<table>
<thead>
<tr>
<th>NAME</th>
<th>EMAIL</th>
<th>PHONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amber Hayes, Project Director</td>
<td><a href="mailto:midas@kast.com">midas@kast.com</a></td>
<td>250-368-7618 (m)</td>
</tr>
<tr>
<td>Brad Pommen, Lab Director</td>
<td><a href="mailto:director@midaslab.ca">director@midaslab.ca</a></td>
<td>250-354-9420 (m)</td>
</tr>
<tr>
<td>Sharon Thompson, Facility Manager (Fenix)</td>
<td><a href="mailto:admin@midaslab.ca">admin@midaslab.ca</a></td>
<td>778-456-2525 (o)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>250-368-1442 (m)</td>
</tr>
<tr>
<td>Joleen Kinakin, Administrative Coordinator</td>
<td><a href="mailto:info@midaslab.ca">info@midaslab.ca</a></td>
<td>1-844-643-2722 (o)</td>
</tr>
<tr>
<td>MIDAS Lab</td>
<td></td>
<td>1-844-643-2722 (o)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KAST CONTACTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erin Handy, Executive Director</td>
</tr>
<tr>
<td>Kandy Schroder, Operations Manager</td>
</tr>
<tr>
<td>Shawna Strobel, Administrative Coordinator</td>
</tr>
<tr>
<td>KAST Office</td>
</tr>
</tbody>
</table>
# Table of Contents

<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>PART A GENERAL SAFETY</td>
</tr>
<tr>
<td></td>
<td>INTRODUCTION</td>
</tr>
<tr>
<td>6</td>
<td>RESPONSIBILITIES</td>
</tr>
<tr>
<td>7</td>
<td>HAZARD AWARENESS</td>
</tr>
<tr>
<td>7</td>
<td>INSPECTIONS &amp; AUDITS</td>
</tr>
<tr>
<td>7</td>
<td>ACCIDENT/INCIDENT REPORTING AND INVESTIGATION</td>
</tr>
<tr>
<td>9</td>
<td>EMERGENCY PREPAREDNESS</td>
</tr>
<tr>
<td>9</td>
<td>COMMUNICATIONS</td>
</tr>
<tr>
<td>10</td>
<td>WorkSafeBC</td>
</tr>
<tr>
<td>11</td>
<td>PART B PERSONAL PROTECTIVE EQUIPMENT / PERSONAL PROTECTION</td>
</tr>
<tr>
<td>14</td>
<td>PART C: LAB SAFETY</td>
</tr>
<tr>
<td>15</td>
<td>GENERAL LAB SAFETY</td>
</tr>
<tr>
<td>17</td>
<td>HAND TOOLS SAFETY</td>
</tr>
<tr>
<td>22</td>
<td>POWER TOOLS SAFETY</td>
</tr>
<tr>
<td>23</td>
<td>PART C: HAZARD ASSESSMENTS</td>
</tr>
<tr>
<td>24</td>
<td>BAND SAW HAZARD ASSESSMENT</td>
</tr>
<tr>
<td>24</td>
<td>MITRE SAW HAZARD ASSESSMENT</td>
</tr>
<tr>
<td>25</td>
<td>DRILL PRESS HAZARD ASSESSMENT</td>
</tr>
<tr>
<td>26</td>
<td>TABLE SAW HAZARD ASSESSMENT</td>
</tr>
<tr>
<td>27</td>
<td>ROUTER HAZARD ASSESSMENT</td>
</tr>
<tr>
<td>28</td>
<td>SANDER HAZARD ASSESSMENT</td>
</tr>
<tr>
<td>29</td>
<td>LASER CUTTER HAZARD ASSESSMENT</td>
</tr>
<tr>
<td>29</td>
<td>3D PRINTER HAZARD ASSESSMENT</td>
</tr>
<tr>
<td>30</td>
<td>GRINDER HAZARD ASSESSMENT</td>
</tr>
<tr>
<td>31</td>
<td>MILLING MACHINE HAZARD ASSESSMENT</td>
</tr>
<tr>
<td>32</td>
<td>LATHE HAZARD ASSESSMENT</td>
</tr>
</tbody>
</table>

## APPENDICES

- **APPENDIX A** OHS Levels of Noise Guidelines
- **APPENDIX B** KAST PPE Policy
- **APPENDIX C** KAST Workplace Bullying & Harassment
- **APPENDIX D** Accident/Incident/Injury forms:
  - I. Hazard Alert Form
  - II. WorkSafeBC Incident & Investigation Forms
  - III. WorkSafeBC First Aid Record Forms
- **APPENDIX E** MIDAS Lab First Aid Facilities & Services
- **APPENDIX F**
  - MIDAS Emergency Response & Evacuation Plan
  - MIDAS Lab Facility Map (zones)
- **APPENDIX G** Operational Guidelines for MIDAS equipment — also refer to: [http://www.midaslab.ca/fabspace/show_equipment.php](http://www.midaslab.ca/fabspace/show_equipment.php) for updates
- **APPENDIX H** Safety Guidelines for MIDAS equipment
- **APPENDIX I** Ladder Safety (WCB)
- **APPENDIX J** Material Safety Data Sheets (separate binder)
PART A: GENERAL SAFETY
INTRODUCTION

The MIDAS Fab Lab Safety Manual was designed to provide you with information to understand specific skills and best practices to be used in the Lab environment. Recognizing the risks and the need for safe work practices is crucial when working in hazardous environments. Maintaining caution, safety awareness and best practices will promote your well-being as well as the well-being of others working around you.

In an effort to keep you safe and make you aware of the importance of safety in the Lab, you will be required to:

- Read and verify readership of the Safety Manual
- Complete a Lab Safety Orientation
- Attend a Lab demonstration of tools and equipment presented by your Instructor/ Lab representative

All of the above items must be completed and verified by MIDAS personnel prior to being allowed to use any tools and equipment in the Lab.

At any point during your time here, if any unsafe condition is observed, immediately report it to the Lab Director, Project Director or Instructor before proceeding. Safety in the Lab is everyone’s business.

