

STATE OF ARIZONA

DEPARTMENT OF EDUCATION

H. E. Hendrix, Superintendent of Public Instruction

RECOMMENDATION FOR
SCHOOL SHOP
SAFETY

Adapted From
"GENERAL SAFETY RECOMMENDATIONS"
Seattle, Washington, Public Schools

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INTRODUCTION

There is nothing so sad as the statement "it could have been prevented" as applied to accidents happening in the school shops. A great deal has been talked about safety and accident prevention in school shops but little has been done in an organized way in this state.

The material in this pamphlet has been developed in the form of suggestions to the wide awake, conscientious teacher who really has the welfare of his students in mind. The material has been developed in various parts of the country and may, in some instances, not be entirely applicable to all school shops in Arizona. It is felt that much of it is of such importance that it should really be made State Law.

It is hoped that conferences will be held with the shop teachers throughout the state so that these suggestions can be considered and discussed and workable methods developed for their effective use.

We are especially indebted to the City Schools of Seattle, Washington, for much of the information contained in this pamphlet and hope that it will result in the reduction of accidents in our school shops in Arizona.

G. S. S.

STATE OF ARIZONA
Department of Public Instruction

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GENERAL SAFETY RECOMMENDATIONS

ON THE USE OF TOOLS

The right way to use tools is the safe way. Do not use any tool or machine until the teacher has shown you the proper way to use it.

The good workman does not hurry, yet he gets his work done well and rapidly without danger to himself or others, because he knows how to use his tools, plans carefully what is to be done and gives his work his undivided attention. HASTE MAKES WASTE.

It is not safe practice to use any tool so that the force is directed against any part of your body or against anyone else. Be sure that the tool will not be turned toward you or anyone else, if it should slip. There is always a safe way to use a tool. If you are in doubt, ask your teacher.

Dull tools are dangerous. More force is required, and control is more difficult.

It is not safe to use defective tools. Tools with loose, split or broken handles, files without handles, tools with mushroomed heads, or any other tools which seem defective to you should be reported to the teacher as soon as discovered.

Use the vise or clamps to hold work firmly. This leaves your hands free so that you can have better control of your tool.

Standing on a bench, stool, box or saw horse is not a safe position for work.

Splinters of metal or wood cause wounds which are difficult to disinfect. Avoid such injuries by using a sandpaper block whenever feasible, by smoothing all cut edges of sheet metal at once, and by using a brush rather than the hand to clear away debris.

Hold tools firmly so that they will not fly from your hand. Pieces may be thrown when struck by a hammer or other tool. Where there is any such possibility, strike light blows. When holding work with tongs or pliers, be sure that you have the proper size and type of tool for gripping it securely.

ON CONDUCT IN THE SHOP

It is not safe for you or others to run or wrestle in the shop, to struggle for possession of tools or materials, to turn or move suddenly, to push or shove another boy, to toss or throw anything about the shop or to point or gesture with a tool or object in your hand.

If there are machines in the shop, keep away from them until the teacher has given you permission to use them.

ON MOVING ARTICLES ABOUT THE SHOP SAFELY

Boards or metal bars should be carried carefully; long pieces with front end above your head, short pieces with front end down. Sheet metal should be carried so that no one can be cut by the edge.

Carry sharp tools carefully so that neither you nor anyone else can be cut if you stumble or someone brushes against you.

Hot metal should never be carried about the shop if it is possible to avoid doing so. Soldering should be done near the furnace. In a few cases it may be necessary to carry heated soldering irons to the work. If this is necessary, carry the heated iron above your head and move with deliberation.

Remove bits and drills from the brace or hand drill before taking the tools to the rack.

Boys have been hurt by dropping sharp tools or heavy articles on their feet. Use care. Do not try to carry too many articles at one time.

ON STORAGE OF TOOLS AND MATERIALS

The bench top should be clear of all articles which are not absolutely necessary for work. When it is necessary to set sharp tools on the benches, place them so cutting edges are protected.

