Design and Fabrication of Rotary Millng Fixture

Project Members

Sakthisivam.K,
Sridharan.B,
Ziaullah.J,
Naveen Rajan.L.S
Final Year Mechanical
Nandha College Of Technology,Erode.

Project Guide
Mr.S.A.Srinivasan,M.E.,
Assistant Professor,
Mechanical Engineering,
Nandha College of Technology,Erode.

Abstract **- The project is start by the overview of jig and fixture. It is the briefly explanation about the prespective of project namely the jig and fixture. List the problem statement that can help to create an idea in order to prepare the solution of all the problems for cylindrically parts in milling machine. In order to determine the problem statement, the comparition between the milling machine and the lathe machine is needed. This is because both of these machines have significant difference in types of work piece, cutting tool and machining processes. Need to understand the objectives of the project and make sure the target is achieved. The scope of the project is totally for milling machine so need to give high focus in order to do the jig and fixture design. Besides, need to organise the words into several parts to make sure the words become more systematically. Divided the words into three main parts namely research, design and analysis. The purpose of this project is to do the case study about jig and fixture for milling machine in perspective of cylindrical work piece, a new design of jig and fixture and comes out with the jig and ficture product. Actually, there are many jigs and fixtures available in the manufacturing field so the development a new product of jig and fixture in needed. On the other hands, this design can improve the ability and characterstic of the milling mahine. There are four design of the jig and fixture for this project and all design are creating by Autodesk inventor 9 software. By the four of the design, the analysis about the specification, safety factor, characteristic and other factor is needed then select one for the best design. The determination about the suitable material is in order to produce this jig and fixture also important. The result for this project can totally solve the problem for milling machine in prespective of cylindrical parts.**

I. INTRODUCTION:

One of the most time-consuming and labor extensive processes in the manufacturing of a mechanical part is the process of work holding or fixturing. It is often remarked that only approximately 10-15% of the overall time required to produce a part is spent actually on cutting or drilling a workpiece: the other time is sprnt primarily planning for executing part setup or work holding which is still performed by highly skilled machinists based on their experience. Recently, industries have begun to experience difficulty finding highly skilled machinists because the number of apprenties is decreasing and it is likely that the situation will worsen in the future. As a result of this trend together with the increasing power of computation speed, there has been a vast activity devoted to analyse the stability of fixturing and to automate fixture designs via CAD techniques. A fixture may constrain the motion of the work pieces in two different ways. One, form closure, is purely kinematics, in which the geomentry of the contacting rigid parts prevents motion regardless of the magnitude of the applied force. The other, force cllosure, involves the use of friction to assist in the freedom of motion of a kinematically under constrained object. Most analyses focused on the stability of the final fixture configurations amd were less concerned on the sequence of placing the fixels. Based on the theories of grasping planar objects demonstrated that improper sequence of planning the fixels will result in the rotation of the planar work pieces. Instead of focusing on the fixturing of planar work pieces which ignores the sequence of placing the overhead clamp that is consider the fixturing of prismatic work pieces which are polyherdal objects with all outer boundary faces either parallel or perpendicular to the fixture base plate. It is shown that proper sequences of placing clamps can actually relax the stringent requirement in the positioning accuracy of the fixels. So, in order to design a complete set or perfect jigs and fixtures, the determination about all the factors which are influence the jigs and fixtures during machining process is important. The factors, pressure weight, cutting speed and others.

II. PROBLEM DEFINITION

Part to part positions can not be closer; therefore, this doesn't yields maximum number of parts for a given area.

Overall fixture heights (“ Z” Dimension) are lower to the machine table, this is a benefit where the measuring machines Z-axis travel is a constraint.

III. LITERATURE REVIEW

Chen Luo, LiMinZhu,Han Ding[1] In his paper Two-Sided Quadratic Model for Work piece Fixturing Analysis, 2011 proposed that presents a novel model for work piece positioning analysis. Existing fixturing models mayunder estimate the positioning error due to neglect of the curvature of one or both contacting bodies.

S. Kashyap W.R. DeVries[2] In their paper Finite element analysis and optimization in fixture, proposed with minimizing deformation of the work piece due to machining loads about fixturing support positions, especially in thin castings.

