SAFETY IN WORKSHOPS

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Introduction:

The single most important issue in a workshop is safety. The primary objective of all people who use the workshop must be to uphold safety in the workshop. There is nothing that you can design or build using the workshop that is worth trading for a permanent disability. This document is intended to give you some guidelines to safety in the work shop as well as familiarize you with some of the hazards.

Workshop is more hazards environment than people are used to. When you enter the workshop you should make a conscious effort to adjust mentally and physically to the increased hazards around you. Consult the first five safety rules below to adjust yourself to the situation in workshop environment. Take the time to learn how to safely operate each tool you need to use. Once you know how to use a tool safely follow safe procedures. Beware that familiarity can breed contempt. Be careful to think through each operation before you execute it. Use your common sense. Do not do things that seem unsafe.

Workshop Supervisory Staff is here to help you to work safely in using the workshop. However a supervisor cannot be everywhere at the same time, therefore people using the shop must take it as their responsibility for the safe use of the facility. If you are unsure of the proper method to do a task, then wait until a staff member can give you guidance. If you notice an unsafe condition in the work shop fix it or bring it to the attention of the Supervisory Staff. If you think someone is using the equipment unsafely, suggest a safer alternative or bring their activities to the attention of the workshop Supervisory staff.

General Safety Rules. The rules listed below apply to all people doing work in the workshop. They are not all encompassing; most shop areas and machines have specific safety rules that relate to their use. These ten rules are a good general guide to safe use of the facility

1. **Never work alone:** When you are working in the workshop you must have a second adult present who is capable of rendering assistance in case of an accident. That second person must be able to see you while you are working, and get to you in case you need help. If the second person moves to a place where he can no longer maintain visual contact with you, then you must stop working. Accidents do happen. You need to have a second person present so

that if you become unable to help yourself, the second person can render aid and contact outside help to get emergency assistance.

2. **Never work when you are impaired:** This includes time when you are too tired, stressed or otherwise inhibited from exercising appropriate caution in the workshop. Do not enter the workshop when you are under the influence of any intoxicants or medication that might make you drowsy or alter your ability to be alert to reality. Do not use the workshop when you are too frantic to think clearly and carefully .Try to avoid last minute shop work in favor of a consistent weekly effort. Deadline-driven haste leads to ruined projects and / or serious injuries. Do not use the workshop if you are wearing a cast or bandage that limits your mobility in an emergency you must be able to react quickly to avoid injury.

3. **Wear all necessary protective gear and clothing:** This always includes safety glasses and leather shoes that completely enclose your feet. Some workshop activities will require additional safety gear. Workshop should have safety glasses available on the door into the shop. You may wear such glasses for work in the workshop. To protect your eyes from side impact you can add side shield to your existing glasses or purchase prescription safety glasses for use in the workshop. Do not wear contact lenses in the welding shop .The intense light from the arc welding torches can cause contact lenses to damage your eyes. Leather shoes are necessary to protect your feet from stray droplets of molten metals in the welding and foundry areas. Leather shoes are required in all areas of the workshop because one would not like to control access to certain shop areas based on foot wear. Certain dust and fumes require respiratory protection. One would require you to obtain and wear one for operation that exposes you to airborne hazards. Hearing protection is available in the form of foam ear inserts and ears muffs; **use these for your protection.** Leather gloves are available in the foundry and welding areas for protection from the heat and radiation of welding0. Please do not get the leather gloves wet. The leather becomes hard and brittle with repeated exposure to water. Welding requires the use of welding masks and natural fiber clothes that completely cover your skin .The electric arc in particular is an intense source of ultraviolet and infrared radiation. Even a brief exposure of your unprotected eyes can cause severe damage to your sight. Do not look at an electric arc without the correct eye protection. If you expose bare skin to the light of the arc, the radiation is intense enough to give you severe sunburn. Natural fiber clothes are required because they will not melt onto you in the presence of high heat , as some man-made materials will

4. **Long hair must be tied up securely:** Most of the power tools in the workshop are based around a rapidly rotating shaft. In use the shaft is frequently sticky with oil. Long, loose hair can stick to a rotating shaft and pull the owner of the hair into the tool. Long hair must be kept out of harms way by tucking it into a cap, tying it up, or knotting it in a way that prevents it from dangling. Be careful of the hair of visiting friends. Assume responsibility for the safety of people who visit you while you are working in the shop.

5. **Remove all personal accessories and loose clothing that might get caught in moving machinery:** This includes rings, watches, jewelry, personal stereos ties and open jackets. Like long hair these things that dangle from your person can get caught in rotating machinery. Regardless of the fashion, it is not worth risking your life. Loose garments must not be worn in the workshop .Tuck in loose shirttails and sweat pants ties keep tight fitting jackets or coats closed. Do not keep workshop rags in your pockets. Do not wear personal stereos or headphones while you are in the workshop. Ear protection can be obtained from a shop staff member.

