

SAFETY HANDBOOK

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for....

Tool Makers—

Machinists—

Welders—

Inspectors—

Mechanical

Maintenance—

Oilers—

Crib-Keepers—

Western Electric Company

INCORPORATED

HAWTHORNE WORKS

REVISED EDITION

NOVEMBER 1943

THE MODERN A-B-C
ALWAYS BE CAREFUL

SAFETY

H A N D B O O K

for

Machinists, Tool Makers, Welders,
Tool and Machine Inspectors,
Mechanical Maintenance
Men, Oilers and
Crib Keepers



Western Electric Company
INCORPORATED

Revised Edition, November 1943

A FUNNY JOKE OFTEN HAS A
SAD ENDING

Safety Supervisor-Phone 3434

WHAT YOU FORGET FOR A MOMENT
YOU' MAY REMEMBER A LIFETIME 1

INDEX

Introduction	3
Medical Service	4
General Safety Suggestions	6
Safety Handbook for Machinists, Tool Makers, Tool & Machine Inspectors, Mechanical Maintenance Men, Oilers, Crib Keepers & Welders .....	.10
Air Grinders .....	.10
Drilling .....	.11
Hoisting Equipment .....	.12
Ladders .....	.13
Compressed Air .....	.15
Grinding .....	.15
Lathes .....	.16
Milling Machines, Boring Mills, Planers & Shapers .....	.19
Goggles .....	.22
Safety Shoes .....	.24
Oilers .....	.26
Pouring Hot Lead or Babbitt .....	.26
Punch Press .....	.27
Rigging .....	.28
Safe Working Loads for Chains .....	.28
Shear-Power .....	.28
Signs-Danger .....	.29
Toolcribs & Storerooms .....	.29
Tools—Small .....	.32
Welding .....	.35
Wrenches.. ..	.41
Safety at Home .....	.42
Supervisors .....	.44

A SAFE WORKER IS A
HAPPY WORKER 1

Your Safety Organization wishes to extend its appreciation to the supervisors and fellow members of your organization for the valuable aid rendered in compiling this handbook.

INTRODUCTION

This book of safety rules is issued to impress every employee with the necessity of exercising the greatest care and judgement at all times.

The Western Electric Company is co-operating with you by guarding machines and equipment. The Company also furnishes personal safety equipment and provides an opportunity for you to purchase safety shoes at a saving.

Do not disregard these rules as they have been made for your protection.

Your supervisor will welcome any suggestions or ideas you may have to offer.

MEDICAL SERVICE

1. The hospital which is located directly East of the main restaurant building, is at your disposal *twenty-four hours a day, seven days a week* for injuries received while at work. If after receiving an injury and being treated at our hospital you go home and later feel you require additional medical service *regardless of the time, day or night* call Lawndale 5000 or Cicero 500 and ask to be connected with the hospital, state your case and the staff will take care of you.
2. There is a first aid station located in Bldg. 29-3 North and one in 75-1 South. They are open from 8:00 a.m. to 4:45 p.m.
3. Do not neglect minor injuries such as bruises, scratches, cuts, burns or foreign objects 'in the eye, regardless of how small the injury may be. Obtain a pass from your supervisor and go to the hospital or nearest first aid station immediately.
4. In case of more serious injuries do not wait for a hospital pass but go to the hospital at once.
5. After treatment, return the hospital pass to your department. If any verbal instructions are given you by the hospital, advise your supervisor.
6. Never attempt to treat your own injuries. We have a capable hospital staff to take care of you.

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Have All Cuts and Scratches Treated Promptly

GENERAL SAFETY SUGGESTIONS

1. Never operate any machine, crane, tractor, elevator or other equipment unless you are thoroughly familiar with it and have been authorized to do so by your supervisor.
2. If your hands become soiled from paint, acid, lead, grease, etc., be sure to wash them before eating.
3. Only the driver should ride on jitneys, trucks, tractors, etc. No riders, please.
4. Employees should practice good house-keeping; keep aisles, emergency exits, etc., clear.
5. Rather than take a chance and have an accident, never attempt to work if you feel sick or dizzy or if the heat makes you feel faint or weak. Avoid drinking too much ice water or standing in drafts when perspiring on the job.
6. Running is prohibited.
7. Never pile, lean or leave tools or material extending in such a manner that they might be knocked down or strike someone.
8. Do not attempt to make any repairs to machinery unless authorized by your supervisor and then only when fuses are pulled. If necessary to remove guards while making repairs to machinery, make certain they are replaced before operation is resumed.
9. Do not have screwdrivers or other tools

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projecting from your pockets.