S. K. Hargrove and A. Kusiak [3] recognize four general requirements of a fixture: (i) Accurate location of the workpiece, (ii) Total restraint of the workpiece during machining, (iii) Limited deformation of the workpiece, (iv) No machining interference.

IV. COMPONENT USED

1) BEARING

It is a part that which is used to make the fixture bed into a good rotation without and friction and wear. Here ball type bearing is used.

2) HOUSING

It is a part that which supports the whole fixture setup

3) FLANGE (FACE PLATE)

It is used to make a perfect rotation of the fixture bed

4) BASE PLATE

A plate that which is used to make contact with both the sides with a flange to make a perfect contact of the fixture

5) PART LOCATOR

It used to make the work piece in a particular place without getting deformation due to the pressure of the machine tool

6) INDEXING PIN

Indexing pin is used to lock the angle of the fixture bed to make the mass production

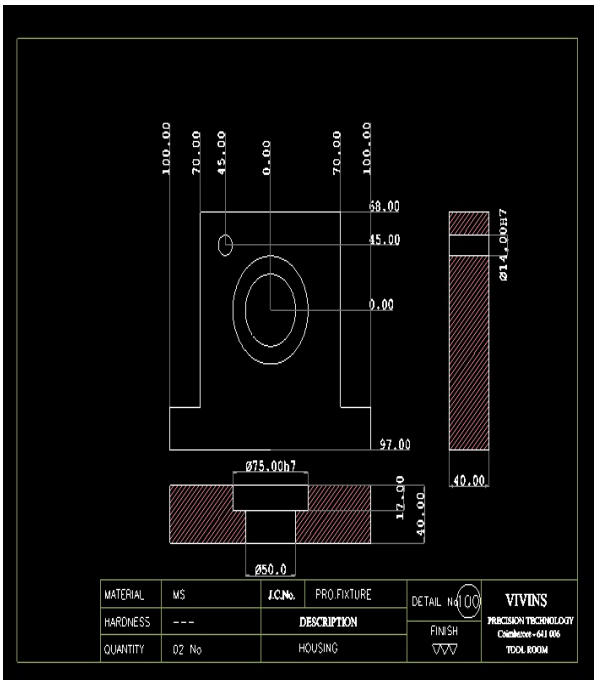
7) CLAMP PAD

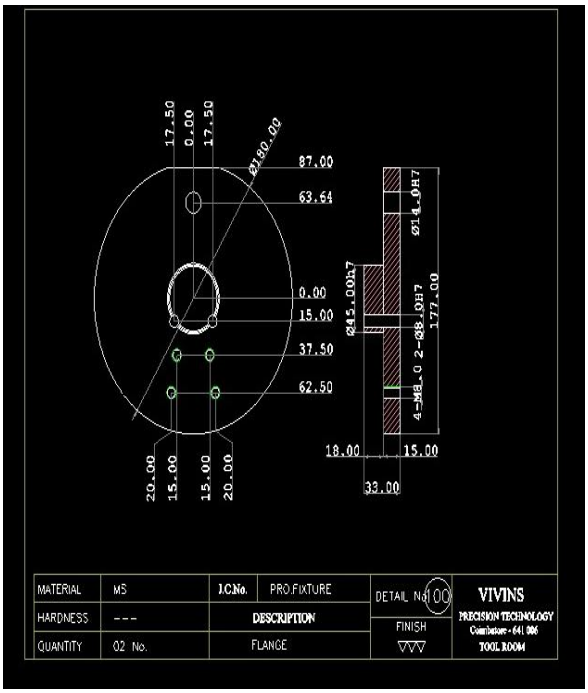
If there is no inclination is necessary the clamp pad will helps to make the fixture to be in a 0^{o} angle

