

DEPARTMENT OF MECHANICAL ENGINEERING

Name of SOP	Lathe usage room 207
Effective Date	Nov 2007
Author	Jim McLaren
Reason for SOP	<p>Check All that Apply:</p> <p><input checked="" type="checkbox"/> Procedure/Process could cause critical injury.</p> <p><input type="checkbox"/> Procedure/Process could cause occupational illness.</p> <p><input type="checkbox"/> Procedure/Process could cause environmental impairment.</p> <p><input checked="" type="checkbox"/> Procedure/Process could damage University property.</p> <p><input type="checkbox"/> Supervisor's discretion.</p> <p>Provide Details:</p> <p>Potential for injury due to rotating machinery</p> <p>Injury from metal cuttings or objects/work piece ejected from machine.</p>
Approved by (supervisor)	Ron Lodewyks
Date reviewed by JHSC	

Definitions

Terms	
Acronyms	<p>RMM – Risk Management Manual</p> <p>JHSC - Joint Health and Safety Committee</p> <p>EOHSS - Environmental and Occupational Health Support Services</p> <p>EPA – Environmental Protection Act</p> <p>OHSA – Occupational Health and Safety Act</p>

Requirements

<p>Applicable OHSA regulations and / or codes of practice.</p> <ol style="list-style-type: none"> 1. OHSA code. 2. McMaster University Risk Management Policies
<p>Training and competency.</p> <ol style="list-style-type: none"> 1. Training provided by Mechanical Engineering technicians . 2. Lab supervised by Mechanical Engineering technicians 3. Competency is shown by the individual after training. Those persons using the facilities must attend a “shop safety course” and pass a written test in order to use the shop facilities

Description of the Task

Location and time of work	JHE 207, 207A, 207B, 207C during normal working hours
Individuals and skills required	Undergraduate students, graduate students, faculty members, workers etc. who have attended the mandatory “Machine shop safety” training course. Those who have demonstrated competency-or

	have received instruction in the required process procedure.
Equipment and supplies required	Colchester lathes, standard and special work holding devices as required eg. Collet, 3&4 jaw chucks, face plates etc. standard and special cutting tools and their holders , cutting inserts, drills, reamers etc
Personal protective equipment required	Safety glasses, As required hearing protection or foot protection

Sequential Steps to Complete the Work Safely

General safety instructions

1. **Develop and use common sense** when using the equipment (think before you act).
2. Be sure to discuss the operation of the lathe in detail with the Technician
3. before operating the machine
4. Do not operate the machine until you have had proper training.
5. Make sure the work piece is adequately clamped in the spindle for the job being performed. The clamping force must be high enough to resist movement under these conditions. Make sure the Technician checks the part clamping before starting the machine. **(Never leave the chuck key in the chuck.)**
6. Make sure the tool holder and cutting insert are adequately clamped for the job being performed.
7. **Always wear safety glasses** when in the project laboratories.
8. Long hair should be tied back to avoid being caught in the revolving parts of the machine **(Keep loose items away from rotating objects).**
9. Loose clothing, rings or watches must not be worn when operating machine tools to avoid getting caught in the rotating part of the machine.
10. Wear long pants (preferably cotton) as metal cuttings removed from the work piece during the machining process can reach temperatures in excess of 300°C and will burn.
11. **No sandals or open toed shoes are permitted in the lab.**
12. Watch out for sharp edges on the part, tool and on the chips.
13. Do not use rags near the rotating machines when the spindle is running. Rags can be caught in the rotating spindle and the result can be serious injury. Rags may be used for material handling and for cleaning purposes provided there are no rotating hazards nearby.
14. Use extreme caution with the chips produced during machining. Chips are sharp and some chips are long stringers which can easily be caught up in the spindle and rotating work and thrown with great force. Do not clear chips away from the work area when the machine is in operation. If it is necessary ask the Technician how this can be best done. (If necessary there is a long handled tool available for pushing the chips out of the way.)
15. It is mandatory to report all cases of injury to the Technician
16. Anyone using the lab equipment is expected to work safely at all times. If you do not work safely you will be asked to leave.. Re-admittance to complete the lab requires the approval of the department chair. You are responsible for your safety and the safety of others working around you. If you do not know how to safely operate the equipment it is your responsibility to obtain the proper instruction from the Technician

Sequential steps to complete the work safely.

