

Machine Shop Job Analysis

Course 323: Machine Shop Job Analysis

Covers types of jobs likely to be encountered by the maintenance machinist, and describes how the machinist decides which machine(s) to use for particular operations. Shows how to analyze the entire job before selecting the most efficient sequence of machining operations. Builds on Courses 315, 316, 317, and is a prerequisite for the “hands-on” projects in the courses that follow.

TPC Training is accredited by IACET to offer **0.5 CEU** for this program.



Lesson 1: Machining Cylindrical Shapes

Topics

Turning; Shoulder Facing; Machining Fillets; Turning Relief Notches; Turning Tapered Profiles; Knurling; Filing on a Lathe; Facing; Boring and Counterboring; Boring Tapered Holes; Thread Cutting; Thread Forms; Job Analysis

Objectives

- Explain the procedures for turning single and multiple diameters, including shoulders, fillets, and relief notches.
- Compute tapers, including the use of the setover method, compound rest method, and taper attachment method.
- Show how to use the cutting tools and machines for knurling, filing, and polishing.
- List the procedures for facing chucked work and work mounted between centers on the lathe.
- Describe the procedures for boring and counterboring in a lathe and boring mill.

Lesson 2: Drilling, Reaming, and Honing

Topics

Drilling in a Lathe; Workpiece Stationary/Drill Rotating; Workpiece Rotating/Drill Stationary; Drill Press Jobs; Radial Drill Presses; Spot Facing Tools; Boring Bars; Drill Bushings and Jigs; Drilling Jigs; Reaming; Honing

Objectives

- Describe the basic drilling process.
- List drilling procedures for work mounted in a lathe.
- List drilling procedures for work mounted in a drill press.
- Explain the use of reaming in a lathe and a drill press.
- Explain the use of honing and the type of equipment used.

Lesson 3: Machining Flat Surfaces

Topics

Milling Flat Surfaces; Profile Milling; Face Milling; Machining Irregular Shapes; Slotting; Shaping; Slotters; Broaching; Broaching Machines; Surface Grinding; Surface Grinding Machines; Grinding Special Shapes

Objectives

- Describe the basic milling process, cutter types, and their application.
- List slotting procedures in a milling machine.
- Define shaping, its tooling, and its relationship to planing and milling.
- Define broaching, its application, and the machines used.
- Define surface grinding, its application, and the machines used.

Lesson 4: Determining Tolerances and Finishes

Topics

Physical Dimensional Factors; Linear Dimensions; Tolerances; Limits; Tolerance Stackup; Rough Cuts; Allowances for Finishing; Finish Cuts; Factors that Affect Surface Finish; Definition of Surface Texture; Examples of Surface Finish Requirements

Objectives

- Define dimensional factors, including linear and angular dimensions.
- Compute tolerances and tolerance stackup.
- Describe allowance for finishing, including procedures for finish cuts.
- Compute surface texture in terms of an average used for final machining.
- Analyze surface finish requirements as specified for the job.

Lesson 5: Variables Affecting Job Efficiency

Topics

Machinability of Workpiece Stock; Machining Variables; Workpiece Variables; Chip Formation; Machinability Ratings; Selection and Application of Cutting Fluids; Solid Lubricants; Application of Cutting Fluids; Machining Efficiency; Keeping Workpiece Movements to a Minimum; Standard Versus Special Tooling and Fixtures; Selecting the Correct Machine; Cutter and Tool Selection

Objectives

- Define machinability of workpiece stock, including machining variables, and workpiece variables.
- Explain machinability ratings.
- Select cutting fluids, cutting lubricants, and solid lubricants.
- Describe machining efficiency, including minimal workpiece setups and standard versus special tooling and fixtures.
- Identify the correct machine and cutting tool for a given job.