

Experiment No 14

Aim: Introduction to jigs and fixtures and study of the Fundamental principles.

Introduction:

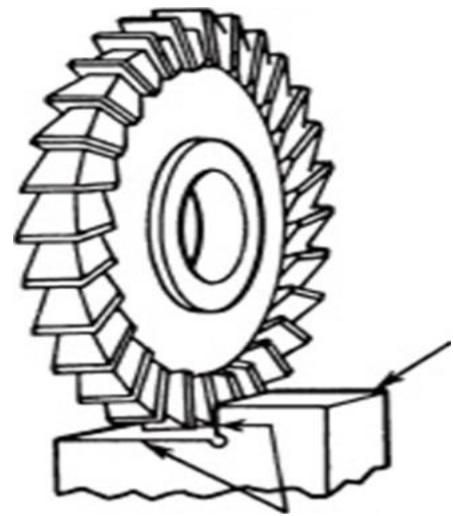
The successful running of any mass production depends upon the interchangeability to facilitate easy assembly and reduction of unit cost. Mass production methods demand a fast and easy method of positioning work for accurate operations on it.

Jigs and fixtures are production tools used to accurately manufacture duplicate and interchangeable parts. Jigs and fixtures are specially designed so that large numbers of components can be machined or assembled identically, and to ensure interchangeability of components.

JIG



FIXTURE



SET BLOCK

DRILL BUSHING

Reference edges for feeler gauge

Figure 1 Referencing the tool to the work.

JIGS:

It is a work holding device that holds, supports and locates the workpiece and guides the cutting tool for a specific operation. Jigs are usually fitted with hardened steel bushings for guiding or other cutting tools. a jig is a type of tool used to control the location and/or motion of another tool. A jig's primary purpose is to provide repeatability, accuracy, and interchangeability in the manufacturing of products. A device that does both functions (holding the work and guiding a tool) is called a jig.

An example of a jig is when a key is duplicated, the original is used as a jig so the new key can have the same path as the old one.