1. Safety glasses must be worn.
2. If competency level has been achieved continue setting up machine. If not review safety rules with a Mechanical Engineering technician

3. For additional information on specific machine tool operations see the text book "Technology of Machine Tools" kept in the Technician's office.
4. Make sure work piece is properly secured in the appropriate work holding device before turning on power.
5. Ensure chuck key is removed from chuck
6. If more than 3 times the diameter of work piece is protruding from the chuck use the tailstock or a steady rest to support the work piece. If the tailstock is to be used make sure tailstock is in position and locked (Fig 1)
7. If the tailstock is not being used, make sure it is pulled to the right hand side of the machine and is not obstructing the free movement or access of the work piece or operator.
8. Install the appropriate tool for the job to be performed do not allow the tool to extend excessively without support
9. Select proper feeds and speeds (Figs.3 and 4)

Power-Up sequence

1. Switch machine power on (power switch is located on back of headstock (Fig.5)
2. Make sure emergency stop button is released Pull stop toward you . (Fig. 6).
3. Press green start button (Fig.6)

Machine operation

1. Start spindle rotation. Pull spindle on/off handle to right and then downward for forward or counterclockwise rotation when viewed from the tool or tailstock position.(Fig7)
2. With the tool clear of the work piece and tailstock check the feed direction and visually confirm feed rate, correct if required
3. Carefully touch tool to rotating work piece and set ZERO on cross feed graduated dial and/or digital readout if equipped.
4. Move cutting tool clear of work piece Relocate cutting tool to right hand side of work piece . Set depth of cut.
5. Start feed by pulling feed on/off lever up. (Fig.8)
6. Stop feed by pushing feed on/off lever downward.
7. Stop spindle .Pull spindle on/off handle up
8. If unsure of any of above sequences consult technician or consult reference text book "Technology of Machine Tools" kept in the technicians office.

Power down sequence

1. Press red emergency stop button.
2. Switch off breaker at back of head stock (Fig. 3.)
3. Clean and remove all cuttings from machine
4. Use gloves if necessary
5. Clean floor area around machine

Contingency Plan and Reporting

Accident / injury response

1. Notify Mechanical Engineering technical staff .Apply first aid as required immediately .
2. For all injuries complete a "Injury/Incident Report" and provide a copy to the Chair and EOHS
3. In case of critical injury call security (DIAL 88).

4. In case of critical injury notify EOHSS immediately, ext 24352

Spill response

If **coolant** is spilled contact a technician who will determine which of the following is appropriate.

In small quantities use available absorbent to minimize slipping hazard.

In larger quantities use a wet/dry vacuum to remove coolant from floor replace into the machine if suitable. If coolant is not useable due to contamination the technician will package and follow established hazardous waste practices for disposal.

If **oil** is spilled contact a technician who will determine which of the following is appropriate.

In small quantities use available absorbent to minimize slipping hazard.

In larger quantities use a wet/dry vacuum to remove oil from floor, the technician will package and follow established hazardous waste practices for disposal.

Equipment shutdowns.

In cases where the machine malfunctions or seems to behave in an erratic manner eg. fails to start, stop or displays excessive vibration etc. contact a technician immediately.

When repairs are made the lock out tag out procedures of [306 Lockout / Tag-out Program](#) will be followed.

Environmental Responsibility

Waste disposal procedures

As indicated in the "Spill Response" area above when oil or coolant is spilled or replaced for maintenance purposes these activities are to be performed or directed by the technical staff who will follow [502 Hazardous Waste Management Program](#)

Building air quality

In some operations cutting oils will generate smoke in these cases use the local exhaust fans to clear the air.

References

1. RMM Policy #300 Safety Orientation and Training Program
2. RMM Policy #301 Standard Operating Procedure
3. RMM [306 Lockout / Tag-out Program](#)
4. RMM Policy #309 Laboratory Safety Manual
5. RMM Policy #310 Eye Protection.
6. RMM [317 Machine Shop Safety Program](#)
7. RMM Policy #403 Noise Control and Hearing Preservation
8. RMM Policy #1000 Reporting and Investigating Injury, Incidents and Occupational Disease

