

4: Milling Machine Training Video Worksheets

Video # 1: Machine Shop 4 – Milling Machine 1 (50:33)

<http://techtv.mit.edu/genres/24-how-to/videos/127-machine-shop-4>

- Mill Parts
 - Which direction does the knee move? _____
 - Which direction does the saddle move? _____

 - Which direction does the bed move? _____

 - What two purposes is the brake used for? _____

 - List the steps to remove a tool:
 - _____
 - _____
 - _____
 - _____
 - _____
 - What do you do if you cannot change from high to low gear? _____

- Quill Feed
 - Note: *Power feed no available in lab*
- Axis Handfeed
 - Note: *Digital readout available on mills for X, Y, Z locating*
- Gib Locks
 - What is this device used for? _____
- Power Feed
 - Note: *Power feeds not available on mills in lab.*
- Digital Readouts

- Do we need to worry about backlash with a digital readout? _____
- *Note: Head and vise are routinely squared by TA. This does not need to be performed by students.*
- Accessories and workholding techniques:
 - What is the “most common tool”? _____
 - To make precise holes, use what tool? _____
 - To square up stock material, use which tool? _____
 - What is an end mill held in place with? _____
 - After you drill a hole, what tool is used to refine a drilled hole? _____
 - What tool is used to find the edge of a part? _____
 - To drill large holes, what tool is used? _____

Honor Pledge: *I watched this video fully focused and without distraction. No answers were dishonestly obtained. Signed: _____ Date: _____*

Video # 2: Machine Shop 5 – Milling Machine 2 (1:03:33)

<http://techtv.mit.edu/genres/24-how-to/videos/84-machine-shop-5>

- Clamping Stock material
 - How is the hex collet block different than the square one? _____

 - What is the V-block used for? _____

 - For large parts that don’t fit in the vise, how should they be secured? _____

 - In this operation, how are parallels used? _____

 - Should the hold down clamp be exactly horizontal when clamping? _____

 - To cut material at an angle, without readjusting the vise, what tool should be used? _____

- What are a few method to securely clamp awkward positions? _____

- For clamping up thin material, what should be used? _____
- Squaring high aspect ratio parts
 - Name some problems of vibrations resulting from cantilevered parts?
 - _____
 - _____
 - How can one increase the stiffness of the part? _____

- *Note: Right Angle Attachment not available for use in lab*
 - To make high aspect ratio slots, what tool should be used? _____

 - Should coolant be used in this operation? How much? _____
- Rotary Table
 - How do you reference the center of the rotary table to the center of the quill? _____

 - What tool can be used to quickly indicate commonly spaced holes? _____

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Video # 3: Machine Shop 6 – Milling Machine 3 (42:36)

<http://techtv.mit.edu/genres/24-how-to/videos/143-machine-shop-6>

- Squaring Stock
 - What does squaring the stock mean? _____

 - Why is a concave surface desired? _____

 - What is a good depth to cut for initial squaring? _____

- For a finishing pass, what is a good depth? _____
- Squaring a Plate
 - List steps to mill the edge of a part:
 - _____
 - _____
 - _____
 - _____
 - _____
 - _____
 - _____
 - _____
 - _____
 - _____
 - When milling the edge of a horizontal part, what is a good pass depth for accurate dimensions? _____
 - Why can one not go deeper per pass? _____

 - When roughing out stock, or removing large amounts of material, what is a good pass depth? _____
- Edge-finder
 - To locate the part relative to the spindle of the machine, what tool is used?____

 - Does the machine need to be spinning for this tool to be used? _____
 - *Note: The electronic edge finders should not be spun*
 - When you have located the edge of the part, is the center of the spindle located over the edge of the part? _____

- Drilling Holes
 - What tool is used to start drilling a hole? _____

- What is special about this tool? _____

- How deep should this first hole be drilled? _____

- When should cutting fluid be used? _____

- What precaution should be taken when drilling all the way through a part? _____

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Video # 4: Machine Shop 7 – Milling Machine 4 (23:07)

<http://techtv.mit.edu/genres/24-how-to/videos/183-machine-shop-7>

- Reaming Holes
 - How close can one expect a hole diameter to be to the state drill size? _____

 - If one requires a more accurate hole than this, what tool should be used? _____

 - How precise can this tool be? _____
- Boring Holes
 - *Should* this tool be used to take out a lot of material at once? _____
 - *Can* this tool be used to take out a lot of material at once? _____
 - Can absolute hole sizes be bored, or relative? _____

- Milling a Slot
 - What is the most common tool used for milling? _____
 - What is the depth of cut that can be taken? _____

- How does one produce a very flat surface, with a good surface finish? _____

- Milling a Shoulder
 - What is climb milling? _____

 - What is conventional milling? _____

 - Which is more dangerous? _____
 - Which is better for finish cuts? _____
 - Which is better for rough cuts? _____
- Cleaning the machine
 - Should compressed air be used to clean a machine? _____
 - What is the risk? _____

 - When should the cutting tool be removed? _____
 - When should the machine be cleaned? _____

Honor Pledge: *I watched this video fully focused and without distraction. No answers were dishonestly obtained. Signed: _____ Date: _____*