FUNDAMENTAL OF JIGS AND FIXTURES DESIGN

Duration : 3 days
Time : 9:00am – 5:00pm
Methodology : Instructor led
Presentation, exercises and discussion
Target : Engineers and Technicians (design and QC) in manufacturing industries, who involved in part testing and inspection process
Prerequisite : None. This course will mainly focus on theoretical fundamental knowledge.
Objective : This professional development course was intended to provide an overview in designing approaches of Jigs and Fixtures based on engineering design standard and value analysis.
Participants will be introduced on various types of Jigs and Fixtures design, performing engineering calculations and required tolerances analysis, inspection and testing process, and documenting the design for final fabrication process.

Course Outline :
Day 1
The Principle of Tool Design
The Objective of Tool Design
The Requirement of Tool Design in Manufacturing
Tool Design Process
Tool Designer and their Challenges
Tool Designer Specific Requirement
Overview of Jigs and Fixtures
Classes of Jigs
Types of Jigs
Types of Fixtures
Classification of Fixtures
Jigs and Fixtures Supporting and Locating Principles
Fundamental Rules for Locating Principle
Planes of Movement Principle
Locating the Work Principle
Jigs and Fixtures Clamping and Workholding Principles
The Design of Workholders
The Clamping Principles
Clamp Categories
The Use of Non-Mechanical Clamping
Special Case Clamping Methodology
Clamping Fittings and Equipment
Jigs and Fixtures Fabrication Fundamental
The Design of Tool Bodies
The Use of Preformed Materials
Application of Drill Bushings
Application of Set Blocks
Type of Fastening Devices

**Jigs and Fixtures Economic Design Aspects**
The Design Economics of Jigs and Fixtures
Design Economics and Design Economy
The Economic Analysis Principle
The Comparative Analysis Principle

**Jigs and Fixtures Initial Development Design**
Performing Jigs and Fixtures Predesign Analysis
Considering the Design Around Human Element
Overview of Previous Machining Operations
Developing Tooling Alternatives

---

**Day 2**

The Fundamental of Tool Drawings
Differences of Tool Drawings and Production Drawings
Producing Simplified Tool Drawings
Producing the Initial Drawing
Documenting and Dimensioning Tool Drawings
The Convention of Millimeter and Inch Dimensioning
Using Geometric Dimensioning and Tolerancing (GD&T) Standard Practices
Understanding Supplementary Symbols
Understanding the GD&T Tool Drawings
Overview of CAD Design for Tool Drawings

The Design of Template Jigs
Fundamental of Template Jigs
Various Types of Template Jigs
Template Jigs Design Procedures
Tool Design Application

The Design of Vice Held and Template Fixtures
Overview of Vise-Held Fixtures Design
Designing a Vise-Held Fixture
Designing a Plate Fixtures
Cam Clamps Analysis and Calculations
Overview of Tool Design Application
Overview of Cam Design Application

The Design of Plate Jigs
Overview of Plate Jigs
Designing a Plate Jig
Designing a Table Jig
Designing a Sandwich Jig or a Leaf Jig
Overview of Tool Design Application in Plate Jigs
Day 3

The Design of Angle Plate Jigs and Fixtures
Variations and Applications of Angle Plate Jigs and Fixtures
The Design Process of an Angle-Plate Jig
The Design Process of an Angle-Plate Fixture
Overview of Tool Design Application in Angle Plate Jigs and Fixtures

The Design of Channel and Box Jigs
Overview of Channel Jigs
Design Process of a Channel Jig
Overview of Box Jigs
Design Process of a Box Jig
Tool Design Application of Channel and Box Jigs

The Design of Vice Jaw Jigs and Fixtures
Overview of Machine Vise
Determining the Locating Work in Vise-jaw Workholders
Design Process of a Vise-jaw Jig
Design Process of a Vise-jaw Fixture
Tool Design Application of Vice Jaw Jigs and Fixtures

The Design of Power Workholding Features
Types of Power-Workholding Systems
Basic Operation of Power-Workholding Systems
Benefits of Power Workholding

The Design of Modular Workholding Features
Design Process of Modular Fixturing Systems
Modular Fixturing Applications

Overview of Welding and Inspection Tooling
Type of Tooling for Welding Operations
Type of Modular Fixturing for Welding
Type of Inspection Fixtures

The Design of Low Cost Jigs and Fixtures
Overview of Chucks and Chucking Accessories
Overview of Collets and Collet Accessories
Overview of Vises and Vise Accessories
Applications of Specialty Clamps and Workholding Devices

END OF COURSE