CONVENTIONAL LATHES

Equipment Identification:

Completed by: Date:

MACHINE ACTION TOOL

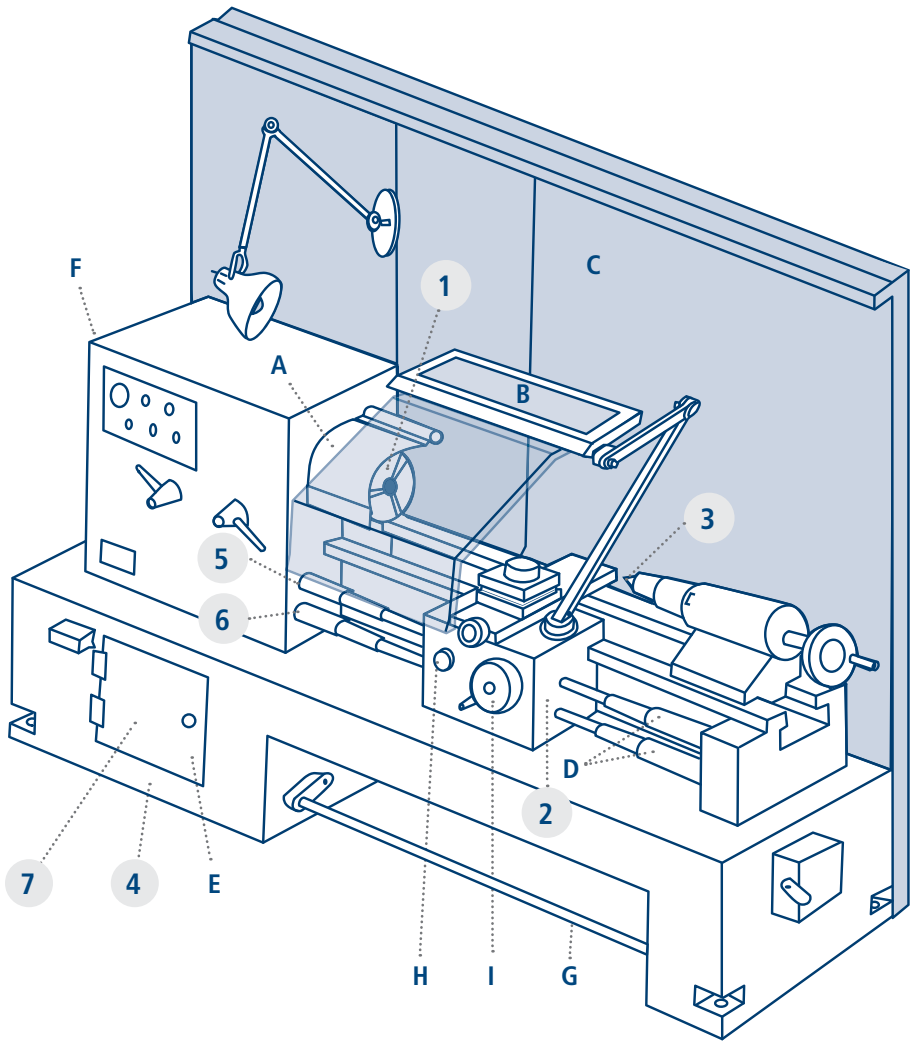
The purpose of this technical sheet is to provide information on the main risk factors associated with conventional lathes and to propose different ways to control them.

Manual lathe components

1. Chuck
2. Tool holder
3. Tailstock
4. Frame
5. Leadscrew
6. Feedshaft
7. Access to power transmission elements

Safety features

- A Interlocking chuck guard
- B Movable front guard
- C Rear guard
- D Leadscrew and feedshaft protectors
- E Fixed or interlocking guard
- F Rear spindle end guard
- G Foot-operated emergency stop
- H Emergency stop button
- I Handwheel with automatic disengagement or plain solid



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CONVENTIONAL LATHES

HOW TO USE THIS DOCUMENT?

In the manner of an audit:

- Systematically review potential risk factors and identify those that are present.
- For each of the identified risk factors, review the proposed prevention measures to select those that seem most appropriate.

For training purposes:

- Target the instructions within the set of prevention measures.
- Provide the necessary means to comply with the instructions.
- Pass on instructions to workers and ensure their implementation.

CAUTION

This document focuses only on mechanical and electrical risk factors. However, there may be other risk factors when using this machine, including those of a chemical, biological or ergonomic nature.

DESCRIPTION

The lathe is a machine tool that allows the shaping of parts by chip removal. The machine process steps are individually controlled by the operator without the aid of a CNC digital program. Unlike many other machine tools, it is the workpiece that rotates and the tool that is held stationary.

INJURIES

The most common injuries with this machine are cuts, amputation, fractures, crushing and foreign objects, electrification and burns.