Generally:

In order to assure a safe workplace and the safety of all Lab occupants, certain basic rules, regulations and work instructions must be in place. Irrespective of the work environment, the following rules and work practices shall be followed:

- Do not carry out, or request others to carry out, any work process which could create a danger to the safety or health of any person.
- Do not knowingly or intentionally put yourself or anybody else at risk.
- Do obey all safety signs. They are there for your protection.
- Use the correct tools and equipment for the job.
- Wear and use protective clothing and equipment when required.
- If unsure about how certain PPE is to be worn, contact the Lab Supervisor for training.
- Correct all hazardous conditions immediately or secure the area and bring the hazardous condition to the attention of the Lab Supervisor.
- Report all accidents or incidents to the Lab Supervisor and, if injured, to the First Aid attendant (brad Pommor or Sharon Thompson).
- Do not use electrical cords or equipment that are damaged.
- Do not attempt to lift objects that are obviously too heavy for one person.
- Review and understand the evacuation alarms and procedures (Appendix F)
- Know the location of first aid facilities and the method of obtaining first aid treatment (Appendix E)
- Keep floors, aisles and thoroughfares clear of obstructions.
- Store items in their correct location. Do not place heavy objects on upper shelves.
- Clean up spills promptly.
- If you are a witness to an accident or are the first person on the scene of an accident, do the following:
  - Ensure that nobody including yourself is at risk before proceeding.
  - Warn others.
  - Send for help as soon as possible.
  - Collect as much information as you can and write it down as soon as possible (i.e. date and time, location, name of injured person, employer, name of witnesses, type of injury, part of body injured, immediate cause of injury, any damage to equipment).
RESPONSIBILITIES

1. MIDAS Fab Lab is responsible to:
   - provide a safe and supervised environment, including adequately trained supervisory personnel
   - establish a culture of safety
   - ensure safety procedures and practices are established, updated and adequately communicated
   - ensure emergency procedures are developed and maintained and all MIDAS representatives and users are trained in those procedures (Appendix F: Emergency Response Plan)
   - take appropriate action when informed about a potentially hazardous situation (Appendix D: Accident/Incident/Injury forms)
   - initiate an immediate investigation into accidents (Appendix D: Accident/Incident/Injury forms)
   - report onsite accidents to WorkSafe BC as required (Appendix D: Accident/Incident/Injury forms)
   - provide adequate First Aid facilities and services (Appendix E: First Aid Facilities & Services)
   - clearly document where and when personal protective equipment (PPE) is required (Appendix B: KAST PPE Policy)

2. Lab Supervisor/Lab Director/Instructor is responsible to:
   - instruct new Members & Training participants (“users”) in safe work and emergency procedures
   - ensure that only authorized, adequately trained participants enter designated safety zones (Appendix E: MIDAS Lab Facility Map (zones), and operate tools and equipment
   - enforce all safety polices, requirements and regulations
   - immediately correct observed or reported unsafe acts and/or conditions
   - formulate safety rules and inspect for and address hazards in the Lab
   - keep accurate safety and training records
   - complete an incident investigation report upon incident (Appendix D: Accident/Incident/Injury forms)
   - ensure that they are using the correct revision of this document: currently Rev B June 1, 2017

3. Members and Training Participants (Lab Users) are responsible to:
   - read, understand and comply with the Safety Manual
   - verify readership of the Safety Manual
   - complete a Lab Safety Orientation with Lab Director upon initiating Membership
   - attend an onsite demonstration of tools and equipment presented by your Instructor/ Lab representative
   - know and follow all safety, health and emergency procedures while in the Lab
   - if unclear as to proper processes for any piece of equipment, ask for additional training before beginning work
   - work safely and intervene in the unsafe work of others
   - take corrective action, when practical, to eliminate potential hazards, or secure the area and immediately report any unsafe acts or conditions to the Lab Director/Lab Supervisor/ Instructor (Appendix D: Accident/Incident/Injury forms)
   - wear all necessary PPE as required by (Appendix B: KAST PPE Policy)
   - report all safety incidents or injuries to the Lab Director/Lab Supervisor/ Instructor (Appendix D: Accident/Incident/Injury forms)
   - take the initiative—make suggestions for improved safety conditions

4. First Aid Attendants are responsible to:
   - Attend to patients
• Request emergency services if required
• Arrange and supervise movement of patients if necessary
• Provide a first aid report (Appendix D: Accident/ Incident/ Injury forms) to the MIDAS Lab Director

HAZARD AWARENESS

• Some of the common hazards in the environment could include:
  o Faulty electrical cords
  o Cluttered aisles, thoroughfares and exits.
  o Tripping hazards, slippery areas.
  o Improperly set up workstations – they must allow a comfortable working posture.
  o Chemicals – Be aware of areas where they are normally used (should be part of an orientation).
  o Toxic Gas Emissions – Be aware of areas where they normally occur (should be part of an orientation). Be aware of pockets of gas that can get trapped in confined spaces.
  o Dust – Sawdust, etc.
  o Operating Machinery – see Appendixes G & H. Do not attempt to work on any device unless trained to do so.
  o Vehicles – e.g. forklift.
  o Hot Materials

INSPECTIONS & AUDITS

2. The Lab Director is responsible to conduct monthly inspections of all work areas. These inspections shall focus on the following items:
   a. Access to exits
   b. Access to first aid equipment
   c. Access to emergency equipment
   d. Access to equipment
   e. Storage of materials
   f. Conditions of electrical cords and equipment
   g. General housekeeping

ACCIDENT/INCIDENT REPORTING AND INVESTIGATION

1. MIDAS Policy on Critical Injuries and Serious Incidents/Accidents: (Appendix D: Accident/ Incident/ Injury forms)

In the event of a serious accident/incident, the following steps shall be followed:

• Remove the injured person from the scene, ensuring there is no danger to yourself or others.
• Rope off the area where the accident/incident occurred.
• Leave the area undisturbed. Do not move or change anything. Keep the area closed off as follows:
  o For critical injuries: To be re-opened only by the local Regulatory Agency;
  o For all other accidents / incidents: To be re-opened by the MIDAS Lab Director.
• Notify the First Aid Attendant and the onsite Lab Supervisor immediately.

