

# A REVIEW ON JIGS AND FIXTURE

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## ABSTRACT

*The jigs and fixture are production devices that increase the rate of manufacturing. The numerous advantages that are associated with the use of jigs and fixtures in manufacturing to include: production increase, cost reduction, interchangeability and high accuracy of parts, reduction of the need for inspection and quality control expenses, the design is dependent on numerous factors which are analyzed to achieve an optimum output, that jigs and fixtures should be made of rigid light materials to facilitate easy handling.*

**Keyword :** *cost reduction, interchangeability and high accuracy of part*

## 1. INTRODUCTION

Jigs and fixtures are the type of manufacturing tools that are used to produce interchangeable and identical components. Jigs and fixtures eliminate the need for a special set up for every work-piece thereby facilitating production and also ensuring that every work piece is manufactured within a predetermined tolerance. The jigs is tool positioning or guiding device that guide the tool to proper location while performing operation. Whereas the fixture is work holding or clamping device . It is use to to fix the work piece firmly on the working table.

### 1.1 JIG

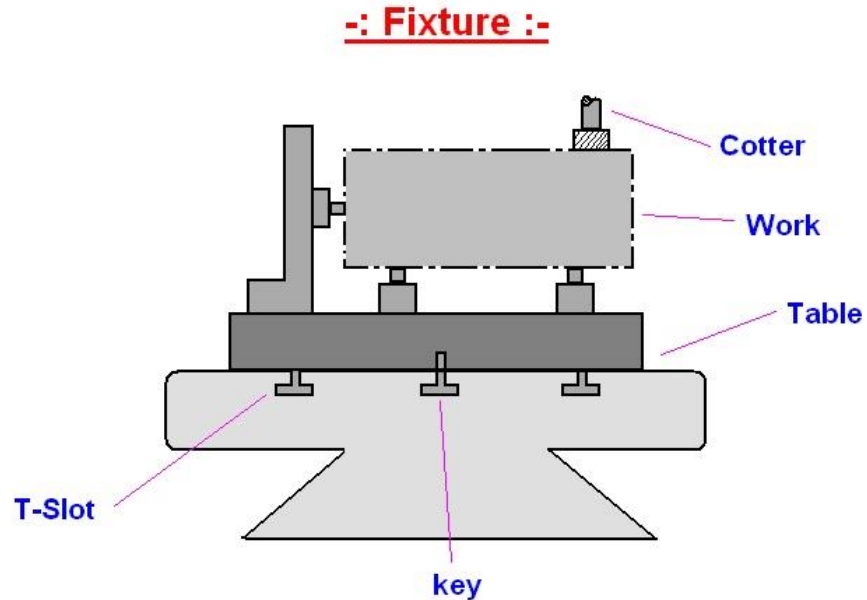
While performing the machining operation jigs is use to guide are used to guide a position or to give support to the tool. Its main objective is to ensure high degree of precision, interchangeability, and duplication in products 'manufacturing, it is also applied to manipulate the location and movement of other tool. The machining operation like drilling, reaming, tapping and counter boring.



FIG. 1. JIGS

## 1.2 FIXTURE

During machining the fixture is use to hold the work piece at proper position. For supporting and clamping the work piece, device is provided. Frequent checking, positioning, individual marking and non-uniform quality in manufacturing process is eliminated by fixture. This increase productivity and reduce operation time.



**FIG.2 .SIMPLE 2-D DIAGRAM OF FIXTURE**

### 1.3 JIGS AND FIXTURES DIFFER IN THE FOLLOWING WAYS:

| Sr.No | Jigs  | Fixture  |
|-------|---|--|
| 1     | In specific operation like guiding or positioning the tool or holding the work piece the jigs are prefer.                             | Fixture is use to clamp or hold or to support the work piece. It is not use to guide the tool.         |
| 2     | If the large diameter is to be drilled the jigs are clamp to the work table. To bring the each bush it is essential to move the jigs. | For performing the machining operation the fixture must be clamped to the table firmly.                |
| 3     | In machining operation like reaming, tapping, boring and drilling is very useful.   | In machining operation like milling machine, shapers and slotting machine the fixture are very useful. |
| 4     | Gauge blocks is not essential.  | Gauge blocks can be provided for effective handling.   |
| 5     | Jigs are lighter in weight.   | Fixtures are rigid in construction.  |

### 1.4 ADVANTAGES OF JIGS AND FIXTURES

1. Low variability in dimension, thereby leading to reliable quality of manufactured products.
2. Cost reduction.

3. Ensures interchangeability and high precision of parts.
4. Reduces the need for inspection and quality control expenses;
5. Reduces accident, as safety is improved;
6. Semi-skilled machine operators can easily use them thereby saving the cost of manpower.

## 2. ELEMENTS OF JIGS AND FIXTURES

### 2.1 The Frame:

By the welding of different slab together the body is made .the mostly mild steel or cast iron is used. The heat treatment is perform to strengthen and support the job.

The different type of frame are :

1. Channel frame type
2. Box frame type
3. Plane frame type
4. Leaf frame type

### 2.2 Gadget / Tool Guide

Jig bushing and the template are the guiding part, they must be wear resistant, and exchangeable .

### 2.3 Holding Device

It must be very simple and easy to operate. Moreover from holding the work-piece firmly in one place, the work holding devices must be able to withhold the Strain of the cutting tool during operations.

### 2.4 Tracing Devices

The tracing device are made from the hardened steel .it is the most popular device which is used to locate the work piece.

## 3. DESIGNING OBJECTIVE FOR JIG AND FIXTURE

1. The accuracy and accessibility of indexing systems or plates.
2. The extent of mechanization, capacity and type of the machine tool where jigs and fixtures will be employed.
3. Bushes and tool guiding frames for jigs.
4. The strength of the machining tool in concern.
5. The precision level of the probable product.
6. Fastening parts.

## 4. SELECTION OF MATERIALS

- 4.1 **Phosphor Bronze:** For the production of jigs and fixtures Phosphor bronze is used for processes that comprise the making of substitutable nuts in clamping systems like vices, and also in operated feedings that require screws.

- 4.2 **Die Steels:** Three variants of die steel –  
high chromium (12 %),  
high carbon (1.5 to 2.3%), and  
cold working steels
- 4.3 **Mild steels:** Mild steel which contain about 0.29% of carbon are very cheap and because of their easy Availability are often the choicest material for the making of jigs of fixtures
- 4.4 **High Speed Steels:** High speed steel which contains more quantity of tungsten and less quantity of chromium and vanadium has high toughness, harden ability, hardness retention at high temperature, and good wear, tear and impact resistance. If HSS is tempered, they can be applied in the production of jigs and fixtures in machining operation like reaming, drilling, boring, and cutting operation

## 5. CONCLUSION

Jigs and fixtures plays most important role in manufacturing tools that are employed to produce substitutable and indistinguishable components. They are exceptional tool-guiding and work-holding Equipment designed accurately for machining and assembling large number of parts. In machining operation the use of jig and fixtures are always not necessary it can depend upon the size of tool and machining operation is being performed .They are fabricated with heat-treated steel that are corrosion and wear resistant. From above paper we have concluded that to achieve optimum result the jig and fixtures should be made with rigid material

## 6. ACKNOWLEDGEMENT

We also thank to Prof. Amol Pitale, G. H. Raisoni College of Engineering Nagpur, for their continuous motivation And guidance.

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Volume 3, Issue 4, August 2015, Pages: 213-219