

3D Modeling of L Shape Bracket Support, Gauge and Fixture used in Automobile

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Abstract - The Fixture and Gauges are designed to facilitate student learning and growth. It enables students to access their learning materials and enhance their implementation skills. Users can work in a highly effective and efficient environment with this product in which students can identify areas for improvement. "Bracket Support" is developed with the objective of being a part of the tractor. A live project involves real-life or simulated hands-on experiences that help students develop specific workforce skills.

Key Words: Bracket Support, 3D Modeling, gauge, Fixture, Automobile.

1. INTRODUCTION

The design of the part for a bracket support side shifter lever used in a tractor is a critical engineering endeavor that requires careful consideration of functionality durability, safety, and ease of use. This component is a fundamental element within the tractor's transmission system, allowing the operator to control gear selection and direction. A well-designed part ensures that the tractor operates smoothly and efficiently.

Here's an introduction to the design process for this crucial tractor component The bracket support lever shifter, commonly used in tractors, plays a critical role in the operation of these agricultural vehicles. The design of fixtures for the bracket support side shifter lever used in a tractor is an essential aspect of manufacturing. Fixtures are specialized tools and structures that securely hold and position the lever during various manufacturing processes. These fixtures are crucial for ensuring the accuracy, consistency, and efficiency of production. Here's an introduction to the design of fixtures for the bracket support side shifter lever.

1.1 3D MODEL OF BRACKET SUPPORT, GAUGE & FIXTURE

3D modelling involves the creation of three-dimensional depictions of objects or surfaces. With the use of three dimensional modelling software the models are drafted. Throughout the process, one can ascertain the size, shape, and texture of an object. Points, lines, and polygons are utilized to construct the 3D shapes within the software.

2. LITERATURE REVIEW

Shree Dewangan, The front axle support undergoes analysis to examine the stress generated within the component. The component design was created using Creo Parametric 2.0, while the analysis was conducted in SolidWorks. [1]

Sindiri Mahesh, The manufacturer has encountered challenges in controlling the process input parameters to achieve a satisfactory welded joint with the necessary weld quality. [2]

SS Chikshe, The automation applications will be utilized in designing the processes. In the mechanical industries, the basic structure is employed to process the small mechanical parts known as fixtures. [3]

Shailsh S. Pachbhai, In machining fixtures, it is crucial to minimize workpiece deformation caused by clamping and cutting forces in order to maintain machining accuracy. The industry is currently leaning towards adopting hydraulic techniques due to their time-saving benefits. [4]

Shubham Koparde, Various industries utilize different types of inspection methods to ensure the quality of their products. These methods include the use of Coordinate Measuring Machines (CMM) and various types of gauges. [5]

Enrico Armentani, The objective of this project was to conduct a Topology Optimization (TO) for an engine bracket to address Noise, Vibration, and Harshness (NVH) issues. The focus was on reducing vibrations transmitted from the engine to the chassis to enhance passenger comfort. [6]

K. Permal, The paper study focuses on customer satisfaction among users of different tractor brands in Tamil Nadu. With economic reforms in the following decade, Indian companies such as Bajaj Tempo Ltd and Mahindra Domestic Tractors Ltd entered the tractor industry. [7]

Tiago F. Pereira, Ontology development plays a significant role in shaping the information system's development cycle and promoting interoperability among its components. [8]

Baloji Badavath, Dr. M. Indira Rani, In machining fixtures, it is crucial to minimize work piece distortion caused by clamping and cutting forces in order to maintain machining precision. This paper examines the various approaches to clamping operations used by different designers in different applications. [9]

Marina Suzdalova, The article discusses the issue of training skilled engineering professionals in the mechanical engineering sector. It provides suggestions for training

qualified specialists with advanced professional skills to enhance Russia's cohesion and advancement. [10]

3D MODEL OF BRACKET SUPPORT

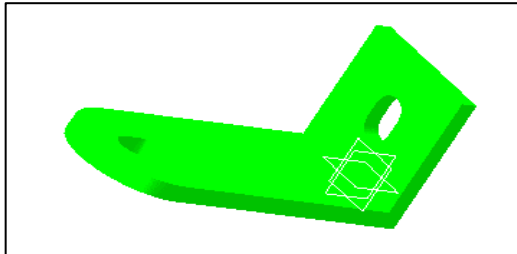


Fig-1: 3D Model of Bracket support

STEPS TO PREPARE CAD MODEL:

Launch the software and navigate to the start menu. From there, select "Mechanical Design" and then "Part Design". Choose the desired plane for sketching. When the XYZ plane is highlighted at the center, click once on the XY plane using the left mouse button. This will set the sketching plane for the new sketch. Access the Sketch tab to view the additional sketching tools. Move the cursor to the Rectangle icon in the Profile log and draw a rectangle according to the desired dimensions. Once the rectangle is drawn, select "Exit Workbench" to proceed with extruding. To extrude the sketch, click on the pad feature icon located in the sketch-based feature toolbar. Extend the rectangular section as per the required dimensions. In order to remove excessive material from the part, select the Sketch feature and choose the desired plane. Draw a semicircle to define the area where material needs to be cut. Selection of Pocket: Pocket on child part: Select the XY plane and draw a sketch based on the desired pocket dimensions. Then, select the Pocket icon from the Sketch Based feature toolbar and extend the pocket until the desired end point is reached.

3D MODEL OF GAUGE

The qualifying gauge used in industrial projects is essential for verifying that manufactured components adhere to specified dimensions and tolerances. This process guarantees consistency and accuracy in production by confirming that parts meet predetermined standards. The 3D design as shown in fig 2.

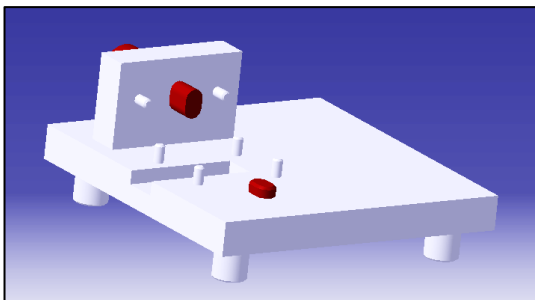


Fig-2: 3D Model of Qualifying Gauge

3D MODEL OF FIXTURE

The fixture securely holds two child parts of the main part. One child part is positioned vertically, while the other is positioned horizontally, both resting on their respective supports for the purpose of welding. The arrangement is shown in figure 3.

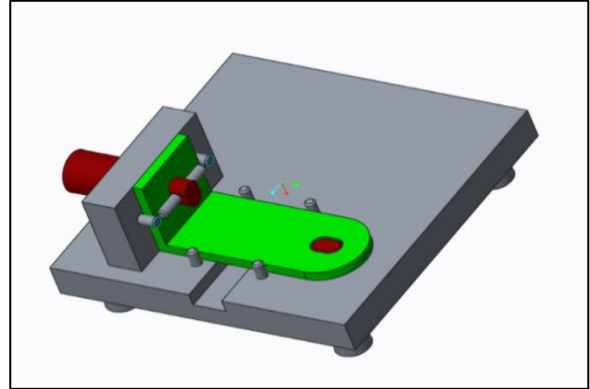


Fig 3: 3D CAD Model of Part Fixture

3. CONCLUSIONS

The product Bracket support side Shift lever is successfully manufacture through the fixture designing & gauge designing. After this through Control Plan manufacturing of the product is done. There are Quality control and Inspection were done. In this way the product is successfully develop for its mass production.

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