Distribution

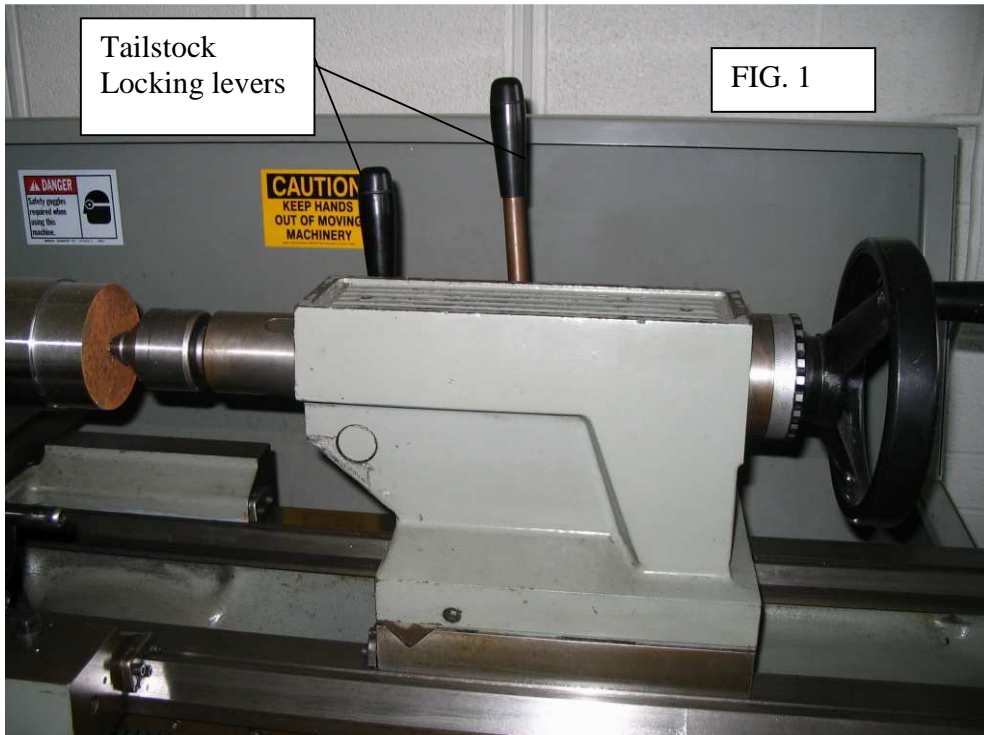
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|---|
| <ol style="list-style-type: none">1. Supervisor2. Technical Staff of Mechanical Engineering3. Available in JHE 207 for reference4. Faculty of Engineering JHSC |
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Risk Management Manual (RMM)