6. **Never leave a machine running unattended:** Many of the tools in the workshop can be cut-off automatically you must keep your attention focused on the machining operation. If you are focused on the process you will be more likely to react in a production sense. It is inevitable that some set ups will go bad. If you are paying attention to the operation. You may be able to avert damage to yourself and the people around you.

7. **Never leave a chuck key in a chuck or a drawbar wrench on a drawbar:** If the key or wrench is in use your hand must be on it. Chuck keys and drawbar wrenches can be accidentally launched across the shop if they are left in place. The start up power of the lathes and mills can throw the tools with enough force to puncture a body cavity. You must be careful not to leave the chuck keys and drawbar wrenches in place when they are in use. Be extremely careful not to leave the key in the chuck .It is an easy and terribly dangerous thing to do. The same rule applies to the chuck keys used to tighten the chuck on the drill presses.

8. **Keep your hands well away from the point of contact between the work piece and the cutter:** If you must hand-hold the work to keep it in place, your set up is unsafe; improve it. While working on the lathe and mill you should never hand-hold your work. If the tool or work piece is vibrating the chances are high for a sudden shift in the set-up .If you are hand holding the tool or work piece, you might not be able to get out of the way as the parts come together.

   Besides, the cutting forces are too large for you to be effective in securing ring the work piece or tool when using the drill press table. If the drill catches an unclamped work piece, the rotating part can cut your hand. On the band saw, table saw, router table, chop saw or any other tool that is designed to be used with a hand fed work piece, be certain to keep your hands, finger, and other body parts out of the path of cutter and away from the point of contact between the work piece and the cutter. Keep all parts of yourself at least 6 inches away from the point of contact between the work piece and the cutter. Do not remove chips with your fingers; Use brushes, pliers or compressed air.

9. **Support work pieces and cutting tools as securely as possible:** A vibrating set-up is usually an indication that the work piece and /or tool are not held strongly enough to resist the applied cutting force. You must take the time to secure the set-up, the force of cutting or use a different operation to do the job. Do not try to make do with a flimsy set up. Do spend a reasonable time in making the shop set-up safe. It is the nature of prototyping. Unfortunately it is also hard to visualize when you are thinking about work in the workshop. This is where a well mannered approach to work in the shop will pay off. If you find things are taking longer than expected you can scale down or redesign your work. At the last minute it is hard to make such large changes.

10. **Have a workshop staff member check you out the first time you use each machine or process in the shop:**. Do not operate any machinery with which you are unfamiliar. Each and every tool in the workshop has safe operating procedures associated with it. Do not work on any tool in the shop until a member of the staff has introduced you to its safe operation. Please get checked out even on tools you have been taught to operate elsewhere. The staff knows the idiosyncrasies of tool set and one would like the opportunity to pass this knowledge on to you. Also the procedures may require more or less care than you are used to. Only by communicating with you can that one exchange information about the safe use of tools.

    Do not use brooms or brushes on the machine tools. The brushes and brooms pick up abrasive dirt from the floor .If abrasive gets on machine tool they will wear very quickly. You should clean the equipment well enough that the next user will not be able to tell what material you were using.

    a. Put a light coat of way oil on the machine ways. The way oil is stored in the red oilcans on a table in the machine shop. Do not put on so much oil that it drips off of the machine .Puddles of oil on the floor can cause people to slip and fall. Any puddles of oil should be cleaned up immediately .Move the machine slides to one extreme position and oil the exposed ways .Be careful not to damage your self or the machine when moving it to the end of its travel. Next move the ways to the middle of their travel and oil the newly exposed section. Leave the machine slides at the approximate centre of travel.

    b. Sweep the floor in the vicinity of the machines you have used. Be careful of sharp machine corners as you maneuver the brooms around the machines. In the model shop and sometimes in the machine shop a vacuum cleaner is more effective at collecting debris than a broom.

    c. Collected debris should be either recycled or thrown in the trashcans. Aluminum, brass, bronze and steel chips can all be recycled if these are pure enough.

d. Go to workshop employees on duty and request a five minute clean up job. Every employ should spend five minutes of each day cleaning some common area of the workshop. Please do not skip on the five minute clean up job. They are part of what makes the shop a pleasant place to work. There are many tools in the shop that are used throughout shop over a day by one person after another. By sharing the cleaning of tools at the end of the day we do not have to keep track of who is responsible for what mess.

e. Report missing or broken tools to the shop employees. Almost everything in the shop can be repaired or replaced. But we need to know about failures in order to correct them. The employees would much rather find out about a broken or missing tool at the end of day than at the beginning. There is generally some spare time between working to solve such problems. Usually the best we can do it is at start of the day tools out of service