All scraps should be picked up at once and placed in the waste can. Sure footing is essential in a safe shop.

Pieces of sheet metal or glass should be picked up at once and placed in a special container, never in the waste can provided for wood and shavings nor in the waste can used for oily rags.

Tools should be placed carefully in the racks with cutting edges or points protected so that no one will be hurt when reaching for a tool.

Sticks should be broken and laid flat in waste cans. They should never project from the can.

Nails or tacks projecting from boards are dangerous. They should be drawn at once.

ON STORAGE OF TOOLS AND MATERIALS (Cont'd)

Hot metal should be completely cooled before it is left anywhere in the shop. It is your responsibility to see that others may not be burned on metal you have heated.

Care is necessary in handling lumber or metal bars in vertical racks. If they are not properly placed or are pulled out carelessly they may fall on someone.

When setting projects on storage shelves be sure that they are securely placed, and that, in placing them, other projects have not been pushed into insecure positions.

Finally, a safe shop is an orderly shop. Do your part toward making the shop safe for yourselves and others by actively assisting in keeping everything in the proper place.

ON INJURIES

Report all injuries, however slight, to the teacher at once. Serious infection may come from even a scratch if it has not been properly treated.

ON THE USE OF GOGGLES

Goggles must be worn when pouring metal, using buffing wheels or grinders which are not equipped with eye shields, and when chipping or drilling if there is a possibility of flying metal.

ON ACID

Do not handle acid except on definite instruction to do so by the instructor.

ON THE USE OF GAS

If the gas furnace is equipped with a pilot light, be sure it is burning before you turn on the gas. If there is no pilot light, light a small piece of paper in the furnace before you turn on the gas.

If you are lighting a gas plate have your match lighted at the aperture first, then turn on the gas slowly until it ignites.

When lighting blow torches have your light ready and turn on the gas slowly until it ignites. After the gas is lighted, turn on the air gradually. Use every precaution to avoid directing the flame against yourself or others or against anything inflammable. Do not lay down a burning torch.

Always turn off the gas when your work is done.

ON POURING METAL

Always have the teacher inspect the mould before you melt any metal. Notify the teacher when you are ready to pour.

ON THE USE OF MACHINES

Get permission from the teacher each time you use a power driven machine. You must have brought to the teacher a standard "Safety First" form, signed by your parent or guardian, before he will permit you to use any machine.

Never start or operate any machine if the teacher is not in the shop.

Give your undivided attention to your work. If you must speak to someone, stop your machine.

You should not talk to anyone using a machine. Standing near him or in any way distracting his attention is dangerous. Safety demands that you keep away from machinery except when you are using it. The only exception is when the teacher assigns you as observer or helper.

Safeguards are provided and must be used at all times. Take no chances. If you have any doubt about using the guard, ask your teacher.

Make certain that everything is clear and all safeguards and attachments are clamped before you start your machine.

Motors which drive line shafts should never be started except at the request of the teacher and then only when you are absolutely certain that no one is in position to be hurt.

Report immediately to the instructor any machine, safeguard, or attachment which is out of order.

Stop the machine before making any adjustments except when instructed to the contrary by your teacher.

Shifting belts in motion is dangerous. Stop the motor before replacing belts on motor or line shaft pulleys. Use a stick for shifting belts, except when instructed to the contrary by your teacher. Never use a tool to shift belts. Report to the teacher at once any exposed end of wire lacing.

Be sure that your clothing is close-fitting. Wear a jumper with close-fitting sleeves or roll your sleeves up to the elbow with the roll inside. Remove or securely fasten flowing ties so they may not be caught in the machine. It is not safe to wear gloves or rings about machines.

If you wear your hair long, be certain that it is securely held back before you use machines.

Never leave your machine until it is stopped.

Always stop machinery in case of accident.

Never oil machinery while it is in motion.

ON THE USE OF MACHINES (Cont'd)

Never oil line shafts unless definitely assigned to the job by the teacher. A sign REPAIRS - DO NOT START should be placed on the controlling switch before the oiling is begun and removed only after it is done. No one but the oiler should place or remove the sign.