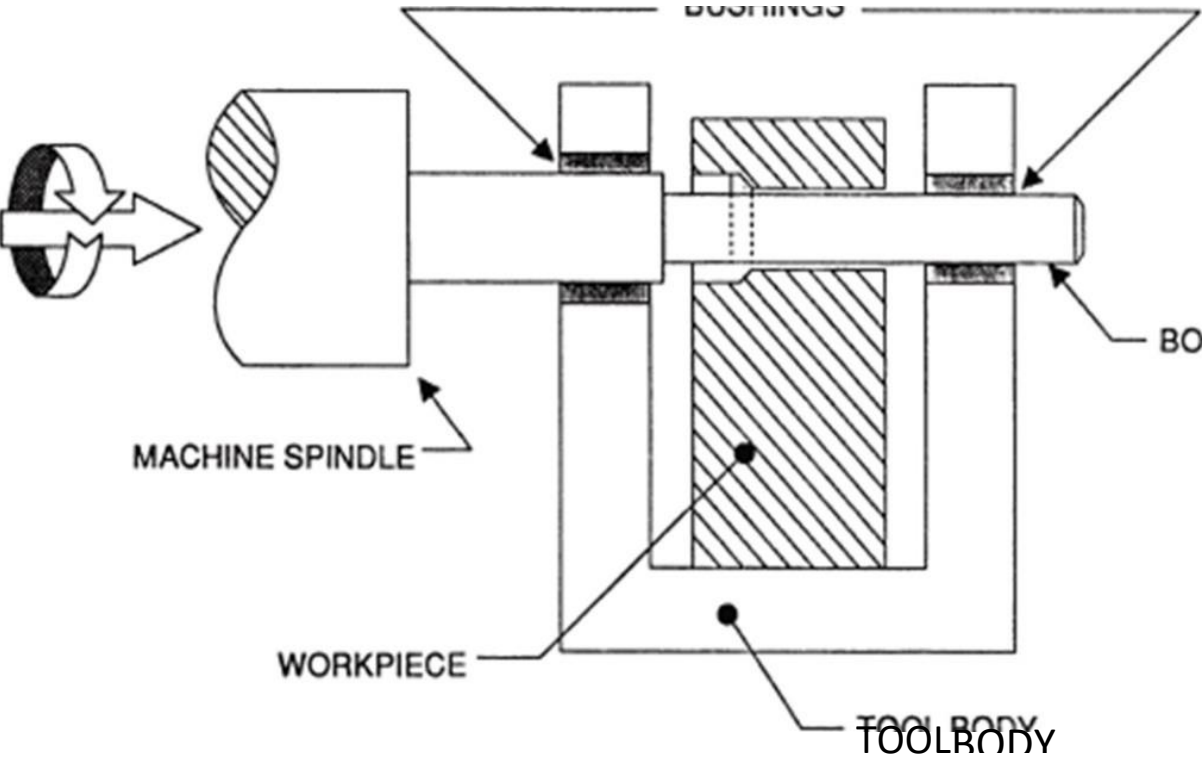
FIXTURES

It is a work holding device that holds, supports and locates the workpiece for a specific operation but does not guide the cutting tool. It provides only a reference surface or a device. What makes a fixture unique is that each one is built to fit a particular part or shape. The main purpose of a fixture is to locate and, in some cases, hold a workpiece during either a machining

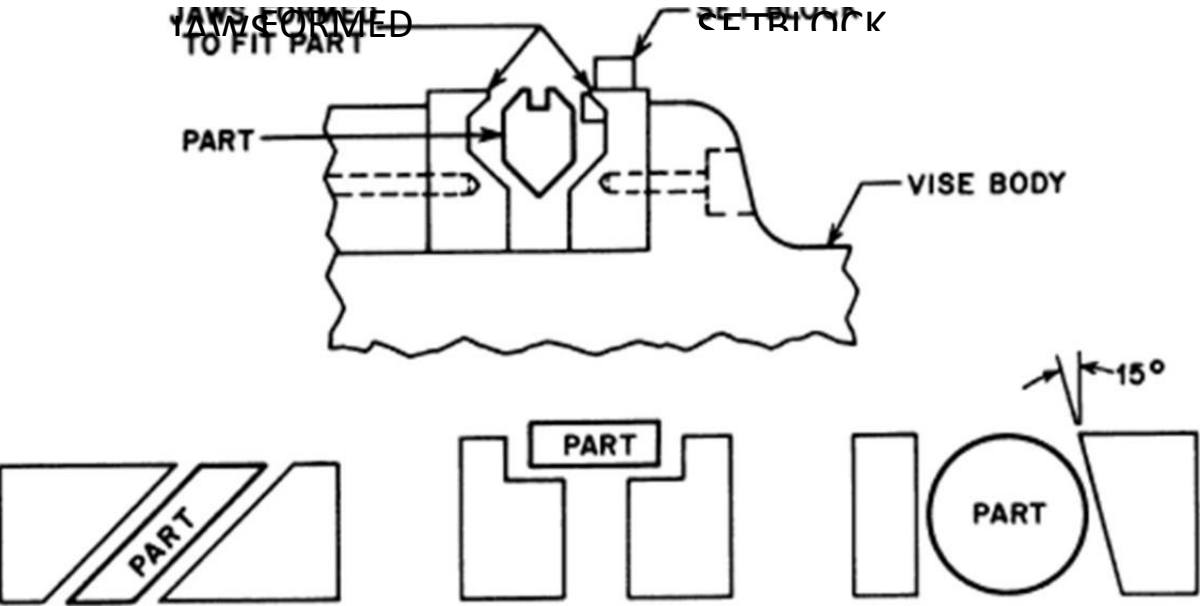
operation or some other industrial process. A jig differs from a fixture in that it guides the tool to its correct position in addition to locating and supporting the workpiece.

Examples: Vices, chucks

BORING JIG:



A VISE-JAW FIXTURE



Fundamental principles of Jigs and Fixtures design

LOCATING POINTS: Good facilities should be provided for locating the work. The article to be machined must be easily inserted and quickly taken out from the jig so that no time is wasted in placing the workpiece in position to perform operations. The position of workpiece should be accurate with respect to tool guiding in the jig or setting elements in fixture.

FOOL PROOF: The design of jigs and fixtures should be such that it would not permit the workpiece or the tool to be inserted in any position other than the correct one.

REDUCTION OF IDLE TIME: Design of Jigs and Fixtures should be such that the process, loading, clamping and unloading time of the workpiece takes minimum as far as possible.

WEIGHT OF JIGS AND FIXTURES: It should be easy to handle, smaller in size and low cost in regard to amount of material used without sacrificing rigidity and stiffness.

JIGS PROVIDED WITH FEET: Jigs sometimes are provided with feet so that it can be placed on the table of the machine.

MATERIALS FOR JIGS AND FIXTURES: Usually made of hardened materials to avoid frequent damage and to resist wear. Example MS, Cast iron, Diesteel, CS, HSS.

CLAMPING DEVICE:

It should be as simple as possible without sacrificing effectiveness. The strength of clamp should be such that not only to hold the workpiece firmly in place but also to take the strain of the cutting tool without springing when designing the jigs and fixtures.