10. Never wash hands in such highly flammable liquids as wood alcohol, benzine or turpentine. Alcohol is a violent poison and should not come in contact with hands or face.
11. Repairs to electrical apparatus shall be made only by authorized electricians or maintenance men.
12. A soap for cleaning hands which is effective yet harmless to the skin is available in Store 209 under R. M. 646679. It will remove shellac, grease, paint, oil, graphite, etc.
13. NEVER EXPECTORATE INTO A DRINKING FOUNTAIN OR ON FLOORS AS THIS SPREADS GERMS.
14. When working around revolving machinery, fans, etc., do not wear loose or cloth gloves, rings, loose fitting jackets, flowing ties, etc., and do not work with sleeves down.
15. Do not insert a bolt or a nail in any kind of a chain to shorten it.
16. Never borrow, lend or transfer goggles from one person to another.
17. When wiping hands with rags or waste, watch out for any steel chips, slivers or wire that may be entangled in the material.
18. Do not throw a tool to your fellow worker, always hand it to him.
19. Report all injuries to your supervisor no matter how slight. There is always



Clear Aisles Are Safe Aisles

danger of infection.

20. Always warn your fellow worker if you feel he is in danger.
21. The use of celluloid eye shades, sleeve holders and screwdriver handles is prohibited as celluloid is highly flammable.
22. Do not leave equipment lying on the floor where it is a stumbling hazard.
23. Protect your feet by wearing safety shoes which can be purchased in the Safety Shoe Store, Bldg. 38-3.
24. If in doubt about any safety rule, practice or condition, consult your supervisor.
25. Working with or around acids or alkalies should not be attempted without the specific instructions of your supervisor.
26. Protective clothing must be worn when working in or around hot molds or die casting dies.
27. Do not attempt to work on tools which are set-up in moulding or diecasting machines unless operating valves or starting mechanism are in "off" position.

**DO YOUR JOB THE SAFE WAY AND
IT WILL SOON BECOME A HABIT**

SAFETY HANDBOOK

For

***Machinists, Tool Makers, Welders,
Tool and Machine Inspectors,
Mechanical Maintenance
Men, Oilers and
Crib Keepers***

AIR GRINDERS

1. Due to the great speed of air grinders it is important that the proper size grinder and the correct size wheel is used.

Size of Grinder	R.P.M.	Max. Diameter of Wheel	Max. Length From Chuck to End of Wheel
Small	50.000	1/2"	1"
Small	75.000	1/4"	3/4"
Small	100.000	1/4"	1/2"
Medium	30.000	3/4"	1"
Large	12.000	1-3/4"	1-1/2"

2. Always clamp arbor of wheel as close to chuck as possible.
3. Make certain air valve is shut off be-

**IF YOU DON'T KNOW THE SAFE WAY
-ASK YOUR SUPERVISOR**

fore replacing wheel and when grinder is not in use.

4. Wear goggles at all times when using grinders. When using medium or large grinders use respirator and face shields.
5. Place guard around work to protect others before grinding to make sure that the flying particles of abrasive and steel will not strike a nearby operator.
6. Do not use grinder with cracked or defective hose; report the condition to your supervisor at once.
7. Discard any defective grinding wheels or arbors.
8. Utilize only grinding areas which are purposely provided for air grinding.
9. Report any defective equipment to your supervisor.
10. After changing wheels on portable grinders or putting in a new one, hold the grinder under the bench and then start it up; this will prevent injuries to yourself or others if the wheel should fly apart or whip.

DRILLING

1. When working around revolving spindles and drills, do not wear gloves, loose fitting jackets, rings or flowing ties; whenever possible wear short sleeve shirts. Wear gloves when handling

DON'T TRUST TO LUCK-PLAY SAFE

rough or sharp materials; however, always obtain the permission of your supervisor before doing this so he may provide you with the proper type of gloves.

2. Always use a brush to brush drillings away from your work, never use a rag or your hand.
3. Never attempt to loosen a chuck or a tapered drill shank until the power is turned off and spindle has stopped.
4. Do not attempt to stop spindle by gripping chuck.
5. Always use proper fixtures and clamps to hold material in place.
6. Keep drills and cutting tools properly sharpened.
7. When in doubt about the proper performance of any work assigned to you, consult your supervisor.