Ladders should be erected only with the teacher's permission and should be taken down as soon as the work is finished. Tools or parts should never be laid on step ladders.

Never open switches or touch fuses unless directed to do so by the instructor.

It is never safe to move levers, screws or wheels on machines unless you know exactly what the effect will be. Do not experiment. Ask your teacher.

SPECIAL SAFETY RECOMMENDATIONS FOR MACHINES

WOOD TURNING LATHE

Inspect all work carefully for splints, checks, knots, soft glue or other defects before putting it in the lathe.

Before you start the lathe, be sure that the centres fit perfectly and are fully in; that the tail stock, tail stock spindle, tool post and tool rest are firmly clamped; that there is no noticeable end play between centres; and that the work turns freely. Always give the lathe at least one full turn by hand to be sure there is no obstruction, before turning on the power.

Keep the tool rest close to the work. Stop the lathe before adjusting the tool rest.

Do not use any tools except the regular tools provided for wood turning.

Hold your tool firmly with both hands. Always keep the hands above the tool.

Stop the lathe when you are using rule, calipers, or dividers on your work.

Keep all tools, except the one you are using, in the tool rack. The lathe bed must be clear at all times.

Get the teacher's approval of the speed and mounting of all heavy work before you start the lathe.

Do not lay your hands on work when lathe is in motion.

Start square or unbalanced work at low speed. Do not change speed until work is well rounded.

WOOD TURNING LATHE (Cont'd)

When fastening work to face plate with screws, use #12 screws except on very small work, choose length which will not extend in wood which is to be removed, drive screws straight and fully in so they do not project and be certain screws hold firmly. Round the corners of all except very light pieces before mounting them.

CIRCULAR SAW

Keep the guard over the saw at all times, unless you have been given explicit directions not to do so for some particular operation. Stop the machine and make certain the guard is over the saw before you leave.

Set the saw at a height just sufficient to clear the work, before turning on the power.

Stand so that your body is not in line with the saw.

Keep your hands well out of the line of the saw. Never reach back of the saw to hold down work.

Never rip stock without using the ripping fence or cross cut stock without using the mitre gauge.

Be certain the fence or guage is firmly clamped before you use it. Never adjust the fence or guage while the saw is in motion.

The edge of the stock which rests against the fence or guage must be perfectly straight.

The surface which rests on the table must be flat.

Always use the push stick or block when ripping stock less than four inches wide, and in other cases when it is safer to do so.

Never rip stock less than twelve inches long. Use the hand saw for short stock.

Always use a clearance block when cross cutting to length against the fence.

Never cross cut stock unless there is ample bearing on the guage so that the work can be held firmly against the guage with the hand well away from the saw.

Keep the top of the table clear. Remove scraps with the push stick.

Never work knotty, split, warped or crooked stock.

Hold the work firmly. If there is the least tendency to pinch, hold the work and stop the saw. Never crowd the saw.

Use the proper saw for your work. If there is any doubt, ask your teacher.

BAND SAW

Round stock or any stock which does not rest flat on the table must not be cut on the band saw.

Adjust the guide to one-half inch or less above the stock before starting the machine.

Hold your hands so that they are not in line with the saw.

Keep the saw table clear. Use a stick or stop the saw when you clear small pieces from the table.

If the saw clicks, stop the machine at once.

If it is necessary to back out of a cut, do so cautiously. Stop the machine at once if the blade begins to pull out even slightly from the guides. Make clearance cuts before starting any cuts where there is a possibility that it may be necessary to back out of a curved cut.

Get your teacher's advice before cutting any stock which is of doubtful quality.

Stop the saw at once if the blade binds in the cut.

Use a stick or stop the saw when you clear small pieces from the table.

JOINTER

Always check to be sure the guard is pressing against the fence before you start the machine, by pulling the guard back slightly and observing the recoil.

Keep the guard over the knives at all times while you are using the machine.

Clamp the fence in position and adjust the depth of cut before starting the machine.

