ONTARIO COUNCIL FOR TECHNOLOGY EDUCATION

STANDARD OPERATING PROCEDURES DOCUMENT

METAL LATHE

Scope and Responsibilities

This standard operating procedure (SOP) applies to all personnel who operate and instruct on the safe operation and use of the Metal Lathe. In a school setting this includes,

- **Administrators/Teachers**: Ensure operators are trained and the SOP is followed
- **Students/Teachers/Operators**: Follow the owner/operators manual, industry recommendations, this SOP, guarding is in place, and wear the appropriate personal protective equipment (PPE)

SAFETY IS A PRIORITY ! DO NOT use this machine unless you have received instruction in its safe use and operation and have been given permission by your teacher.

To ensure the safe and efficient operation of the metal lathe, this machine requires:


Safety glasses must be worn at all times in work areas.


Closed toe / CSA approved footwear must be worn at all times in work areas.


Keep hands clear of blades, cutters, and/or router or drill bits. Rings and jewelry must not be worn.


Hearing protection may be required for certain operations.


Close fitting / protective clothing must be worn.


Long and loose hair must be contained.

Personal Protective Equipment (PPE)

- Safety glasses or face shield
- Close fitting clothes and/or protective shop coat
- Hearing protection
- Closed-toed footwear (CSA Safety footwear is required on Co-Op placements in industry)

Pre-Operational Checks

- **Always refer to the manufacturer's manual**
- Check workspace and walkways to ensure no slip-hazards are present
- Check that the chuck guard is in position
- Ensure the chuck key (self-ejecting preferred) has been removed from the chuck
- Locate and ensure you are familiar with the operation of the ON/OFF starter and E-Stop (if fitted)
- Follow correct clamping procedures to ensure work is secure
- Remove all tools from the bed and slides of the machine
- Ensure the correct speed for the machining process is selected
- Do not try to lift chucks or face plates that are too heavy for you
- Faulty equipment must not be used. Immediately report suspect equipment
- Only use sharp cutting tools that are in good condition

This equipment SOP provides a general guideline for operating a metal lathe. Always refer to the manufacturer's manual, industry best practices, and specific workplace safety protocols for detailed instructions. IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR or SUPERVISOR.

Operational Steps

1. Preparation
    - Make sure you have been authorized to use this metal lathe - you have received training, passed the test, have demonstrated the safe use of this metal lathe and have a safety passport signed
    - You are “shop ready” – trained, proper clothing, wearing required PPE, etc.
    - Never leave the metal lathe while it is running
    - Before making adjustments or measurements switch off and bring the machine to a complete standstill
    - Do not attempt to slow/stop the chuck or revolving work by hand
    - Avoid letting swarf build up on the tool or job. Stop the machine and remove it
    - Use a safe working posture (beware of hair catching)
    - Always remove the chuck key from the chuck
    - Do not store tools and parts on top of the machine
    - Never override or defeat a safety device
2. Starting the Machine
    - Engage magnetic starter
    - Start the metal lathe and allow it to reach full speed before beginning the operation
    - Use cutting fluid (if required)
3. Facing Operation
    - Always use the correct angle of the cutter
    - Center the tool bit using the tail stock and dead center
    - Position the cutter perpendicular to the face of the work using the cross feed
    - Take light cuts, moving from outside the part towards the middle until the surface is flat
4. Parallel Turning
    - Position tool post parallel to the work
    - Use the correct tool bit and tool holder for the job
    - Using the auto-feed or the carriage handwheel, take light cuts until desired diameter is achieved
    - Measure only with the lathe chuck fully stopped
5. Shutting Down the Machine
    - Turn off the metal lathe and allow the chuck to come to a complete stop
    - Release and remove your workpiece
    - Clean the machine and work area

Post-Operational Checks

- Inspect the tool bit(s) for any damage
- Clean the machine as required
- Replace guard for the next operator once machine is cleaned
- Report any issues or maintenance needs to the supervisor/instructor

Common Problems of Operation

- Machine does not power up
- Lead Screw or feed rod does not move
- Chuck key does not tighten or fit the chuck
- Dull or damaged tool bits
- Improper set up

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Safety Precautions

- When starting a metal lathe, always stand in front of the machine, never off to the side or behind
- Never leave the metal lathe unattended while it is running
- Always deburr your work with a file or deburr tool
  Keep hands and head away from the chuck during operation
- Wear Personal Protective Equipment (P.P.E) such as safety glasses, safety goggles, face shields, proper clothing as appropriate, NO GLOVES
- No loose clothing, long hair, or jewelry is allowed in the shop
- Only operate the metal lathe after you have received instruction and permission from the teacher
- Never leave the chuck key in the chuck
- Be aware of the positions of the on/off and forward/reverse switches and emergency STOP button
- Ensure that the tool is centered and tight
- Ensure all handles and controls operate correctly before starting
- Always select the correct speeds and feeds for material and tools being used

Common Injuries Sustained

- Cuts, lacerations, and burns
- Descalp of long hair
- Entanglement of loose sleeves, long hair, etc.

Maintenance

- Always refer to the manufacturer's manual
- Regularly check and repair or replace damaged or worn equipment immediately
- Clean and lubricate the machine as required
- Keep a maintenance log for the machine
- Inspect the electrical cords for damage, cracked insulation, fraying, etc.
- Inspect tool bits before using – always use sharp bits in good condition
- Sharpen bits as instructed by your teacher and dispose of broken ones

Work Zones

- Typically, in front of the machine approximately 1 meter (3 feet) the length of the machine
- Work zone or area should be identified on the floor (i.e.: yellow paint or tape)
- Work zone or area should not be entered while operator is using the machine

Additional Information can be found at,
Ontario Council for Technology Education SAFEdocs and ToolSAFE Videos: OCTE
Canadian Center for Health and Safety Lathes
WayKen Rapid Manufacturing Lathe Cutting Tools Types
The Little Machine Shop.com Grinding Tool Bits

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