HOISTING EQUIPMENT

1. Never Overload the capacity of your hoisting equipment. All equipment is marked showing the capacity.
2. Discard all bent hooks and never attempt to straighten one as it may be cracked in the course of straightening.
3. Never try to lift anything on the point of a hook.
4. Do not insert a bolt or nail in any chain to shorten it and never splice a chain with a nail or bolt or piece of wire; always have the chain repaired.

5. Before starting to hoist any material make certain there are no kinks in the chain, rope or cable.
6. Do not take hold of a cable above the sheave block as your finger might be drawn into the block.
7. When hoisting material make certain you are clear of the load; see that all other persons in the vicinity are clear and keep your eyes on the load.

LADDERS

1. Never use a box, keg, chair or other object as a substitute for a ladder.
2. Check ladder for defects before using -look for split side rails or steps.
3. Do not use a ladder that has a defective tag on it.
4. Make certain the ladder is placed at a safe angle so that it will not slip at the bottom or fall backwards.
5. If a ladder must be placed on a slippery or oil soaked floor, always see that the base of the ladder has non-skid shoes, is securely tied, anchored or that someone is holding it.
6. Never place a ladder against a window sash. Clamp a board across the top of the ladder to give bearing on each side of the windows.
7. Never place ladder feet on boxes, kegs, trucks or any movable object.
6. Always make certain that the hinged spreader on step ladder is open all the way.

9. Never splice two ladders together.
10. Do not use ladders that are too long or too short for the job.
11. Make certain ladder is sufficiently guarded so that it will not be run into by trucks or persons.
12. Never place a ladder before door opening towards it unless the opposite side of the door has a "Hands-Off" sign and someone is available to hold the ladder.
13. All ladders used on roofs or other high spots should be securely fastened to avoid slipping.
14. Always face ladder when ascending or descending.
15. Never stand on top step of ladder.
16. Never "walk" a ladder; get down and move it.
17. Wear a life belt when working from a vertical ladder.
18. Carry rope on shoulder, then pull up the objects with the rope after you are in position.
19. Never over reach from a ladder.
20. Never leave tools on steps or rungs of ladder.
21. The use of ladders on top of benches is ordinarily prohibited. However, should it become necessary, make certain the ladder is securely fastened so that it cannot slip.

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COMPRESSED AIR

1. Before using air for blowing out chips put on goggles and then guard so that they will not blow in the direction of other persons or yourself.
2. Use compressed air only for the job for which it is intended.
3. Do not clean your clothes or fool with compressed air and never blow the air against anyone. Always make certain hose connections are secure.
4. Turn off all air connections at the source when not in use.

GRINDING

1. Always wear your goggles and look through the glass guards, never under or over them.
2. Always be careful when grinding tools as they are liable to be caught between rest and wheel; adjust rest properly.
3. Sound all grinding wheels before mounting them on machine.
4. Do not use a wheel with broken edges.
5. Use safety washers on both sides of wheel.
6. See that work is properly secured before starting machine.
7. Never stand directly in front of wheel when first starting.

**SAFETY ON THE JOB MEANS
HAPPINESS IN THE HOME**

8. Always wear goggles when operating a grinder.
9. Make certain emery disc is tight on the plate before using.
10. New wheels should be run up to the working speed before applying work. Stand to one side while doing this so that you will not be hurt in case wheel disintegrates.
11. See that glass guard over pedestal grinder is always clean.
12. Never adjust work rest while wheel is in motion.
13. Never use the side of an emery wheel for grinding unless it is equipped for side grinding.
14. After mounting new wheel be sure that hood is properly placed.

LATHES

1. Always wear goggles.
2. Always stop lathe before removing tools from tool post.
3. Centers and all sharp tools shall be removed from tail stock and tail stock chuck while not in use.
4. Never put on lathe chucks or face plates by power. Use hand power and center plugs provided for this purpose.
5. All files must be provided with standard handles.
6. Always hold file so that if it is forced back it will not be forced against your body, but to one side.