2. Reporting:

• All Lab incidents, accidents, injuries and disease shall be reported to the onsite Lab Supervisor and Lab Director immediately after occurrence: “No accident is too small and no incident too slight. It must be reported.”
• It is important that we all participate in reporting “Near Hits” or “Close Calls”.

7
• Reporting and investigating incidents is a pro-active approach, as opposed to simply reporting accidents which is a re-active approach. Reporting and investigating incidents will greatly assist in reducing serious accidents.

• Training in this area is critically important. Lab Supervisors must encourage other Lab Supervisors, Members and Training Participants to report all incidents and must consistently take the time to respond as required.

3. Procedure for Filling Out Accident/Incident Reports

• If you are involved in, or observe, an accident, incident or sub-standard condition, bring it to the attention of the Lab supervisor and the Lab Director.
  o In person and by telephone call on the same day in which the accident, incident or sub-standard condition occurred
  o By written report within 24 hours of the occurrence.

• If you have an accident, incident or a sub-standard condition to report, obtain, complete and submit an Accident/Injury/Incident/Condition Report TEMPLATE form from/to the Lab Director. (Appendix D)

• Corrective action will be implemented and the completed Incident report will be sent back to the originator.

• NOTE: Participation in this pro-active approach to reducing accidents is mandatory. All Lab users will benefit from the resulting safer operations.

• The purpose of an accident/investigation is not to find fault. It is to determine the immediate and basic causes and the corrective action required to prevent a recurrence. The immediate cause could be: object fell from above and struck worker on shoulder. The basic cause could be: Poor inventory management above.

• Investigations shall be carried out by a person or persons knowledgeable of the type of work involved and the prevailing working conditions.

• The following list includes examples of accidents/incidents which must be investigated immediately after occurrence, followed by a written report to be submitted to the MIDAS Lab Director per Appendix C.
  o Accident or injury requiring first-aid or medical aid.
  o Inadvertent exposure to harmful concentrations of hazardous materials.
  o Electrical failures
  o Property damage in excess of $100.

4. Corrective Action

• Where corrective action is recommended in the investigation report, a follow-up report shall be issued by the KAST Operations Manager, within seven days, that will detail the steps taken to prevent a reoccurrence.

• Routing of Accident Investigation Report to WCB is the responsibility of the KAST Operations Manager. Forms often contain confidential information, are not fully completed within the next working day and do not necessarily state precautions to be taken in other areas of the facility to prevent a similar event from occurring elsewhere. Distribution is limited to: Incident Reporter to MIDAS Lab Director, MIDAS Lab Director to MIDAS Operations Manager.
EMERGENCY PREPAREDNESS

1. First Aid (See Appendix E MIDAS Lab First Aid Facilities & Services AND Appendix F MIDAS Emergency Response Plan)
   - First Aid Stations are located throughout the Lab.
   - The names and telephone numbers of the Lab First Aid Attendants are:
     o Brad Pommen 250-354-9420
     o Sharon Thompson 250-368-1442
   - For minor injuries, the patient will be taken to the First Aid Station in the main lobby and the First Aid Attendant contacted. For more serious injuries, a Lab Supervisor in the vicinity shall render first aid assistance, call the First Aid Attendant and make the patient as comfortable as possible.
   - If you suffer an injury, report it to the First Aid Attendant, onsite Lab Supervisor, and the Lab Director per Appendix C. This is not only for treatment, but also as a record in the event that further complications arise after the incident.

2. Emergency Evacuations (see MIDAS Lab Evacuation Map & Plan)
   - The 2950 Highway Dr. building has an emergency plan for the safe evacuation of occupants in the event of fire, earthquake, bomb/bomb threat or other emergency. The plan covers the following elements:
     o Names and responsibilities of individuals.
     o Method of communications.
     o Methods of evacuation.
   - Fire extinguishers are strategically located throughout the Lab - see map in Appendix F.
   - MIDAS Personnel, Members and Training Participants shall familiarize themselves with their location.
   - If you discover a fire, the following procedure should be followed:
     o If the fire is small and the personal risk is negligible, use a fire extinguisher to put out the fire. If a fire is successfully extinguished with the fire extinguisher, do not remain in the immediate area as lack of oxygen or the accumulation of toxic gases could be hazardous.
     o If the fire cannot be extinguished, activate the fire alarm system by pulling the manual pull station. Notification of the security company who then contacts the Fire Department is automatic whenever a pull station is activated.
     o If a fire alarm is activated, close all doors behind you and evacuate the building. Walk, do not run.
     o Fire Wardens are Brad Pommen and Sharon Thompson. Fire Wardens will conduct a search of each floor to ensure that all persons have evacuated the building. This search will consist of visual inspections of all offices, labs, kitchen, restrooms and other enclosed areas.
   - The Mustering Area will be at the bus stop outside the Learning Centre.
   - Do not return until it is declared safe to do so by a RDKB (Regional District of Kootenay Boundary) Fire Official.

COMMUNICATIONS

- An important element in a Health & Safety program is the communication system. It allows management to communicate its expectations to personnel and Lab Users, and it allows the personnel and Lab Users to communicate their health and safety concerns to management.
- All general health & safety issue items will be posted in the Welcome Room, between the main lobby and interior lab entrances.
- It is the responsibility of the Lab Director to ensure that a copy of each bulletin is in the Welcome Room, between the main lobby and interior lab entrances.
WorkSafeBC

- WorkSafeBC Health & Safety Act and regulations are applicable to the use of the MIDAS Lab.


