

Webinar Title: DESIGN, DEVELOPMENT, APPLICATION, AND MAINTENANCE OF TOOLS, DIES, JIGS AND FIXTURES

Registration Fee (including GST):- Rs 1200/- (Rupees One hundred two hundred only) per participant inclusive of GST

Expert Speaker (Name/ Designation) – MR. K.K.MAHAJAN , A NATIONAL LEVEL CONSULTANT CUM TRAINER, INDUSTRY EXPERT , ENERGY MANAGEMENT PROFESSIONAL

Webinar Date: 04.09.2021 Duration: 15.30 hours to 17.00 hours (One hours thirty minutes)

About Webinar -

Tools are used to convert raw materials into a required shape in various manufacturing industries. The main objective of tool design is to increase production while maintaining quality and lowering costs. To this end, the tool designer must reduce the overall cost to manufacture a product by making acceptable parts at the lowest cost.

A die is a specialized machine tool used in manufacturing industries to cut and/or form material to a desired shape or profile.

Dies, jigs and other tools are generally used as an attachment to a machine. 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 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

Fixture 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.

Jigs and fixture help to maintain the correct relationship between the cutting tool and work piece, and they simplify the process of locating during a machining. They ensure that the every

part machined within specified limits and tolerance. It helps the concept of interchangeability in the manufacturing process.

The Major Difference between Jig and Fixture is that Jig is a type of tool used to control the location or motion of another tool. Whereas Fixture is a support or work holding device used to hold work in place. In metal and woodworking, both jigs and fixtures are essential tools used.

The design of jigs and fixtures is dependent on numerous factors which are analysed to achieve optimum output. Jigs should be made of rigid light materials to facilitate secure handling, as it has to be rotated severally to enable holes to be drilled from different angles.

Jigs and Fixtures: The employment of jigs and fixtures is an important aspect of workshop engineering for the production of articles in large quantities with a high degree of accuracy and inter-changeability at a competitive cost. The purpose of jigs and fixtures is to maintain low manufacturing costs and to increase industrial efficiency & productivity .

Jigs and fixtures are manufacturing tools that are employed to produce interchangeable and identical components. They are unique tool-guiding and work-holding devices designed specifically for machining and assembling large number of parts. The following are the purposes of jigs and fixtures

- reduction of production cost, increase of production rate, high accuracy of products without any manufacturing defects, provision of interchangeability, easy machining of complex shaped parts, reduction of quality control costs, etc.
- 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.
- Jigs and fixtures "eliminate the necessity of a special set up for each individual part .
- The main advantages of Jigs and fixtures are "durability, setup reduction, improvement in productivity, reduced decision making in operation selected from the standard components."

Fixtures Purpose :

- Primary purpose is to create secure workpiece mounting and more accuracy, precision, reliability, and interchangeability in the finished parts. Minimum rejection.
- Reduces working time by quick set-up & smooth multiplication of parts .
- Using a fixture improves the productivity by ensuring smooth operation and transition from part to part . More monetary profits .
- There are multiple advantages like
- Assembly Fixtures, to minimise the assembly efforts and increase accuracy
- Welding Fixtures for easy & effective welding
- Testing Fixtures, especially for mechanical testing like vibration & endurance tests

- Inspection Fixtures to hold in desired position for dimensions checking etc.
- And many more areas in industries and production

Fixture Design :

- Fixtures need to be designed with the purpose of reducing manufacturing costs. The cost reduction outweighs the cost of using the fixture.

Advantages of Jigs and Fixtures:

The advantages of jigs and fixtures include but not limited to the following:

- • Production increase;
- • Low variability in dimension, thereby leading to consistent quality of manufactured products;
- • Cost reduction;
- • Ensures interchangeability and high accuracy of parts;
- • Reduces the need for inspection and quality control expenses;
- • Reduces accident, as safety is improved;
- • Semi-skilled machine operators can easily use them thereby saving the cost of manpower;
- • The machine tool can be automated to an appreciable extent;
- • Complex and heavy components can be easily machined;
- • Easy assembly operations save labour, and also lead to reduction of defective products;
- • They eliminate the need for measuring, marking out, punching, positioning, alignments, and setting up for each work-piece thereby reducing the cycle and set up time;
- • Increases technological capacities of machine tools;
- • The application of more than one tool simultaneously on a work-piece can be achieved;
- • Setting of higher values of some operating conditions like depth of cut, speed, and rate of feed can be attained because of the increased clamping capability of jigs and fixtures.
- Hence, this webinar will be of great help in this regard .

For being competitive in manufacturing of world class Quality , Efficiency and productivity , Jigs & Fixtures , Press Tools etc. can play a great role . It will lead India on the path of Atam Nirbhar . For sustainability in quality manufacturing , zero defect and zero rejections , mass production , innovative manufacturing etc. , the understanding about the subject of Jigs , Fixtures , Press Tools , Templates is important .

The new areas of technological advances like Industry 4.0 or Manufacturing 4.0 , Circular Economy , Sustainable Quality Manufacturing , Minimising Rejections in Manufacturing , Waste reduction , Automation ,ZED etc. directly connected with the efficiency in manufacturing which can be achieved through the proper design and application of Jigs , Fixtures , Press Tools and Templates

Hence the present scenario of Digitalisation in area of Manufacturing , IoT in Design of Products and Processes , the Jigs , Fixtures, Press Tools occupy a prominent space .

The webinar aims at explaining the importance and purpose of tools, dies, jigs and fixtures & their methods of design, development, application & maintenance of tools, dies, jigs , fixtures and templates to achieve maximum efficiency in manufacturing.

Webinar Coverage: -

- Importance and purpose of tools, dies, jigs and fixtures
- Different types of tools and their design
- Criteria for tool selection and application of tools
- Different types of dies and their design
- Die making process
- **Advantages of Jigs and Fixtures**
- **Types of Jigs**
- **Difference in Jigs and Fixtures**
- **Elements of Jigs and Fixtures**
- **Types of Fixtures**
- **Essential features of Jigs and Fixtures**
- Basic Comparison in Jigs & Fixtures
- Design Principles of Jig and Fixture
- Factors to be considered for design of Jigs and Fixtures
- Design Steps of Jig and Fixture
- Use of Jig Body in Jig and Fixture
- Basic Rules for Locating Jig and Fixture.
- Materials used in making Jig and Fixture
- Case study and examples

Speaker Profile: MR. K.K.Mahajan is a national level consultant cum trainer in the field of Quality, Energy, health and safety, Environment , HR and management . He has worked at Senior positions in reputed companies like Senior Executive of Tata Chemicals Ltd, Gujarat , DCW Limited , Gujarat and SIEL Chemical Complex, Rajpura (Pb.) and Delhi .He is having over 35 years of working experience in Manufacturing sector . He is a certified Lead Auditor for ISO 9001: 2015 . He is associated with PCRA,

EESL and BEE as Energy Management professional. He is a guest speaker & visiting faculty for many reputed Engineering & Management Institutes in the country



Register to learn (Key Learning's' in bullet points):

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- **Types of Jigs and Fixtures**
- **Difference in Jigs and Fixtures**
- **Design Principles of Jig and Fixture**
- **Factors to be considered for design of Jigs and Fixtures**
- **Design Steps of Jig and Fixture**
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Thanks, and regards

S.P.Singh

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