<http://www.workingatmcmaster.ca/link.php?link=Job+Matters%3APolicy-Manual>

Environmental and Occupational Health Support Services

<http://www.workingatmcmaster.ca/link.php?link=Job%20Matters:EOHSS>

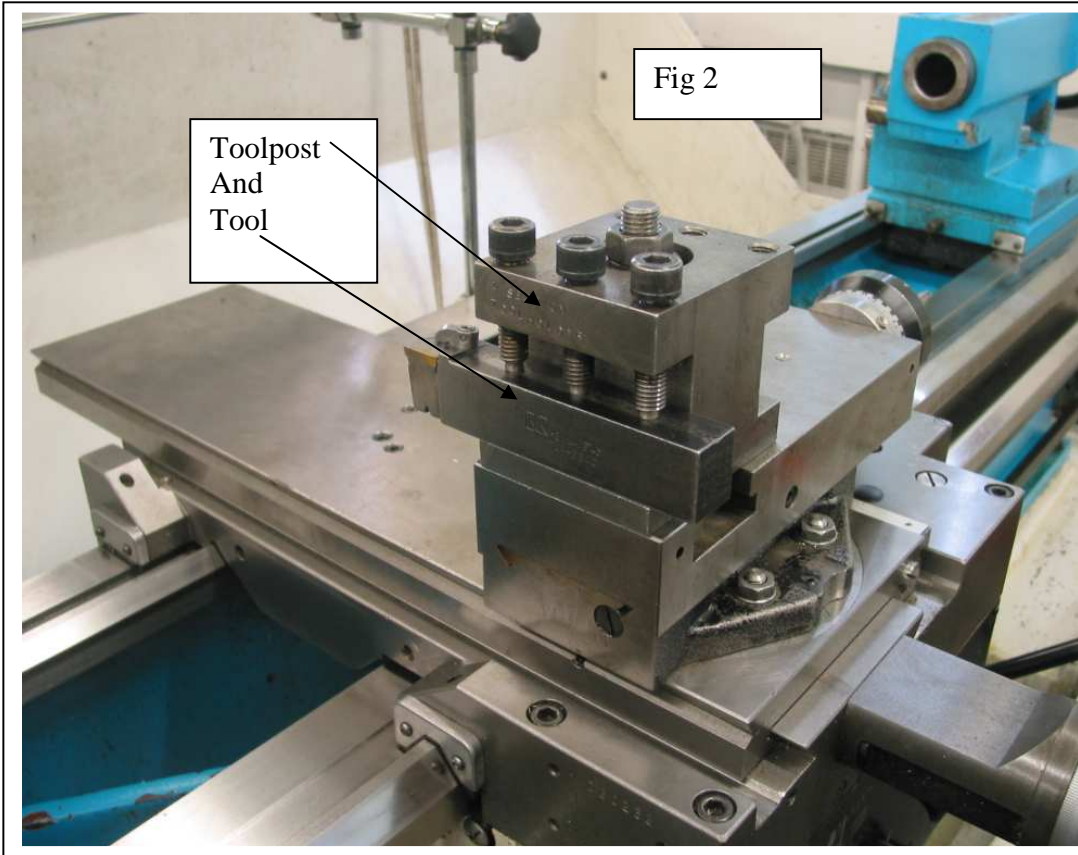


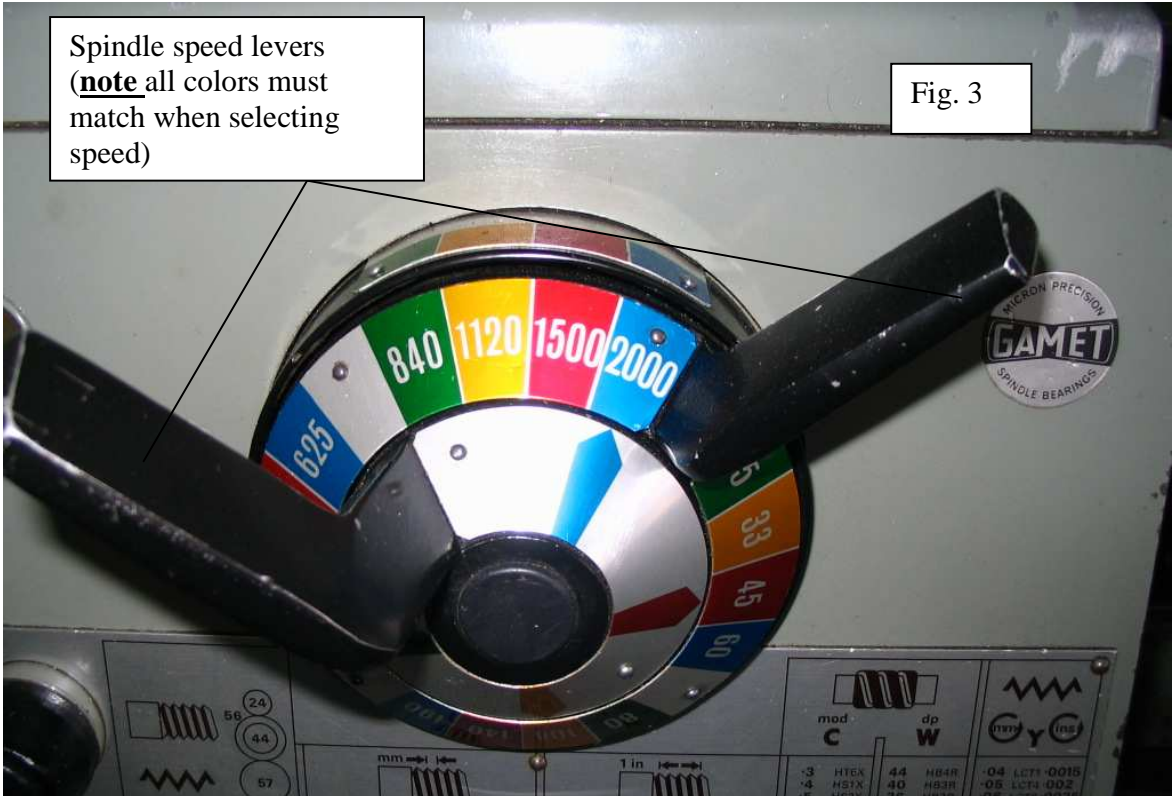
Tailstock
Locking levers

FIG. 1

DANGER
Safety program
required when
using this
tool.