- Personnel, Members and Training Participants should direct questions or requests for clarification of the regulations to the KAST Operations Manager at 250 362-5052 or operations@kast.com
PART B:
PERSONAL PROTECTIVE EQUIPMENT
PERSONAL PROTECTIVE EQUIPMENT

Hazards exist in every workplace, so strategies to protect FabLab users and instructors are essential. Controlling a hazard at its source should be the first choice because this method will eliminate it from the workplace altogether or isolate it from the worker. This approach may require substitution of a material with nonhazardous ones, isolation of hazards, addition of safety features to existing equipment, redesign of the work processes, or purchase of new equipment. When the hazard cannot be removed or controlled adequately, Personal Protective Equipment (PPE) must be used if the work process is to continue.

PPE is equipment worn to minimize exposure to specific occupational hazards. Examples of PPE are respirators, gloves, aprons, fall protection, and full body suits, as well as head, eye and foot protection. Using PPE is only one element in a complete safety program that would use a variety of strategies to maintain a safe and healthy occupational environment. **PPE does not reduce the hazard itself nor does it guarantee permanent or total protection.**

If engineering controls are neither feasible nor result in completely eliminating the hazard, PPE must be used. **Criteria for choosing PPE should be that they:**

- provide adequate protection for the FabLab user
- comply with applicable regulations and policies
- not cause undue discomfort and doesn’t create new hazards

**Consider why and for how long the PPE is needed, such as:**

- for a short time due to a temporary process or in case of temporary breakdown of engineering controls
- for long term, regular use
- to compensate for lack of engineering control or inadequate control
- during handling of substances, clean-up of spills, repair of equipment
- to comply with regulations, Worksafe BC policies and KAST policies

**Also consider the:**

- nature and size of the hazard
- degree of protection the PPE will provide
- how easy the PPE is to use

**Proper fit is important**

- A proper fit ensures maximum effectiveness of the equipment, and that the equipment itself does not cause discomfort or pose a further hazard.
- Inspection of PPE prior to each use is the responsibility of the individual user.

**Personal Protection**

- The personal clothing of all staff and volunteers must be of a type and in a condition which will not expose the individual to any unnecessary or avoidable hazards.
- In all operating areas:
  a. The clothing must fit closely about the body and not be loose or have pieces of fabric or other materials hanging from it.
  b. Dangling neckwear, bracelets, or rings must not be worn, except for Medical Alert bracelets, which may be worn with transparent bands that hold the bracelet snugly to the skin.
c. Cranial hair **must** be worn at a length that will prevent it from being snagged or caught in the work process. Long hair **must** be worn in a bun, tied back or covered.

- Visitors and staff or volunteers who are entering the Reception Room, the Welcome Room, front offices or The Learning Centre are exempt. The above noted restrictions apply in all other areas of the building.
- These are minimum requirements. Through the risk assessment process, the Project Director or Lab Director may implement additional requirements.

**Training/Education**

FabLab users utilizing PPE must ensure they seek out and receive appropriate training, including:

- how to properly fit and wear it
- when it should be worn
- how to care for it and identify when it requires repair, cleaning and disposal
- hazards they are working with and how the PPE will provide them with protection
- any legislative requirements that may apply
- the consequences of not wearing the PPE.

Please refer to Appendix B for the KAST PPE Policy, which must be signed prior to use of any MIDAS FabLab equipment.
PART C: LAB SAFETY
GENERAL LAB SAFETY

Before entering the FabLab, be aware of training requirements, and be prepared:

- Only authorized persons may work in the FabLab. An authorized person is an individual who has been trained and confirmed as being competent to work safely on a specific machine, tool or other work related task in the FabLab.
- A minimum of two people must be present at all times in the FabLab.
- No food or drink is allowed in the FabLab.
- Open toe shoes are not allowed; shoes must cover the entire foot to be acceptable. Safety toe footwear is preferred.
- Long hair must be tied back or covered by a cap while operating machinery.
- Ties, rings, watches, bracelets, unbuttoned long sleeves, dresses, or other loose clothing cannot be worn while operating machinery.
- Personal entertainment devices (e.g. IPODS) with ear pieces cannot be used while using machine tools.
- No cell phones can be used when working in the FabLab.
- Don’t work in the FabLab if you are under the influence of anything. Do not work while tired, distracted or upset. Those found under the influence of intoxicating substances will be subject to penalties

When in the Lab:

- Report all accidents immediately to the Lab Director or your instructor. Get prompt medical treatment (First Aid) for any injuries.
- Each machine can only have one operator at a time, unless otherwise instructed by qualified MIDAS staff.
- Machine guards provided for a machine must be in place whenever the machine is operated. Guards or shields removed for maintenance, adjustments, must be replaced before the machine is used.
- Ensure guards and guides are operable and adjusted properly.
- Before using any tool, read the operator’s manual, or comparable literature as available, to learn the applications, limitations, and potential of each power tool.
• Eye protection is required.
• Locate and remember where the “OFF” switch is located so you can turn off the machine quickly.
• Do not commence work without verifying the set-ups, etc. unless you have been specifically trained and authorized to do so.
• Machine tools and hand tools that are unsafe must not be used, and must be reported immediately to the Lab Director or your instructor.
• Personal power tools may not be brought from home for use in the FabLab. If having a personally owned power tool is required for a specific task, then it should be approved first by the Lab Director, Project Director or your instructor.
• Be aware of the interaction between you, the tool, material and your space. For example, visualize the cutting path of your tool to ensure it does not interfere with anything, and that the piece being cut does not inadvertently fall off onto anything.
• Pay attention. Do not talk to other people while operating the machinery and do not fool around with the equipment. Do not use compressed air for cleaning yourself or your clothing. Do not direct compressed air at nearby people.
• Keep floors free of oil, grease or any other liquid. Clean up spilled liquids immediately; they are slipping hazards.
• Store materials so they cannot become tripping hazards. Return all excess material to its proper storage place.
• Ensure that work and cutting tools on any machine are clamped securely before starting.
• Get help when handling long or heavy pieces of material.
• Put tools away when not in use.
• Place all scrap in scrap containers.
• Gloves must NOT be worn when operating any rotating machinery. Gloves are recommended for handling sheet metal and sharp tools.
• Never use your bare hands to remove chips, shavings, or other material from your work. Use a brush or push stick.
• Equipment lockout must be completed under the supervision of the Lab Director or your instructor.
HAND TOOLS SAFETY

Hand tools are tools that are manually operated and powered by human force such as screw drivers, pliers, wrenches, and cutting shears, etc. For hand tools, FabLab users must be trained in:

- Selecting the right tool for the job
- Knowing the hazards of the tool
- The correct use of tools
- Having a regular tool inspection procedure
- Maintaining tools
- Proper tool storage

Misuse of common hand tools is a source of injuries. DO NOT assume that everyone knows the proper use of common hand tools.

