

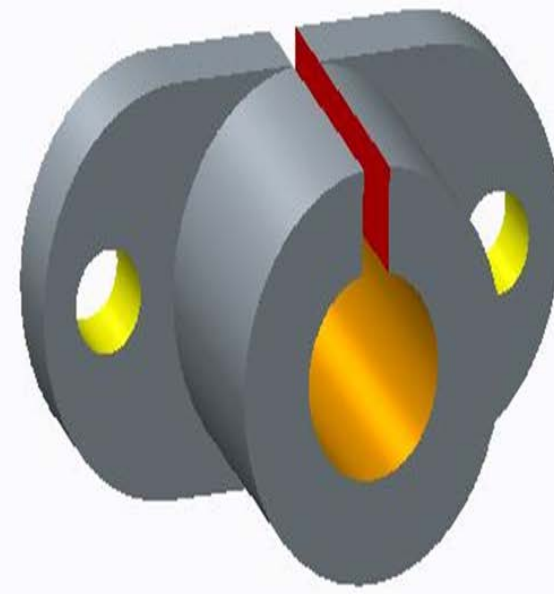


Tooling and Fixture Design for Component Manufacturing in Automobile industry

Ananthapriya Nettem, Adhish Umranikar, Ajinkya Shah, Zheng Li (Advisor)
Department of Mechanical Engineering
University of Bridgeport, Bridgeport, CT

Abstract

Mass production aims at high productivity to reduce unit cost and interchangeability to facilitate easy assembly.. Fixtures hold the work pieces securely in correct position with respect to the welding / machine / cutter during operation.



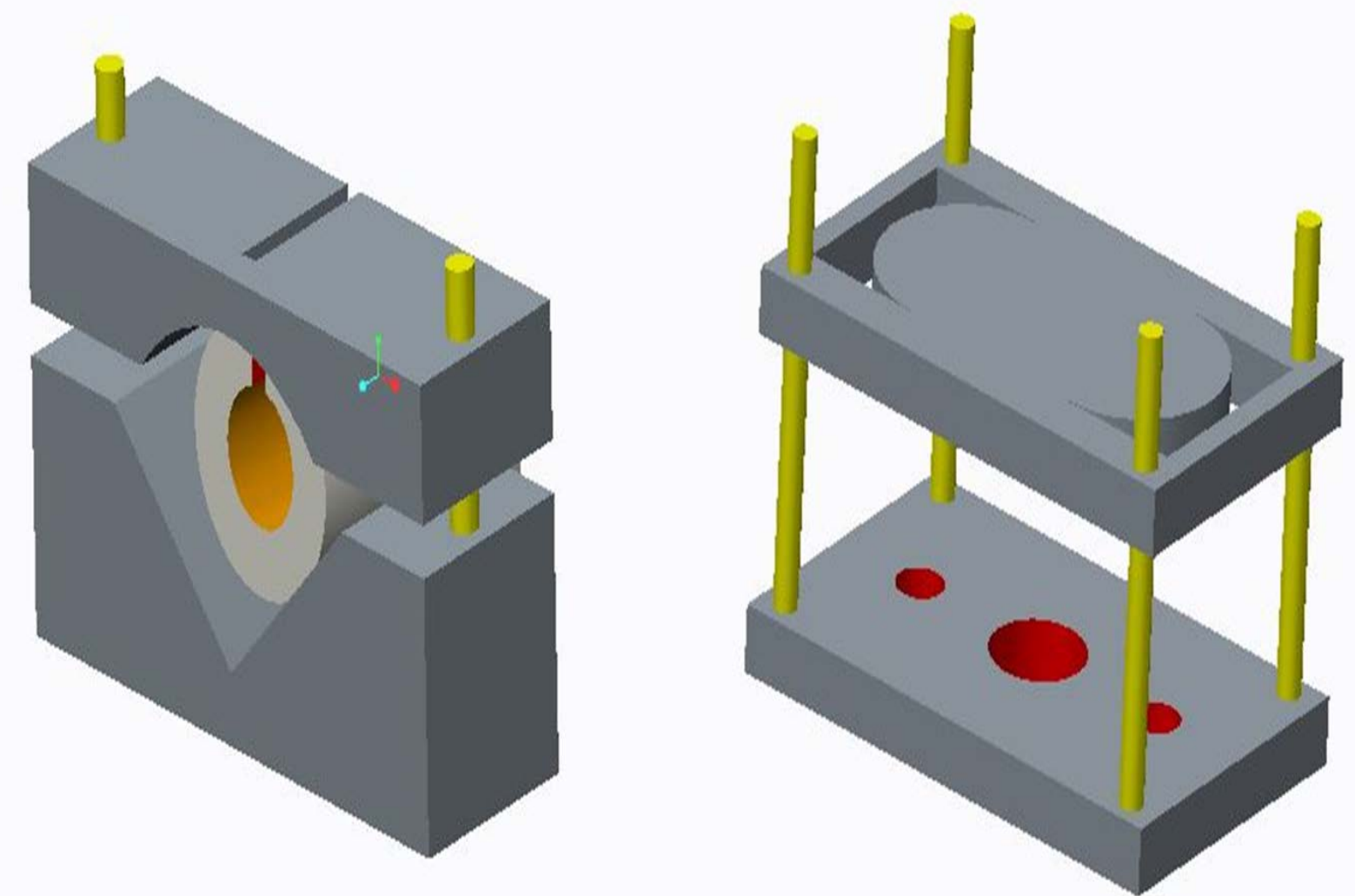
Manufacturing Procedure

Let us consider a work piece given to us in the form of block having dimension 60x40x20cm. Our fixture is designed such that work piece does not move when the machining is performed. Place the work piece inside the Fixture and place it on to the machine bed, the bottom plate of the fixture consists of triangular curved slots so that the semi circular shape is obtained for the work piece. The top part of the fixture consists of three holes, two for the bottom plate and one hole for the center part of the component. Their distances are fixed. Another fixture is designed for cutting a slot. A V-shaped pattern is made to obtain the center of the cylinder and top phase consists of a slot so that a slot is drilled exactly in the center of the cylinder. As per the design, the slots are cut of the protrusion surface and other which is symmetric to the center axis. The screw hole has been drilled. All the machining is done with tolerance.

Analysis

This paper is concerned with minimizing deformation of the work piece due to machining loads about fixture support positions, especially in thin castings. Finite element analysis is used in simulating the deformation of the work piece at selected points.

Fixture Design



Conclusion

It is light and portable. It can be efficiently used .It is simple and rigid in construction. Manufacturing cost in lesser than other clamping devices. This fixture is mainly used in production field for clamping the cylindrical rod firmly and securely to perform operations such as shaping and various processes. This device find place in, It is used in automobile industries and almost in all types if industries (Large, Small & medium scale workshops).