The depth of cut should never be more than $1/16$ inch.

Never work stock less than twelve inches long.

Never cut across the grain of the wood.

Use push block whenever possible. Never put your hand above the knives.

Do not allow your hands to pass over knives while on material that is being jointed. Use both hands, keeping them back from knives until piece is well started then work one hand on each side.

Get the teacher's advice before working any split, knotty, warped or crooked stock.

Never work salvage stock that may have nails, sand or cement imbedded in it, until it has been cleaned to the satisfaction of the teacher.

Never feed work to cut across the grain.

SURFACER

Before starting machine, adjust table to thickest part of stock. For boards 16 inches wide, table may be raised one-quarter turn of wheel; for 8 inches wide, one-half turn; other sizes in proportion, but never over one full turn.

Wait until the machine is up to speed before feeding stock.

Stand to the side of the work when feeding stock. Do not look in the throat of the machine. Keep your hands at least six inches from the feed rolls.

When you are surfacing a number of pieces of approximately the same size, run the thickest first. If it is necessary to raise the table for later pieces, run the first pieces through again before you raise the table a second time. Feed in succession, not side by side.

Release feed at once if surfacer slackens speed.

Get the teacher's advice before surfacing stock less than one-quarter inch thick or any split, knotty or warped stock.

Never work salvaged stock that may have nails, sand or cement imbedded in it, until it has been cleaned to the satisfaction of the teacher.

Never feed work to cut across the grain.

MORTISING MACHINE

Before turning on the power, be sure that your work is securely held and that all adjustments for depth, etc., have been made.

Keep your hands away from the chisel.

If using a mortising attachment on a saw table, take off the saw, or adjust the guard to cover it completely before turning on the power.

GRINDER

Always have eye shield in place, so you must look through it to see work. If this is not possible, use goggles.

Always stand out of line with the wheel.

Keep the tool rest close to the wheel. Be certain it is securely fastened.

Never grind on the side of the wheel unless directed to do so by the teacher.

Never grind pieces too small to be securely held in the hand. Holding work in pliers is extremely dangerous. If there is even a slight possibility that the work may be wedged between wheel and rest, do not attempt to use the grinder. Such work can be done more safely, and frequently more easily with a file.

ENGINE LATHE

After the set-up is complete and has been checked, give the lathe at least one full turn by hand to be sure that everything is clear before turning on the power. Check your set-up -- work well centred tool bit and tool holder screws tight, dog screw tight, centres tight in spindles, tail stock tight, tail stock spindle clamped tight with only enough clearance so work can turn freely, work clamped securely in chuck and chuck wrench removed when chuck is used, and all packing and clamps securely fastened when work is clamped to face plate.

Keep the ways of the lathe clear of tools, oil cans or materials.

Stop the lathe before putting on or removing chucks or face plates. Use Cradle when putting on or removing chucks. Be careful in carrying or placing chucks in rack, especially if there is oil on chuck or hands.

Never take hold of chips or put your hands on revolving work.

When filing rotating work, use special care to be certain that you can not come in contact with any revolving part of the machine or work.

Stop your lathe before attempting to clean hole in live spindles.

Avoid polishing with emery cloth held in your hand. Use rest whenever possible.

Stop your lathe before measuring work except as directed otherwise by your teacher.

Keep your cutting tool placed in the tool post so that it will be in advance of any feeding part of the compound or cross feed.

DRILL PRESS

Bolt or clamp all work that can not be easily controlled by hand. Small pieces should be held in vise or by clamps, never in the hand.

Before starting the machine, be certain that the work and table are securely clamped.

Centre punch for every hole.

Do not take hold of chips that run from the drill. Stop the drill and use pliers if it is necessary to remove chips.

Drill pilot hole for holes over one-half inch in diameter.

Keep your head and hands away from drill and spindle.

SHAPER

Keep your eyes out of line of path of tool.

Be certain stock is securely clamped and that ram will clear work before starting the machine.

Keep your hands away from the work while the shaper is in motion.