Modifying, or using modified tools, will not be tolerated in the Lab.

Below is a list of best work practices for hand tools:

**Metal Chisels**

Factors determining the selection of a cold chisel are the materials to be cut, the size and shape of the tool, and the depth of the cut to be made.

The chisel should be heavy enough so that it will not buckle or spring when struck. A chisel large enough for the job should be selected so that the blade is used rather than the point or a corner. Also, a hammer heavy enough to do the job should be used.

Safety glasses or goggles must be worn when using a chisel and a shield or screen to prevent injury to other users from flying chips should be set up. If a shield does not afford positive protection to all exposed users, then glasses with side protection must be worn.

**Hack Saws**

Hack saws should be adjusted in the frame to prevent buckling and breaking, but should not be so tight that breakage of the pins that support the blade can occur. Install blade with teeth pointing forward.

Pressure should be applied on the forward stroke not on the back stroke. If the blade is twisted or too much pressure is applied, the blade may break and cause injury to the hands or arms of the user.

**Files**

Selection of the right kind of file for the job will prevent injuries and lengthen the life of the file. The extremely hard and brittle steel of the file chips easily, the file should never be cleaned by being struck against a vise or other metal object. A file-cleaning card or brush should be used.

For the same reason, a file is not to be hammered or used as a pry. Such abuse frequently results in the file's chipping or breaking causing injury to the user. A file should not be made into a center punch, chisel, or any other type of tool because the hardened steel may fracture in use.
A file is never to be used without a smooth, crack-free handle; if the file should bind, the tang may puncture the palm of the hand, the wrist, or other part of the body. Under some conditions, a clamp-on raised offset handle may be useful to give extra clearance for the hands. Files are not to be used on lathe stock turning at high speed (faster than 3 turns per file stroke) because the end of the file may strike the chuck, dog, or face plate and throw the file (or metal chip) back at the operator hard enough to inflict serious injury.

**Tin Snips**

Tin snips should be heavy enough to easily cut the material so that the worker needs only one hand on the snips and can use the other to hold the material. The material is to be well supported before the last cut is made so that cut edges do not press against the hands.

Jaws of snips are to be kept tight and well lubricated.

Users must wear safety goggles when trimming corners or slivers of metal because small particles often fly with considerable force.

**Cutters**

Cutters used on wire, reinforcing rods, or bolts should have ample capacity for the stock; otherwise, the jaws may be sprung or spread. Also, a chip may fly from the cutting edge and injure the user.

Cutters require frequent lubrication. To keep cutting edges from becoming nicked or chipped, cutters are not to be used as nail pullers or pry bars.

**Wood-Cutting Tools**

Edge tools are to be used in such a manner that if a slip should occur, the direction of force will be away from the body. For efficient and safe work, edge tools are to be kept sharp and ground to the proper angle. A dull tool does a poor job and may stick or bind.

**Wood Chisels**

Users must be instructed in the proper method of holding and using chisels. Handles are to be free of splinters. The wood handle of a chisel struck by a mallet is to be protected by a metal or leather cap to prevent it from splitting. The work to be cut must be free of nails to avoid damage to the blade or cause a chip to fly into the user’s face or eye.

**Saws**

Saws should be carefully selected for the work they are to do. For crosscut work on green wood, a coarse saw (4 to 5 points per inch) is to be used. A fine saw is better for smooth, accurate cutting in dry wood. Saws are to be kept sharp and well set to prevent binding.

**Axes**

An ax person is to make sure that there is a clear circle in which to swing the ax before starting to chop. Also, objects within range should be removed, especially overhead objects that may catch or deflect the ax.
Ax blades must be protected with a sheath or metal guard when not in use. When the blade cannot be guarded, it is safer to carry the ax at one's side. The blade on a single-edged ax shall be pointed down.

**Planes, Scrapers, Bits, and Drawknives**

Planes, scrapers, bits, and drawknives are to be used only by experienced users. These tools are to be kept sharp and in good condition.

The principal hazard in the use of knives is that the hands may slip from the handle onto the blade or that the knife may strike the body or the free hand. A handle guard or a finger ring (and swivel) on the handle eliminates these hazards. Adequate guarding is important.

FabLab users who must carry knives with them must keep them in sheaths or holders.

Knives must never be left lying on benches or in other places where they may cause hand injuries. Safe placement and storage of knives is important to knife safety.

Users who handle knives must have ample room in which to work so they are not in danger of being bumped by other students.

Users should be particularly careful about the hazard of leaving knives hidden under a product, under scrap paper or wiping rags, or among other tools in work boxes or drawers. Knives are to be kept separate from other tools to protect the cutting edge of the knife as well as to protect the employee.

Nothing should be cut that requires excessive pressure on the knife. Knives cannot be used as a substitute for can openers, screwdrivers, or ice picks.

**Open-End or Box Wrenches**

Open-end or box wrenches shall be inspected to make sure that they fit properly and are never to be used if jaws are sprung or cracked.

When defective they shall be taken out of service until repaired.

**Socket Wrenches**

Socket wrenches give great flexibility in hard-to-reach places. The use of special types shall be encouraged where there is danger of injury. Socket wrenches are safer to use than adjustable or open-end wrenches.

**Adjustable Wrenches**

Adjustable wrenches are used for many purposes. They are not intended, however, to take the place of standard open-end, box or socket wrenches. They are used mainly for nuts and bolts that do not fit a standard wrench. Pressure is always applied to the fixed jaw.

