excess its fracture zone and the sheet is sheared. The blank or the workpiece falls below is collected. Zhiqiang Xie Weiming, [3] This paper includes Die-Set is one of the Punching/Blanking die components which includes lower and upper shoes, guide posts and guide bushes. The maximum demand of Die-Set in industry resulted in the supply of specified die set from many manufacturing companies. The high rated components in the market cover only the small and medium die sizes. In more cases, the designers need

to build their own die-sets especially in case of progressive die design and non-tradition die sizes. A CAD system for building a Die-Set is discussed in this paper. This system is based on Visual Basic (VB) interfacing with Auto CAD. Hartmut Hoffmann et.al.[4] A temperature rise occurs in the sheet metal and tool parts due to the dissipation of a large part of plastic work during blanking. The resulting temperature in the shearing zone has various impacts on the process.

➤ Process Planning

It generally includes the following considerations.

1. Quantity required – total and annual.
2. Work piece – shape & size.
3. Work piece – dimensional tolerances.
4. Work piece – material limitations.
5. Equipment available for manufacture.

In each tool design the process planning plays important role. it's always necessary to follow proper methodology for manufacturing tool, so that one can get accurate dimensional stability for that particular part within appropriate time. The completion of the job in the planned time period a continuous follow-up of machine availability is made to maintain the delivery date. the completion of the job in the planned time period a continuous follow-up of machine availability is made to maintain the delivery date. Trained worker to run machine. But for this machine no any highly trained worker is required. Anyone can work on this machine. In this case the selected material is the D2, because it is readily accessible in the market, economical for use and is existing in standard sizes. Its mechanical properties are good i.e., it is easily machinable, has modest factor of safety. Mild steel also has high tensile strength and low coefficient of thermal expansion. major conclusions were drawn from the Design and Development of modification washer die.

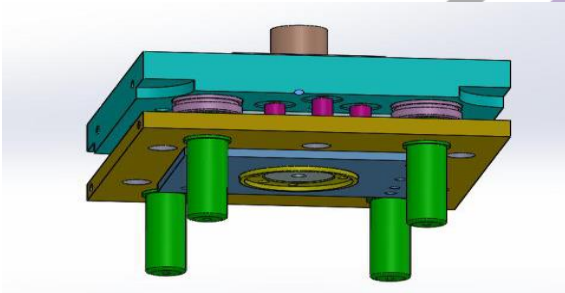


Fig. Top half of tool

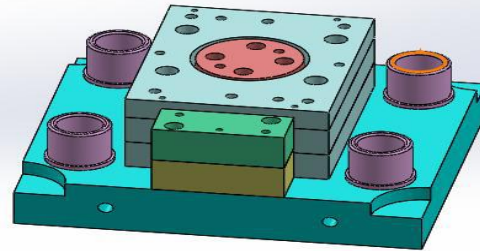


Fig: Bottom half of tool

V. CONCLUSION

Regarding on various theories and empirical review, we conclude that washer die today are important of any industry. The washer die increases the efficiency and effectiveness of manufacturing organization since it has many significant contributions which is finally results the reduction of production costs. The approach was made to study the process to be followed to obtain an accurate blank part to manufacture a washer special component. The results are seen for the stress and the deformation on the punch and die in the blanking tool. On these of the results, the D₂ material taken for the design is said to be as the best suitable material for the punch and die.

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