RISK FACTORS

#	MECHANICAL	PRESENT? (Yes / No)
1	Contact with the rotating part or chuck	
2	Accidentally starting the lathe during maintenance or repair	
3	Contact with the power transmission elements	
4	Contact with the sharp edges of the stationary workpiece, chips, or tool	
5	Fall of material	
6	Falling, slipping	
7	Projections of various elements (chuck key, tool fragments, part, chips, etc.)	
7 a)	Projection of the chuck key	
7 b)	Projection of fragments in case of tool breakage	
7 c)	Projection of the part or fragments due to a poorly secured part	
7 d)	Projection of fragments due to wrong cutting parameters	
7 e)	Chip projection and movement	

#	ELECTRIC	
8	Contact with elements usually or accidentally energized	

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1 CONTACT WITH THE ROTATING PART OR CHUCK

PREVENTIVE MEASURES	Applied ☑	Not applicable n/a	NOTES (responsible / schedule / priority)
TECHNICAL MEASURES			
Install an interlocking chuck guard* linked with the spindle drive. • The guard covers the entire chuck body, from the frame to the end of the jaws. • The guard should cover at least the top half of the chuck.	☐		
Install a clear, movable guard in front of the cutting area.	☐		
Install a guard for the leadscrew and feedshaft if accessible.	☐		
Modify the handwheels so that they have automatic disengagement or are plain solid (no spokes).	☐		
Install a valve to adjust the flow of cutting fluid to have easy access without getting close to the chuck or the rotating part.	☐		
Install a brake (mechanical, electrical, etc.) to quickly stop the rotation of the chuck and the workpiece.	☐		
Install an emergency stop device within reach of the worker. The emergency stop must activate the brake.	☐		
SAFETY INSTRUCTIONS			
Wait for the complete stop of the chuck rotation before carrying out any intervention near the chuck or the part, such as removing or fixing a part, measuring, removing chips, etc.	☐		
Use a brush with long, smooth handle without loops or hooks to remove chips.	☐		
Never approach the rotating workpiece or chuck with gloves or a rag.	☐		
Wear close-fitting clothing.	☐		
Do not wear jewelry.	☐		
Tie back long hair and contain it in a cap.	☐		
Never leave the chuck and workpiece running unattended.	☐		
Do not use hand tools (lathe file and emery cloth) to deburr or finish a part. Use a system specifically designed and adapted for deburring or polishing operations that keeps hands away from the danger zone and thus reduces the risk of being caught.	☐		

2 ACCIDENTALLY STARTING THE LATHE DURING MAINTENANCE OR REPAIR

PREVENTIVE MEASURES	Applied ☑	Not applicable n/a	NOTES (responsible / schedule / priority)
SAFETY INSTRUCTIONS			
Apply a lockout procedure during maintenance or repair work: • Isolate energy sources • Lock out the isolation devices • Dissipate residual energy • Make sure that no start-up is possible.	☐		

3 CONTACT WITH THE ELEMENTS OF THE MOVEMENT TRANSMISSION MECHANISMS

PREVENTIVE MEASURES	Applied ☑	Not applicable n/a	NOTES (responsible / schedule / priority)
TECHNICAL MEASURES			
Install fixed or interlocking* guards to limit access to pulleys, belts, gears, etc.	☐		

*NOTES
An interlocking guard must have the following characteristics:
- It causes the machine or its dangerous parts to stop working when it is moved;
- It makes it impossible to start the machine or to operate its dangerous parts until it is replaced;
- it does not cause the machine or its dangerous parts to start up when it is put back in place.

These characteristics correspond to the definition of an interlocking guard in the ROHS. For interlocks, use a safety switch with forced opening of the contacts, installed according to the positive actuation principle.

4 CONTACT WITH THE CUTTING EDGES OF THE STATIONARY WORKPIECE, CHIPS, OR TOOL

PREVENTIVE MEASURES	Applied ☑	Not applicable n/a	NOTES (responsible / schedule / priority)
SAFETY INSTRUCTIONS			
Mount the part as far away from the tool as possible.	☐		
Coat the end of the tool with a material that protects against sharp edges during handling.	☐		
Use a rag or cut-resistant gloves for handling, only when the workpiece and chuck are stopped.	☐		
Prefer tightening the mounting elements of the part and the tool by pulling towards you.	☐		
Immediately store unused cutting tools.	☐		
Remove the chips with a brush.	☐		

5 FALL OF MATERIAL

PREVENTIVE MEASURES	Applied ☑	Not applicable n/a	NOTES (responsible / schedule / priority)
TECHNICAL MEASURES			
Anchor the lathe frame securely to the floor.	☐		
Provide mechanical handling equipment (hoist, lifting table transport trolley, etc.) adapted to the weight and size of the parts, tools and assembly accessories.	☐		
SAFETY INSTRUCTIONS			
Check that there is no object on the lathe that could potentially fall.	☐		
Wear CSA approved safety shoes with steel toe caps.	☐		

