AMTD12 DESIGN OF JIGS, FIXTURE AND GAUGES

UNIT-1 BASICS OF JIGS AND FIXTURES

1.1 Introduction- Jigs and Fixtures- Difference between Jigs and Fixtures- Advantages of jigs and Fixtures- Economy and cost- Elements of Jigs and Fixtures- Fool Proofing

1.2 Materials used in Jigs and Fixtures- Degrees of Freedom- 12 degrees of freedom- 6point location principle- (or) 3-2-1 principle of location.

1.3 Essential features of Jigs and Fixtures- General Design Principles- Design steps- Common defects in Jigs design.

UNIT-2 PRINCIPLES OF LOCATION AND CLAMPING

2.1 Principles of location- location point- types of locators- pins and studs- V block- cup and cone location points- adjustable locating points- special adjustable stops- location from finished holes in the work

2.2 Diamond pin locator- Cam operated 'V' locator – Quick action 'V' locator - Six point location of a three legged object- Location of a cylinder on a v-block.

2.3 Principles of clamping- types of clamping- lever clamp- hinged clamp- two way clamp- swinging clamp- wedge clamp- eccentric clamping arrangement- quick action clamp

2.4 Cam operated clamp- quarter turn screw

2.5 Toggle clamp- Pneumatic and hydraulic clamps- Washers- 'C' washer- Spherical and flat washers.

UNIT-3 JIGS AND BUSHINGS AND DRILL JIGS

3.1 Jig Bushing: Materials for jig bushing - press fit bushing- Fixed renewable bushing- slip renewable bushing- liner bushing- screw bushing- miscellaneous type of drill bushings- bushing specifications.

3.2 Drill Jigs: Open drill jig plate drill jig- plate drill jig- template drill jig- channel drill jig- turn over drill jig- angle plate drill jig- closed box drill jig- leaf drill jig- post jig- indexing drill jig- universal drill jig - design of template and leaf jig.

UNIT-4 PRINCIPLE OF FIXTURE DESIGN

4.1 Introduction - principles of fixture design- element of fixtures

4.2 Design consideration of locators and clamps for fixtures- types of fixtures

4.3 Design of turning fixtures- mandrels- type of mandrels

4.4 Boring fixtures- milling fixtures- essentials of milling fixtures

4.5 Method of locating milling fixtures with respect to cutter position

4.6 Grinding fixtures- surface grinding and cylindrical grinding fixtures

4.7 Broaching fixtures- internal and external broaching fixtures- welding fixtures

UNIT-5 GAUGES

5.1 Introduction- limits gauges- Taylor's principle of limiting gauging application of limit gauges

5.2 Material for limit gauge- three basic type of limit gauges- plug gauge

5.3 Snap gauge- ring gauge- thickness and length gauges- recess gauges- step gauges

5.4 Position gauges and receiver gauges- IS specifications for gauges- design of plug and snap gauges.

Reference Books:

1. Tool Engineering & Design by GR. Nagpal(Khanna publishers)
2. Jig and fixture design- 5th edition by Hoffman
3. Jigs and Fixtures by Grant