CAUTION
KEEP HANDS
OUT OF MOVING
MACHINERY





Feed levers and knob



Fig. 4





Fig. 6

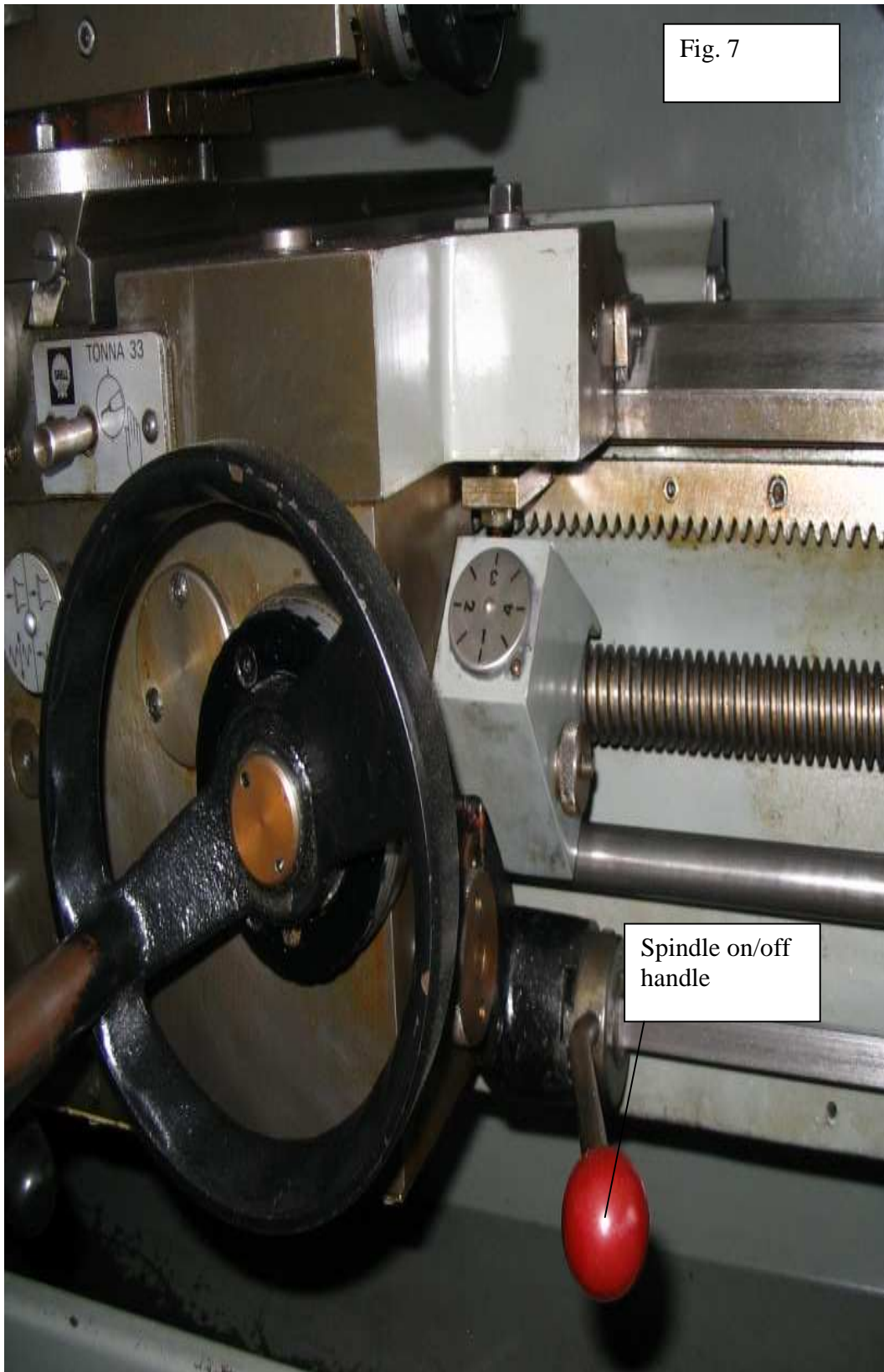


Fig. 7

Spindle on/off handle

Feed directional
Mode controls
Position 1 Longitudinal machining
Position 2 Threading
Position 3 Crossfeed (Facing)

Fig. 8

Feed on/off
lever