**Pipe Wrenches**

Pipe wrenches, both straight and chain tong, must have sharp jaws and be kept clean to prevent slipping.
The adjusting nut of the wrench should be inspected frequently. If it is cracked, the wrench must be taken out of service. A cracked nut may break under strain, causing complete failure of the wrench and possible injury to the user.

A piece of pipe "cheater" slipped over the handle must not be used to give added leverage because this can strain a pipe wrench to the breaking point. The handle of every wrench is designed to be long enough for the maximum allowable safe pressure.

A pipe wrench should never be used on nuts or bolts, the corners of which will break the teeth of the wrench, making it unsafe to use on pipe and fittings. Also, a pipe wrench, when used on nuts and bolts, damages their heads.

A pipe wrench must not be used on valves, struck with a hammer, nor used as a hammer.

Pliers

Side-cutting pliers sometimes cause injuries when short ends of wires are cut. A guard over the cutting edge and the use of safety glasses will help prevent eye injuries. Pliers must not be used as a substitute for a wrench.

Special Cutters

Special cutters include those for cutting banding wire and strap. Claw hammers and pry bars must not be used to snap metal banding material.

Screwdrivers

The practice of using screwdrivers for punches, wedges, pinch bars, or pries is not allowed. Cross-slot (Phillips-head) screwdrivers are safer than the square bit type, because they have fewer tendencies to slip. The tip must be kept clean and sharp, however, to permit a good grip on the head of the screw. The part to be worked upon must never be held in the hands; it should be laid on a bench or flat surface or held in a vise.

Hammers

A hammer must have a securely wedged handle suited to the type of head used. The handle should be smooth, without cracks or splinters, free of oil, shaped to fit the hand, and of the specified size and length.

Steel hammers should not be used on hardened steel surfaces. Instead, a soft-head hammer or one with a plastic, wood, or rawhide head should be used. Safety goggles or safety glasses must be worn to protect against flying chips, nails, or scale.

Riveting Hammers

Riveting hammers, often used by sheet metal workers, must have the same kind of use and care as ball pen hammers and should be watched closely for cracked or chipped faces.
Spark-Resistant Tools:

Spark-resistant tools of nonferrous materials are sometimes advised for use where flammable gases, highly volatile liquids, and explosive materials are stored or used. The intensified sparks from steel tools are capable of igniting substances such as lint, carbon disulfide, aviation fuel, and ethyl ether.

In certain circumstances, steel coated with aluminum paint can emit sparks when struck with a metal striker (steel, brass, or spark-resistant alloys) and such sparks may ignite mixtures of flammable gases or vapors in air.

Nonferrous tools reduce the hazard from sparking but do not eliminate it. They must be inspected before each use to be certain that they have not picked up foreign particles which could produce friction sparks.

POWER TOOLS SAFETY

Portable power tools are divided into 3 primary groups according to the power source:

- Electrical
- Air-Powered
- Special Powered

**ALL users** must review a hazard assessment prior to working on any powered tool in the Lab (see page 23 on)

**Electrical tools** include drills, circular saws, reciprocating saws, miter-box and Lab saws, stationary band saws, jig/saber saws, rotary die grinders, soldering irons, percussion tools, grinding wheels, buffers, wire brushes, sanders, and routers. Personnel must recognize and protect themselves from shock, noise, cuts, burns, and other potential hazards by using proper guards and safety equipment and devices.

**Air-powered tools** include air hoses, grinders, and pneumatic-impact tools. Air-powered grinders require the same type of guarding as electrical grinders. Pneumatic-impact tools (nailers, drills, impact wrenches, staplers, jackhammers, etc.) require two safety devices: an automatically closing valve and a retaining device to hold the tool in place to prevent it from being fired accidentally. Additionally, hearing protection is needed and eyes must be guarded against flying debris using safety glasses.

**Special powered tools** include hydraulic, gasoline-powered, and powder-actuated equipment.

Hydraulic tools cause injuries because high pressure leaks or ruptures in hoses may force oil under the skin of hands or arms.

Gasoline-powered tools are commonly used in logging and construction activities. The chain saw is a common gasoline-powered tool.

Powder-actuated tools are commonly used for fastening fixtures and materials to metal, precast or pre-stressed concrete, masonry block, brick, stone, and wood surfaces. Blank cartridges provide the energy and are ignited by a percussion primer.

Gasoline-powered and powder-actuated tools present serious hazards and must be operated only by trained users and adequately guarded to prevent fires and injuries.
HAZARD
ASSESSMENTS
# BAND SAW HAZARD ASSESSMENT

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Hazard</th>
<th>Control</th>
<th>Training Req’d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cuts/abrasions</td>
<td>• Push sticks must be used when feeding stock close to the blade</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Machine must come to a complete stop and be off/locked-out before cleaning or making adjustments.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• All guards must be in place prior to starting work.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Adjust guard to ensure it is as close to the stock as practicable (1/4” above stock).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kick back</td>
<td>• Ensure the appropriate blade is used for material. The blade must be changed by a technician.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inspect blade prior to use – blade must be in sharp and sound condition.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Excessive noise</td>
<td>• Hearing protection must be worn.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dust</td>
<td>• Particulate respirator must be worn for materials causing excessive dust.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Keep area clean of debris and materials.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flying Objects</td>
<td>• Operators must wear appropriate Eye Protection – Safety glasses/goggles or a face shield</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Work piece should be fed forward evenly and held firmly.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Never “back out” of a cut – can cause blade to break. Machine must come to a complete stop before attempting to back out.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Set-up appropriate jigs for cutting round stock or other odd-shaped objects</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ensure all locks are securely tightened before operating.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Allow the machine to develop full speed before using.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ensure workplace is clear before operating machine.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ensure the appropriate blade is used for material. The blade must be changed by a technician.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ensure no one is near the machine when in operation. For longer pieces a larger areas must be kept clear.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical</td>
<td>• Electrical cord must be inspected prior to use to ensure it is not frayed and in good working order. Inform Lab Director immediately if any defects are noted.</td>
<td></td>
</tr>
</tbody>
</table>
## MITRE SAW HAZARD ASSESSMENT