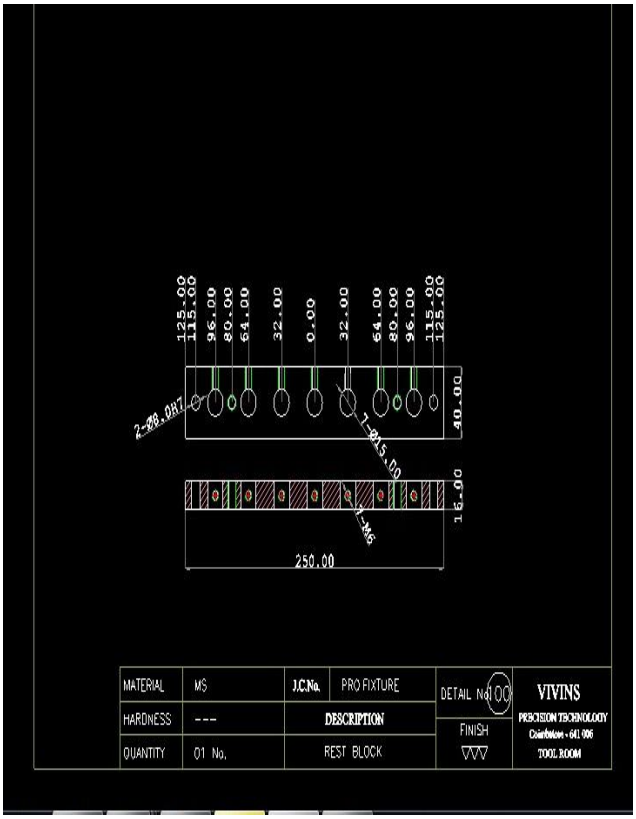
8) ALLIGN SCREW, NUT

It is used to make fix the parts of the component

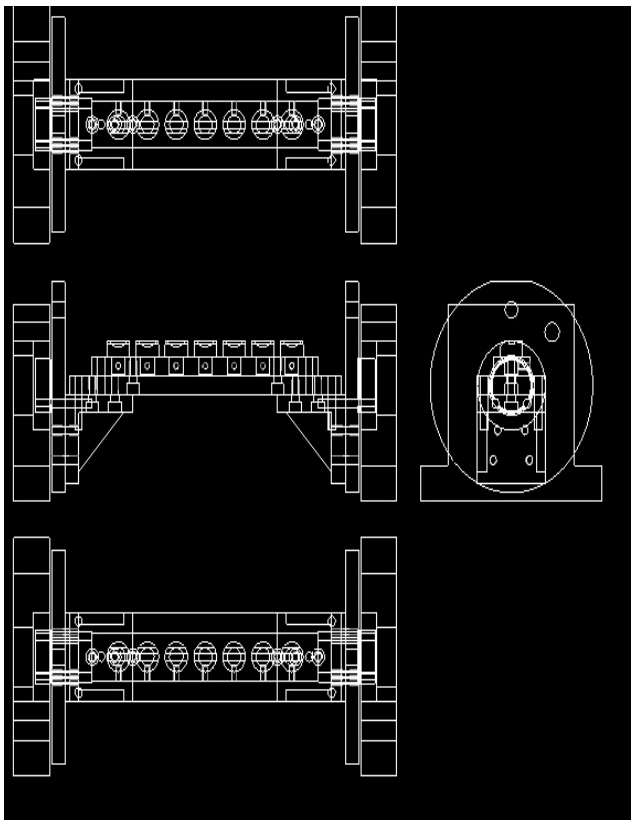
V. PART DIAGRAM







VI. ASSEMBLY DIAGRAM



VII. OPREATIONS DONE

a. TURNING

b. MILLING

c. SURFACE GRINDING

d. WELDING

e. DRILLING

f. M1TR

VIII. ADVANTAGES

- Reduced the setup time
- Make a inclined milling with the same machine
- It protects the fixture from the regular damages due to tool.
- It can able to work around 180^{o} angle.

XI. DISADVANTAGES

- Bearing must be dust free
- Avoid the scrabs that enters into the work holder

VII. CONCLUSION

The design and fabrication of ROTARY MILLING MACHINE is to be done. Here we used AutoCAD software is used to make the design of our project.

VIII. REFERENCES

Mr. Jeyapragash,
VIVINS PRECISION TECHNOLOGY,
KANNIMAR NAGAR, GANAPATHY,
COIMBATORE_641006.