

DESIGN AND DEVELOPMENT OF BENDING DIE

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ABSTRACT

In this paper, the bending tool is designed for apple piaggio. It can reduced the various factors which is uneconomical for industry. Now day's sheet metal processes are widely used in all industries. It is an economical as well as effective process, which helps to forming a various tools. Bending is one of the most important operation which is perform on press machine. Bending is a non-cutting operation performed on press. Bending requires a press tool to deform a component permanently to a required shape and is employed on many components such as trays, boxes, brackets, clips etc. The work is bent by placing on the die and then forcing the punch on to it so as to take the shape between the die and the punch. When metal is bent, the outer surface is stretched and the inner surface is compressed. The radius of the corner must not be too small, otherwise too much stress will be set up and the material will crack on the outside.

Keywords: *apple piaggio, bending, non-cutting, press work.*

INTRODUCTION

The project is related to bending die is designed for piaggio ape bumper box this an industry based project. The company placed in Ahmednagar and company name is sumesh press shop has been assigned the project of designing and manufacturing to sumesh industry. The problem was discussed the previous design is less efficient. In previous manufacturing process the component required four stroke four bending. The cycle time for production is more and more space is required. During this project, various causes was identified and solution by using collected data from the industry the bending die is used to band or moved the sheet metal into curved shape. In this project we combine the two bending tool in single base plate. We have bend the two types of sheet which have different side bending, one sheet have a left hand aside and other one have right side bending. Therefore we combine the two different side bending tool.

LITURATURE REVIEW

Zone chin lien [1] believes in design new expert and learning system for designing new bending die. The expert system further divided into three types. The sheet metal bending knowledge base uses the rule of experience to control system flow chart. The sheet metal bending data base type uses to save qualitative data like pressure, spring back amount which can applied to rules for knowledge base. The design experience knowledge base of sheet metal bending uses for saving previous design experience to use in future design and learning. Learning system are of two types' rote and concept learning. According to concept learning, related modules are classified. Sing rote learning all input knowledge and changes memorized into production rule. This system also follows Martin's law, which defines learning as adding of already acquired knowledge. The expert system possess flexible developing capabilities converging sheet metal bending design. Using this system one can reduce used memory of time for designing bending die and increase speed of execution. By using learning and rote learning, automatic rule addition is done which is very useful for designing new bending die.

Satyandra k gupta [2] ,develop algorithm for setup planning which set of parts and capable shared setup of production of every part in given set of parts , if it's feasible .in low quantity manufacturing , the min problem is frequent change in setup for various part production , to produce cost effective small batches of product . We have to use new technique to reduce no of setup changes. In actual process, time taken for process is

significantly less compared to time taken for tool change and setup. The given algorithm described as a part family formation algorithm and mixed integer programming based single setup generation algorithm. The algorithm uses, bottom up approach for generate part families. This algorithm makes use of mixed integer programming formulation for generating setup of each part family. The approach is based on mixed integer programming and offer two advantages. Moderate size problem, it opposed to approximate solution and finds optimum setup. Opposing to minimizing number of stages, and also allows to minimize total stage length. The algorithm present improvement over previous work. The part fail formation to NP-hard probable, it is practically good to develop algorithm generating rather than best solution.

Apurv Kumar [3], the finite element method is used to determine different optimum design as well as process variables for producing part without defect. In common analytical at different phase of operation all the effect of friction, thinking of sheet & botching effect is neglected. In fem actual process is simulated thus time & money for trial & error method shared. Process variables, material property & design parameter play an important role in bending of sheet metal. Punch nose radius, die corner radius, punch angle & length of stroke are design parameter. The optimum design ensure that the bent sheet metal part free from cracking & necking the punch nose radius affect the inner curvature radius of bent as well as an residual stressed. By using fem, crack free bent part with uniform thickness & minimum variable stress of die & punch design.

Vivek D. Bharad [4] the all part of bending die does not need high involve in direct operation of press tool. Die, punch & hitting are the most important part of die set so required strengthen material. The principle for selection of material for three part are

- 1) Material having more wear, adhesive or abrasive resistance than part material
- 2) The friction force & hardness should be more than part material
- 3) Compressive strength, shear & fatigue strength should be plastic & elastic deformation strength should be less.

Ketan Kapse [5] has studied metal bending operation are widely performed on press machine. The number of operations are performed in press machine like, bending, drawing, dip drawing, etc. The tool used for manufacturing the component have a high accuracy and it is in large numbers. This paper shows the design of bending die which is use for producing the rib. This paper concentrated in design of different component of blanking tool, 2D and 3D modelling of parts. This modelling component was carried out on solid works.

CONCLUSION

In this project we can produced a more efficient bending tool for reduce the cycle time and various cost of production. This tool can reduce the electricity consumption the combination of two, similar dies can reduce the production time, and its more economical for industry.

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