# JOB SAFETY ANALYSIS

Safety Information for the University of California, Berkeley

## DEPARTMENT OF MECHANICAL ENGINEERING

### OPERATING A VERTICAL MILLING MACHINE

<table>
<thead>
<tr>
<th>TASK</th>
<th>HAZARDS</th>
<th>CONTROLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assess work area; is it clear of obstructions and slip/trip/fall hazards?</td>
<td>• Slip, trip, or fall</td>
<td>• Clear work area of any obstructions or slip/trip/fall hazards</td>
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<tr>
<td>2. Install vise or work piece.</td>
<td>• Pinching hazard for hands/fingers</td>
<td>• Avoid pinch points</td>
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<td>• Foot injury from dropping of heavy objects</td>
<td>• Position body to maintain balance, maximize use of legs, and ask for assistance if necessary</td>
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<tr>
<td>3. Insert end mill into collet (or insert drill bit into drill chuck), then install it in the spindle of the milling machine.</td>
<td>• Pinching hazards</td>
<td>• Keep hands free from pinch points</td>
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<td></td>
<td>• Lacerations to hands/fingers from bit</td>
<td>• Handle tool bit with care; avoid sharp edges</td>
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<tr>
<td></td>
<td>• Misalignment of drill bit in chuck</td>
<td>• Ensure all 3 chuck jaws are making contact with the bit</td>
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<tr>
<td></td>
<td>• Cutter dislodged from collet</td>
<td>• Ensure the cutter is tightly secured in the collet before turning on the spindle</td>
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<tr>
<td>4. Adjust the gear and speed of the spindle for your application</td>
<td>• Pinching hazard for hands/fingers</td>
<td>• Avoid pinch points</td>
</tr>
<tr>
<td>5. Turn on spindle</td>
<td>• Cutter dislodged from collet</td>
<td>• Ensure the cutter is tightly secured in the collet before turning on the spindle</td>
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<tr>
<td></td>
<td>• Lacerations to hands/fingers from rotating cutter</td>
<td>• Do not place your hands or fingers anywhere near the rotating cutter</td>
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<td></td>
<td>• Operator entanglement</td>
<td>• Never wear loose clothing when operating, tie hair back, tuck in drawstrings, and remove jewelry.</td>
</tr>
<tr>
<td>Step</td>
<td>Task</td>
<td>Hazards/Precautions</td>
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</tbody>
</table>
| 6.   | Feed cutter into workpiece | - Lacerations to hands/fingers from rotating cutter  
- Eye injury from flying debris  
- Material dislodged from the vise  
- Lacerations to hands/fingers from chips  
- Burning hazards from chips  
- Lacerations to hands/fingers from the cut part  
- Excessive noise  
- Do not place your hands or fingers anywhere near the rotating cutter  
- Always wear safety glasses when operating equipment  
- Ensure the material is securely fastened in vise before making a cut  
- Never brush chips away with bare hands or fingers. Use a chip brush or pliers to remove chips.  
- Stand to the side of the cut or use a chip shield; hot chips can burn skin  
- Always deburr your parts before handling  
- Wear ear plugs/muffs if necessary |
| 7.   | Turn off machine and remove cutter | - Pinching hazards  
- Lacerations to hands/fingers from bit  
- Keep hands free from pinch points  
- Handle tool bit with care; avoid sharp edges |
| 8.   | Remove finished work piece and clean machine | - Lacerations to hands/fingers from chips  
- Lacerations to hands/fingers from the cut part  
- Eye injury from debris  
- Never brush chips away with bare hands or fingers. Use a chip brush or pliers to remove chips.  
- Always deburr your parts before handling  
- Do not use compressed air to clean table. Use a chip brush and wipe up excess oil.  |

**Required Training:**
Student Shop Safety Training Program (*Phase 3*)

**Required Personal Protective Equipment (PPE):**
- Safety glasses, ear plugs/muffs

ME Pro Shop, Scott G. McCormick; R&D Engineering Manager, Jacob Gallego; Principal Lab. Mech.  
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(EH&S will insert number here, if applicable)

For more information about this JSA, contact the Office of Environment, Health and Safety at UC Berkeley, 317 University Hall #1150, Berkeley, CA 94720-1150  
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