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Hazard</th>
<th>Control</th>
<th>Training Req’d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitre Saw</td>
<td>Cuts/abrasions</td>
<td>• Bevel adjustments must be done by technicians.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ensure saw has come to a complete stop prior to removing materials.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Clamp material down.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• All guards must be in place and operating, prior to starting work.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Keep hands away from blade.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flying objects</td>
<td>• Inspect machine prior to use to ensure blade and machine are in good working order. Inform supervisor immediately if any defects are noted.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inspect work piece to ensure there are no nails or other objects embedded in to it.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ensure work area is clear prior to using saw. Ensure nobody is standing behind the saw.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kick back</td>
<td>• Inspect work piece to ensure there are no nails or other objects embedded in to it.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Material must be clamped down.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Let saw come up to speed before starting cut. Lower saw and start cut. Ensure saw has completely cut through material, then let the blade come to a full stop before raising it again.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dust</td>
<td>• Wear a particulate respirator when operating this machine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Excessive noise</td>
<td>• Hearing protection must be worn.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical</td>
<td>• Electrical cord must be inspected prior to use to ensure it is not frayed and in good working order. Inform Lab Director immediately if any defects are noted.</td>
<td></td>
</tr>
</tbody>
</table>
## DRILL PRESS HAZARD ASSESSMENT

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Hazard</th>
<th>Control</th>
<th>Training Req’d</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Drill Press</strong></td>
<td>Flying objects</td>
<td>• Ensure drill bits are tightened&lt;br&gt;• Must wear safety glasses&lt;br&gt;• Speed is adjustable. Must be adjusted by technician, if that requires machine to be opened.&lt;br&gt;• Ease up on “feed force” when drill is about to break through the material.&lt;br&gt;• Learn proper drilling techniques for material you are drilling.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Bits breaking</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Loose bits</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Materials breaking</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Entanglement in rotating machinery parts</td>
<td>• Do not wear gloves while drilling.&lt;br&gt;• Long hair must be constrained (tie back long hair)&lt;br&gt;• Do not wear loose clothing (roll up your sleeves).&lt;br&gt;• Do not wear gloves while drilling.&lt;br&gt;• Drill must be turned OFF and at a complete stop prior to setting up work&lt;br&gt;• All guards must be in place prior to starting work.&lt;br&gt;• Be aware of hand and finger locations to avoid pinch points.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rotating materials</td>
<td>• Secure the work piece by clamping it to the table or holding it in a vise.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical</td>
<td>• Electrical cord must be inspected prior to use to ensure it is not frayed and in good working order. Inform supervisor immediately if any defects are noted.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heat – material may get hot when drilling</td>
<td>• Allow material to cool down prior to removing from clamps.</td>
<td></td>
</tr>
</tbody>
</table>
# TABLE SAW HAZARD ASSESSMENT

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Hazard</th>
<th>Control</th>
<th>Training Req’d</th>
</tr>
</thead>
</table>
| Table Saw | Cuts/abrasions | • Saw blade should not be raised more than 1/8 inch above the stock  
• Ensure saw has come to a complete stop prior to removing materials.  
• Hands should never come closer than 12 inches to the saw blade.  
• A push stick must be used when cutting materials shorter than 12 inches or narrower than 6 inches  
• Materials shorter than 4 inches wide must be cut by a supervisor/technician.  
• Do not place hands in front of or over the blade  
• All guards and fence must be in place prior to starting work. Always use the guards, splitter and kickback fingers  
• The fence is used for rip cutting only, never for crosscutting  
• Do not make freehand or unguided cuts; always use either the fence or the mitre gauge. |                 |
| Table Saw | Kick back    | • Inspect machine prior to use to ensure blade and machine are in good working order. Inform Lab Director immediately if any defects are noted. Only a technician can change the blade. Saw must be locked out/disconnected prior to making any changes.  
• Inspect work piece to ensure there are no nails or other objects embedded in to it. Ensure materials are not twisted.  
• Stand to one side of the saw blade when cutting; do not allow other to stand in direct line with the saw blade while in operation. |                 |
| Table Saw | Excessive noise | • Hearing protection must be worn. |                 |
| Table Saw | Electrical   | • Electrical cord must be inspected prior to use to ensure it is not frayed and in good working order. Inform Lab Director immediately if any defects are noted. |                 |
# ROUTER HAZARD ASSESSMENT

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Hazard</th>
<th>Control</th>
<th>Training Req’d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Router</td>
<td>Cuts</td>
<td>• Ensure the router comes to a complete stop before removing materials.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Be aware of hand and finger locations at all times.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flying objects</td>
<td>• Bits must be tight and secured properly</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bits can only be changed by technicians.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inspect router prior to use to ensure blade and machine are in good</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>working order. Inform Lab Director immediately if any defects are noted.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kick back</td>
<td>• Either the material or router must be clamped down.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hold material or router with a firm grip. Ensure it is under the</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>operators control at all times.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Both hands must be firmly on the router when in use.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical</td>
<td>• Electrical cord must be inspected prior to use to ensure it is not</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>frayed and in good working order. Inform Lab Director immediately if</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>any defects are noted.</td>
<td></td>
</tr>
</tbody>
</table>
# SANDER HAZARD ASSESSMENT

