

Aerospace Engineering Machine Shop Basic Safety Course

I. Purpose:

This course is designed to familiarize students with much of the equipment in the Aerospace Engineering Instrument Shop. The course stresses safety to the user, proper and improper uses of equipment, and basic maintenance. Students who wish to utilize the shop in any fashion, whether that be use of hand tools, workbench space, or stationary machines, **must** take this course and sign a safety contract.

II. Basic Safety:

- A. Wear safety glasses at all times (glasses provided)
- B. Wear closed-toed shoes at all times (no sandals)
- C. Tie back loose hair or clothing
- D. Remove all jewelry (with the exception of wedding rings)
- E. Be aware of and courteous to other shop users
- F. NO drugs or alcohol

III. Machines & Tools:

- A. Hand Tools & Workbenches
 - i) Location
 - ii) Safe use
- B. Arbor Press
 - i) Used for pressing bearings in & out
 - ii) Shatter danger (eyes)
 - iii) Pinching danger (fingers)
- C. Table Punch
 - i) Used for punching holes in sheet metal (1/16" or less)
 - ii) Acceptable items:
 - a) Aluminum, Brass, & Copper < 1/16" thick
 - b) Steel & Stainless Steel < 0.050" thick
 - c) Rubber < 1/8" thick
 - d) Plastics < 3/32" thick
 - iii) Non-Acceptable items:
 - a) Wood
 - b) Fiberglass
 - c) Any abrasive material (ask supervisor if not sure)
 - iv) Pinching Danger (fingers)
- D. Foot Shear & Corner-Notcher
 - i) Used for shearing sheet metal
 - ii) Acceptable items:
 - a) Aluminum, Brass, & Copper < 1/16" thick
 - b) Steel & Stainless Steel < 0.050" thick
 - c) Rubber < 1/8" thick
 - d) Plastics < 3/32" thick
 - e) Fiberglass (circuit boards) < 3/32" thick
 - iii) Non-Acceptable items:
 - a) Wood
 - b) Any abrasive material besides fiberglass (ask supervisor if not sure)
 - iv) Never remove cutting blades!!!!
 - v) Slicing Danger (fingers)
- G. Press Brakes
 - i) Used for bending sheet metal
 - ii) Acceptable items:
 - a) Aluminum, Brass, & Copper < 1/16" thick

- b) Steel & Stainless Steel < 0.050" thick
 - iii) Remove press fingers only with supervisor permission
 - iv) Pinching danger (fingers)
 - v) Shatter danger (eyes)
- H. Solvent tank
 - i) Used for cleaning metals of oils
 - ii) Clean ONLY metals with solvent tank
 - iii) Wipe or spray all excess chips off of part
 - iv) Use gloves
 - v) Close tank when finished
 - vi) Fire Danger
 - vii) Splatter Danger (eyes)
 - viii) Inhalation & skin absorption danger
- I. Belt Sander
 - i) Used for removing burrs, creating radii, trimming to size
 - ii) Always keep guard on sander
 - iii) Clean sander after use (making sure to unplug while cleaning)
 - iv) NEVER wear gloves
 - v) Abrasion danger (fingers)
 - vi) Heat danger (fingers)
 - vii) Inhalation danger (lungs)
 - viii) Catch danger (hands)
 - ix) Noise danger (ears)
- J. Pedestal Grinder
 - i) Used for grinding tools and occasionally hard metals
 - ii) DO NOT grind any material OTHER THAN hard metals
 - a) NO aluminum, brass, copper, wood, plastic, fiberglass, etc.
 - iii) Shatter Danger (eyes)
 - iv) Abrasion Danger (fingers)
 - v) Heat danger (fingers)
 - vi) Catch danger (hands)
 - vii) Noise danger (ears)
- K. Horizontal Band Saw
 - i) Used for cutting large materials, long lengths, and round material
 - ii) Hold the material properly
 - iii) Choose the appropriate feeds & speeds
 - iv) Use mist coolant
 - v) Cutting Danger (fingers/hands)
 - vi) Catch Danger (fingers/hands)
 - vii) Crushing Danger (feet)
- L. Vertical Band Saw
 - i) Used for cutting most materials precisely
 - ii) USE THE PROPER BLADE FOR THE MATERIAL
 - iii) Choose appropriate feeds & speeds
 - iv) NEVER wear gloves
 - v) Use mist or liquid coolant
 - vi) Use push sticks when close to blade
 - vii) Slicing danger (fingers)
 - viii) Inhalation danger (lungs)
 - ix) Noise danger (ears)
- M. Drill Press
 - i) Used for drilling holes
 - ii) Hold the material properly
 - iii) Use the proper drill for the application
 - a) Sheet Metal
 - b) Brass

- c) Center Drilling
- iv) Choose appropriate feeds and speeds
- v) Center drill when appropriate
- vi) Use coolant
- vii) Shatter Danger (eyes)
- viii) Catch Danger (fingers/hands)
- ix) Ejection Danger (other shop users/body)

N. Other shop tools

- i) Engine and tool-room lathes
- ii) Milling machines
- iii) CNC Milling machine
- iv) Welder
- v) Acetylene torch
- vi) Use of these items MUST be directly supervised
- vii) You must set up an appointment to use these machines
- viii) Unsupervised use of these machines is at instructor discretion
- ix) CNC Milling must ALWAYS be directly supervised

IV. Safety Contract:

- i) You MUST read, understand, and sign the safety contract to use shop equipment
- ii) Use of shop equipment without the supervisor's presence in the shop is prohibited
- iii) Let instructor know what machines you intend to use and for what purpose upon entering the shop
- iv) Understand the shop priority schedule and how your project fits in