

Design of Nozzle Fixture for Lathe Machine

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Abstract:- The abstract shows the brief description about nozzle fixture for lathe machine. It is widely used on the lathe machine. Design of new fixture is modified over the old fixture due to some drawbacks. This fixture was developed for various machining processes. The new fixture is simple in design. To design a new fixture various phases for fixture designing such as planning, design and assembly. So this fixture is used various machining processes on nozzle on the lathe machine because of simple design and low cost.

Keywords:- Fixture Design, Fabrication.

I. INTRODUCTION

The nozzle fixture is widely used in manufacturing industries such as on the lathe machine for machining processes like turning, facing, taper turning, etc. of nozzles which is longer in length as compared to other nozzles. The jigs and fixtures are the production tool used to machining very accurately. Jigs and fixtures and fixture are specially design so that large number of parts can be machined. The various fixtures were designed for mass production with less cost. And the loading time and unloading time of component is also be less. In order to examine the causes of failure, the technique Includes job alignment method, visual inspection, etc. are carried out. Design of fixture required great knowledge about manufacturing process.

II. FIXTURE

The fixture is a device for locating and holding the work piece. During manufacturing operation like turning, milling, grinding, shaping, etc. the main purpose of fixture is to locate and in some cases holding a work piece during machining processes. The only difference in jig and fixture is that in fixture it is not guided the cutting tool. Using a fixture improves the economy of production by allowing smooth operation and quick transition from part to part, reducing the requirement for skilled labor by simplifying how work pieces are mounted, and increasing conformity across a production run. A fixture's primary purpose is to create a secure mounting point for a work piece, allowing for support during operation and increased accuracy, precision, reliability, and interchangeability in the finished parts. It also serves to reduce working time by allowing quick set-up, and by smoothing the transition from part to part.

➤ Fixture Studies

The study fixture was starting in 1940's and the result leads to several manuals on jig and fixture design such as Houghton (1956) and Wilson (1962). Fixture is simple in design and it is design as per the requirement of nozzles. The nozzle fixture is used for locating as well as holding the job for accurate machining at less time.

Before designing the fixture for holding the nozzle the circular plate are welded inside the nozzle and the small bore is drilled on centre on circular disc for supporting the nozzle by tailstock. In this process the loading and unloading time is more.

Another process for holding and locating the nozzle the steady rest is used. The steady rest is mounted on lathe bed and clamped an outside of nozzle. But the problem is that various difficulties are there for machining operation. Because of this problems for minimum loading and unloading time this fixture is designed.

➤ Type of fixture

1. Plate fixture
2. Angle plate fixture

III. OBJECTIVE

1. To study about fixture used in lathe Machine.
2. To holding the nozzle.
3. To reduce the loading time.

IV. WORKING METHODOLOGY

The following procedure was followed in this project used for locating and holding the First the material was chose.

1. Then the rectangular plates and blocks are cut By proper respected dimensions.
2. The respected parts are assembled with respect to design. The nozzle which you have to machined one end Clamped by chuck and the other is clamped by using fixture.
3. By using this fixture the various machining operations are carried out on long length nozzles with high accuracy.
4. The minimum inside diameter of nozzle 100 mm and maximum inside diameter nozzle is 250 mm respectively.

V. DIFFERENT PARTS OF FIXTURE



Fig 1:- main body of Fixture



Fig 2- stud and spacer

VI. OPERATIONS TO BE PERFORMED BY USING FIXTURE-

1. Turning
2. Facing
3. Taper Turning
4. Grinding
5. Threading

Component	Length	Width	Thickness	Diameter
Rectangular plate	60	25	5	-
Rectangular square block	100	15	15	-
Stud	400	-	-	30

Fig 3- Table of dimensions



Fig 4- Turning & facing operation

VII. DESIGN AND FABRICATION OF NOZZLE FIXTURE

➤ *Design of Rectangular Plate – Material Used – Carbon Steel*

The design detail of rectangular plates have length is 60 mm, width is 25 mm and the thickness of the plate is 5 mm of each plate respectively. The no. of plates is 8. Each plate has the same dimensions.

➤ *Design of Rectangular Square Block – Material Used – Carbon Steel*

The design detail of rectangular square block have length is 100 mm, the width is 15 mm. And the thickness is equal to the width of block As t is equal to 15 mm. The no. of rectangular Blocks is 3.Each block having same dimensions.

➤ *Design of Fixture Bolt and Spacer – Material Used – Mild Steel*

The main purpose of spacer is to holding properly at required diameter of nozzle. As the bolt the head is on one end and the threads are on the other end. The small bore is drilled on top of head for support nozzle by tailstock.

Component	Length	Width	Thickness	Diameter
Rectangular plate	60	25	5	-
Rectangular square block	100	15	15	-
Stud	400	-	-	30

Fig 5- Table of fixture dimensions of diff. Parts

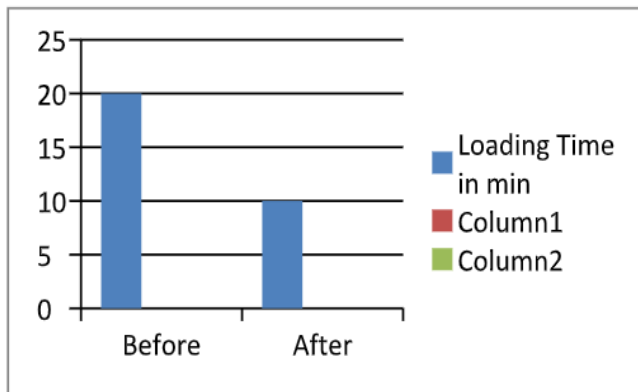


Fig 6- Time reduction graph

VIII. CONCLUSION-

1. By using this fixture loading time which is reduced which we can see in an above graph. With the help of this fixture we can hold nozzles of diameter from 150-200 mm.
2. By using this fixture we can hold the nozzle with high accuracy and also nozzle is parallel to the bed of lathe machine.
3. In this fixture only one limitation is that this fixture is used only on lathe machine for holding long length nozzles.

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