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Hazard</th>
<th>Control</th>
<th>Training Req’d</th>
</tr>
</thead>
</table>
| Combo disc/belt sander | Abrasions | • Do not exert excessive pressure on a moving sander. Only light pressure weight is adequate for most jobs.  
• Keep hands away from sanding belt.  
• Belts and adjustments can only be made by a technician. |                |
| Dust          |          | • Respirator must be worn for materials causing excessive dust.  
• Keep area clean of debris and materials. |                |
| Pinch         |          |                                                                         |                |
| Electrical    |          | • Electrical cord must be inspected prior to use to ensure it is not frayed and in good working order. Inform supervisor immediately if any defects are noted. |                |
| Spindle Sander| Abrasions | • Do not exert excessive pressure on a moving sander. Only light pressure weight is adequate for most jobs.  
• Keep hands away from sanding belt.  
• Belts and adjustments can only be made by a technician. |                |
| Dust          |          | • Respirator must be worn for materials causing excessive dust.  
• Keep area clean of debris and materials. |                |
| Kick back     |          | • Hold material with a firm grip. Ensure it is under the operators control at all times. |                |
| Electrical    |          | • Electrical cord must be inspected prior to use to ensure it is not frayed and in good working order. Inform Lab Director immediately if any defects are noted. |                |
### LASER CUTTER HAZARD ASSESSMENT

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Hazard</th>
<th>Control</th>
<th>Training Req’d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser Cutter</td>
<td>Fire</td>
<td>• Ensure only appropriate materials are used. Must verify with a technician</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical</td>
<td>• Electrical cord must be inspected prior to use to ensure it is not frayed and in good working order. Inform Lab Director immediately if any defects are noted.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Radiation</td>
<td>• Machine cannot operate until the lid is closed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ensure machine is in good working condition prior to using.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fumes</td>
<td>• Machine must be connected to the local exhaust system</td>
<td></td>
</tr>
</tbody>
</table>

### 3D PRINTER HAZARD ASSESSMENT

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Hazard</th>
<th>Control</th>
<th>Training Req’d</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-D printer</td>
<td>Burns</td>
<td>• Allow materials sufficient cool down time prior to removing from the printer.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Machine damage</td>
<td>• Appropriate adjustments must be made by a technician.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical</td>
<td>• Electrical cord must be inspected prior to use to ensure it is not frayed and in good working order. Inform Lab Director immediately if any defects are noted.</td>
<td></td>
</tr>
</tbody>
</table>
# GRINDER HAZARD ASSESSMENT

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Hazard</th>
<th>Control</th>
<th>Training Req’d</th>
</tr>
</thead>
</table>
| Grinder   | Flying Objects | • Face shield must be worn  
• Do not grind anything on the side of the wheel, as this may cause the wheel to crack or shatter.  
• All guards must be in place prior to starting the machine.  
• Prior to starting the grinder it must be inspected to ensure all parts are tight and fitted correctly.  
• Only the Lab Director or technician can change the wheel or make any adjustments.  
• Use light pressure against the wheel.  
• Only grind iron or steel  |                |
|           | Cuts/abrasions| • When grinding small articles they must be secured i.e. vise grip pliers to ensure hands don’t come into contact with the wheel.  
• Ensure the full face of the tool rest is used to support material  |                |
|           | Electrical   | • Electrical cord must be inspected prior to use to ensure it is not frayed and in good working order. Inform Lab Director immediately if any defects are noted.  |                |
|           | Entanglement | • Sleeves must be rolled up and hair tied back.  |                |
# MILLING MACHINE HAZARD ASSESSMENT

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Hazard</th>
<th>Control</th>
</tr>
</thead>
</table>
| Milling Machine   | Flying Objects | • Eye protection must be worn at all times.  
                      • The clutch and feed controls must be in neutral before the machine is started.  
                      • The machine must not be started until the guards are in position.  
                      • The work table must be kept free from tools and loose material.  
                      • Proper feed rate and spindle speed must be reviewed with the technician prior to use.  
                      • The holding device must be solidly mounted to the table and the work firmly held before commencing work.  
                      • Adjustments must not be made near a moving cutter.  
                      • The cutter must be stopped to check the work and clear away metal waste.  
                      • Before changing a work piece, the milling fixture, the vise or the clamp must be withdrawn well clear of the cutting area. |
|                   | Cuts/abrasions | • Sharp edges shall be removed from completed work.  
                      • Ensure the full face of the tool rest is used to support material  
                      • Chips shall be removed with a brush, not the hand. Air hoses should not be used to clean the machine.  
                      • Before any cleaning work is carried out, the machine must be isolated from the power supply. Lockout/isolation must be conducted by the Lab Director. |
|                   | Electrical     | • Electrical cord must be inspected prior to use to ensure it is not frayed and in good working order. Inform Lab Director immediately if any defects are noted. |
|                   | Entanglement   | • Sleeves must be rolled up and hair tied back. |
## LATHE HAZARD ASSESSMENT

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Hazard</th>
<th>Control</th>
<th>Training Req’d</th>
</tr>
</thead>
</table>
| Lathe     | Flying Objects  | • Eye protection must be worn at all times.  
• All stop controls must be checked with a lab technician before starting work.  
• All belt and gear guards must be in place before starting the machine.  
• The chuck key must be removed before starting the machine.  
• The users shall keep hands clear of the chuck rim when the lathe is in motion.  
• All tools, measuring instruments and other objects must be removed from the saddle or lathe bed before starting the machine.  
• All work must be solidly clamped with an appropriate size work-holding device.  
• Chucks must be mounted and removed by hand.  
• If vibration or odd noise develops, the machine should be stopped immediately. |                |
|           | Cuts/abrasions  | • The chips must be removed using a brush or pliers, never by hands. Air hoses cannot be used to clean the machine.  
• Never attempt to stop the spindle with hands or fingers.  
• Never stop the lathe by reversing its direction of rotation.  
• The lathe must be stopped to perform any adjusting, measuring, cleaning or lubricating. All adjustments must be made by the Lab Director.  
• The spindle should be stopped by shutting the lathe off and letting it coast to a stop. If the lathe is equipped with break treadle, the break treadle must be depressed to stop the spindle.  
• Before any cleaning work is carried out, the machine must be isolated from the power supply. Lockout/isolation must be conducted by the Lab Director. |                |
| Electrical|                 | • Electrical cord must be inspected prior to use to ensure it is not frayed and in good working order. Inform Lab Director immediately if any defects are noted. |                |
| Entanglement|                | • Sleeves must be rolled up and hair tied back.                                                                                                                                                        |                |