

SCC CMA Training Curriculum

Manual Milling Machine Basics

Objectives: Upon completion the User will be able to operate the Manual Milling Machine in a safe manner. User will be able to set up the machine, including tramming the head, squaring the vice, and touching off tools. User will understand how to use the DRO or Vernier dials on the handwheels to move the table in a precise manner. User will understand how to select proper Speeds and Feeds based on materials and tooling to be used. User will be able to perform basic milling and drilling operations.

Time required: for a group of 8 users or less it should take about 2 hours to deliver this material. This allows for quick user interaction with the machine, but no actual practice time.

Outline:

1. Safety
 - a. Clean work area
 - b. PPE / loose clothing / jewelry / hair
 - c. Buddy Requirement
 - d. Only 1 person operates the machine
 - e. Workpiece Fixturing
 - f. Cutter and swarf containment
 - g. Sign into SUMS kiosk
2. Machine Anatomy / Parts
 - a. Head
 - b. Quill
 - c. Ram
 - d. Column / base
 - e. Knee
 - f. Saddle
 - g. Table
 - h. Power feed motors (if equipped)
3. Machine Controls
 - a. Spindle switch
 - b. Brake
 - c. Speed Control (step or vari-speed)
 - d. Back gear (and engagement check)
 - e. Quill Handle and lock
 - f. Automatic quill feed controls

- g. Head alignment adjustment points
 - h. Ram position adjustment points
 - i. Table feed handles (and power feed if equipped)
 - j. Table locks (if equipped)
 - k. Knee handle and lock
4. Machine Set-up
- a. Tramming the head / head angle adjustment points
 - b. Squaring the vice
 - c. Chucking on tools
 - d. Touching off / edge finder
 - e. Basic DRO function / jogging and feeding on Prototrak
 - f. Speeds and Feeds – sample chart – recommend online calculators
5. Milling techniques
- a. Climb versus conventional / ballscrews versus acme / backlash
 - b. Drilling
 - c. Peripheral versus end milling
 - d. Facing
6. ProtoTrak (time permitting)
- a. Power Feeding
 - b. Bolt Circle
 - c. Pockets
7. Clean-up
- a. Cleaning the T-slots / vise / way covers
 - b. Sweep around machine – how far did the chips fly?
 - c. Wipe down the table and vise / WD-40
 - d. Sign out of SUMS kiosk