6 FALLING, SLIPPING

PREVENTIVE MEASURES	Applied ☑	Not applicable n/a	NOTES (responsible / schedule / priority)
TECHNICAL MEASURES			
Install a movable transparent guard in front of the cutting area to prevent the projection of chips or cutting fluid.	☐		
Install a screen behind the lathe to prevent chips or fluids from splashing onto the floor.	☐		
Repair and clean the floor: uneven surface, holes, slippery floor, presence of chips, etc.	☐		
Install a mat with beveled edges.	☐		
SAFETY INSTRUCTIONS			
Minimize cutting fluid flow and pressure.	☐		
Direct the cutting fluid stream to minimize splashing.	☐		

Remarks

7 PROJECTIONS OF VARIOUS ELEMENTS (CHUCK KEY, TOOL FRAGMENTS, PART, CHIPS, ETC.)

PREVENTIVE MEASURES	Applied ☑	Not applicable n/a	NOTES (responsible / schedule / priority)
TECHNICAL MEASURES			
Install a chuck guard.	☐		
Install a clear, movable guard in front of the cutting area.	☐		
Install a screen behind the lathe at a height of 1.8 meters (6 feet). This height can be adjusted according to the distance (see ISO 13857: 2008.) Another option is to install the lathe next to a wall.	☐		
Orient the lathe in such a way as to prevent the projections from reaching workstations nearby.	☐		
SAFETY INSTRUCTIONS			
Tangent (position the cutting tool in relation to the workpiece) only when the workpiece is rotating.	☐		
Stop the lathe if an unusual vibration or sound is heard.	☐		
Wear a CSA approved safety glasses with side shields near the lathe.	☐		
If necessary, wear a CSA approved safety face shield in addition to protective eyewear.	☐		

7 a) PROJECTION OF THE CHUCK KEY

PREVENTIVE MEASURES	Applied ☑	Not applicable n/a	NOTES (responsible / schedule / priority)
TECHNICAL MEASURES			
Provide a spring-loaded chuck key (self-ejecting) to install the workpiece on the chuck.	☐		
Make sure the chuck guard cannot be put on while the key is still on the chuck.	☐		
SAFETY INSTRUCTIONS			
Make sure the key is removed from the chuck before starting the lathe.	☐		

7 b) PROJECTION OF FRAGMENTS IN CASE OF TOOL BREAKAGE

PREVENTIVE MEASURES	Applied ☑	Not applicable n/a	NOTES (responsible / schedule / priority)
SAFETY INSTRUCTIONS			
Check that the cutting edges of the tool are in good condition.	☐		
Securely attach the inserts and cutting tools before starting the machine.	☐		
Stop the rapid feed at a sufficient distance from the workpiece assembly.	☐		

7 c) PROJECTION OF THE PART OR FRAGMENTS DUE TO A POORLY SECURED PART

PREVENTIVE MEASURES	Applied ☑	Not applicable n/a	NOTES (responsible / schedule / priority)
SAFETY INSTRUCTIONS			
Make sure that the part is secured in the chuck according to best practices.	☐		

7 d) PROJECTION OF FRAGMENTS DUE TO WRONG CUTTING PARAMETERS

PREVENTIVE MEASURES	Applied ☑	Not applicable n/a	NOTES (responsible / schedule / priority)
SAFETY INSTRUCTIONS			
Consult the tool manufacturer's data or other technical information to choose the right cutting parameters combination (feed rate, depth of cut, cutting speed, lubrication) according to the material, the operations to be carried out, the assembly method and the tool used.	☐		

7 e) CHIP PROJECTION AND MOVEMENT

PREVENTIVE MEASURES	Applied ☑	Not applicable n/a	NOTES (responsible / schedule / priority)
SAFETY INSTRUCTIONS			
Choose the right cutting parameters to avoid long metal chips.	☐		
Use cutting and drilling tools equipped with chip breakers. Otherwise, move back and forth when drilling.	☐		
Use pliers to remove a long chip only when the chuck is stopped.	☐		
The preferred method for cleaning chips should be the use of a brush. If compressed air is needed, make sure the pressure stays below 200 kPa (30 psi). Never blow with your mouth towards the chips to remove them.	☐		

8 CONTACT WITH ELEMENTS USUALLY OR ACCIDENTALLY ENERGIZED

PREVENTIVE MEASURES	Applied ☑	Not applicable n/a	NOTES (responsible / schedule / priority)
TECHNICAL MEASURES			
Install and identify a circuit breaker near the lathe.	☐		
SAFETY INSTRUCTIONS			
Apply a lockout procedure during maintenance or repair work: • Isolate energy sources • Lock out the isolation devices • Dissipate residual energy • Make sure that no start-up is possible.	☐		
Check the insulation of the power cables and grounding of the electrical circuit of the lathe.	☐		

Remarks

NEED ASSISTANCE?

Do not hesitate to consult your MultiPrevention consultants if you have any questions about this sheet or about occupational health and safety.

REFERENCES

The proposed preventive measures come in part from the Regulation respecting occupational health and safety (RROHS, S-2.1, r.13), the Quebec Act respecting occupational health and safety (AOHS, S-2.1), ISO Standard 23125, *Machine Tools-Safety - Turning Machines*, 2010 and the INRS safety data sheet, Lathes, 1998.

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