MILLING MACHINE

Be sure the tool will clear the work and that the work is securely clamped before starting the machine.

Stop the machine before brushing away chips. Keep eyes out of range of chips.

SPECIAL SAFETY RECOMMENDATIONS FOR ELECTRIC SHOPS

Always consider a circuit alive until you are absolutely certain that it is not. Test it by using a test lamp as directed by the instructor.

Always get the teacher's permission before making any connection to the 120 volt circuit. This includes wiring on boards or house and the testing of transformers or other appliances. Break the connection as soon as your work is done. Never leave, even temporarily, unless connection is broken.

Avoid touching a live wire and a steam or water pipe so that the current may be shorted through your body to the ground. 120 volts is dangerous. Use care with storage batteries. The acid will eat clothing or flesh, and accidental shorts may heat wires red hot.

Place reels of wire flat so that they will not roll.

SPECIAL SAFETY RECOMMENDATIONS FOR PRINT SHOPS

PLATEN PRESS

Be certain your form is securely locked before removing it from the stone. Check to make sure you have clamped the form securely on the bed. Turn the press over by hand (using the fly wheel, not the large pulley) to be sure the platen guard is working before you turn on the power.

Insert or remove paper only while the press is opening.

Never attempt to catch a falling sheet.

Stop the press before reaching for any paper that has fallen into the press.

Stop the press before washing, oiling or making any adjustment.

Stop the press before attempting to replace the belt.

Stop the press before you leave it.

Do not permit anyone to assist you in operating the press unless, to your personal knowledge, he has been directed to do so by the teacher.

Apply ink to the disk above the rollers and on the downward stroke only.

PAPER CUTTER

Never use the paper cutter unless directed to do so by the instructor.

Do not permit anyone to assist you or stand close to the cutter while you are using it unless, to your personal knowledge, he has been directed to do so by the teacher.

When cutting paper, place both hands on the lever and do not remove them until the handle is back well past the centre to the right.

SPECIAL SAFETY RECOMMENDATIONS FOR THE AUTO SHOP

Always be sure that no one is in the way, front or back, before moving a car. Have someone to signal that the way is clear.

When you have brought a car into the shop; do not leave it until the emergency break is set and the wheels are blocked front and rear, the gasoline tank has been inspected for leaks (never store car with leaking tank), and one terminal of the battery has been disconnected,

Keep flame away from gasoline tanks. Avoid getting gasoline on body. Remove overalls or clothing immediately if gasoline is spilled on them. Never siphon gasoline unless the instructor has directed you to do so.

Be sure doors and windows are open before any motor is operated in the shop.

Keep well away from all moving parts, when motor is running. Never crank a car unless you are certain that it is out of gear, and that no one is in position where he may be hurt. Never put your hands in any part of the car if it is possible for someone to crank the car.

Keep out of line with the fan when motor is running.

When using the jack, be certain that it is placed so it cannot slip. Never leave car standing on jack. Use the metal supports provided for this purpose.

Before working under cars be absolutely sure that the car is supported on standards and blocked so that it cannot possibly drop. Inspect carefully for sharp edges of metal or protruding parts, and for leaks in the battery. Use care to avoid getting dirt in your eyes. Find a position where you can see your hands and your work.

Before lifting anything with the hoist, get the teacher's approval of the sling and knots. Keep your hands away from hoist gears, and all parts of your body from under any part suspended by the hoist.

Do not work on a hot engine.

When you wish to remove valve springs on valve-in-head engines, call the teacher. The removal of the first spring must be done under his direct supervision.

AUTO SHOP (Cont'd)

Always make sure the frame is supported on the standards provided for this work before assembling or disassembling springs. Do not drive spring bolts toward anyone.

Be sure that you and everyone else is in the clear before you drop the transmission.

Always stand to the side when using pullers.

Call the instructor when you wish to disassemble a clutch. Clutch springs may cause serious accidents if not properly handled.

Call the instructor when you are ready to use the press.

When charging a battery, hold no flame above it. Be sure clips and connections are tight and take care that the battery is not shorted.