SAFETY HAS SAVED 265,000 LIVES
IN 27 YEARS IN THE UNITED STATES



A Safe Worker

7. Stop motor when clamping work on face plate.
8. Be sure motor is stopped while changing gears for special threads and lathes.
9. Do not have waste or rags hanging from pocket, they may get caught on the lead screw.
10. Do not leave knockout bar in spindle of lathe.
11. Always make sure that chucks and face plates are pushed well back on the support rack, as they may drop off and injure your feet.
12. Do not use emery cloth, as it may wrap around the work and injure your hands. Use emery sticks.
13. Never start machine until sure that work and tools are properly secured.
14. Severe cuts often result when bare hands are used for removing chips. Use bayonet or brush provided for this purpose.
15. Do not leave tools or work on machines where they can be jarred or pushed off.
16. Always make sure that tool holder is properly secured and resting on cross slide when used with drills, etc.
17. Lathe dogs must be of the safety type or properly guarded.
18. Where possible, chip breakers shall be ground in turning tools, as this tends to product short chips.

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19. Long unsupported revolving bars may whip and cause a serious accident. Use a steady rest.
20. Always stop the lathe before changing the position of tool in tool posts.
21. Operators on woodworking and metal working lathes should not use hand turning tools unless they are fully acquainted with their use. Such tools without handles or with double cutting ends must not be used.

MILLING MACHINES, BORING MILLS, PLANERS & SHAPERS

1. *Goggles must be worn always.*
2. Do not put on or take off the arbor nut by applying power.
3. Use a brush only and on the off side of cutter so that brush will not be drawn between work and cutter.
4. Be sure to disengage the hand wheels for transverse and vertical movements of the table, before starting machines.
5. Do not leave wrenches, etc., lying on table where they can be jarred or pushed off.
6. Severe cuts often result when bare hands are used for removing chips. Use bayonet or brush provided for this purpose.
7. Do not leave tools or work on machines where they can be jarred or pushed off.
8. Always make sure that tool holder is properly secured and resting on cross

- slide when used with drills, etc.
9. Wrong size wrenches should not be used. Use socket wrenches whenever possible.
 10. Do not change set up or measure work without first stopping rotation of cutter.
 11. Always withdraw the table holding work away from the cutter when using a lead maul to seat work.
 12. No attempt should be made to clean a machine with one hand on the starting lever or switch, as the machine is likely to be set in motion.
 13. After a cut is completed the vise or table should be backed away far enough so as to avoid a cut from the saw or cutter when removing or replacing work.
 14. Use oil cans with bent spouts. Straight spouts are prohibited.
 15. Keep waste and industrial towels off table of machine so they cannot be drawn into cutter.
 16. Be sure guards are in place, and in good repair.
 17. Always make sure that work will clear the overhanging arm and arm support before starting machine.
 18. When operating a shaper always make sure that work and ram arm are securely fastened before starting.
 19. Remove draw bars when not in use.

**WATCH WHAT YOU ARE DOING
WHEN YOU ARE DOING YOUR JOB**



*Protect Yourself from Severe
Cuts and Scratches*

GOGGLES

1. Goggles are furnished by the company without charge. They are used to protect the eyes from:
 1. Flying objects and molten metal.
 2. Injurious light and heat rays.
 3. Acids and other corrosive liquids.
 4. Dust and wind.
2. Goggles issued to one individual are not to be worn by anyone else.
3. When watching welding operations protect yourself with proper goggles and other protective equipment.
4. Goggles which have become broken, defective, do not fit, or are unsatisfactory in any way shall be reported at once to your supervisor, who will arrange to have necessary corrections made.
5. Ordinary spectacles are not sufficient protection and should not be worn in place of goggles. If you are wearing spectacles and require goggle protection, take the matter up with your supervisor.
- 6: When striking steel against, steel you must protect your eyes by wearing goggles.

... Safety Supervisor-Phone 3434

ANY JOB IS A SAFE JOB FOR A
CAREFUL WORKER



*He Wears a Smile Because
He Wore Goggles*

SAFETY SHOES

1. Safety shoes for men and women are obtainable in a number of styles and are similar to other shoes except for a concealed toe cap which will withstand a heavy impact. The wearing of safety shoes has prevented many serious foot injuries and all employees are urged to wear them.
2. Safety shoes may be purchased at cost in the safety shoe store at the south end of Building 38-3 at any time of the day. Your supervisor will give you permission to visit the shoe store on Company time.
3. Safety shoes may be purchased with no down payment and weekly pay deductions as low as \$1.25.



Womens Safety Shoes



All styles of Safety Shoes are available in Safety Shoe Store and can be obtained at reasonable prices on easy payment plan to suit your convenience

OILERS

1. If possible never oil machines while they are in motion.
2. Keep oil holes in bearings clean and free from dirt; also wipe off oil spout.
3. Do not wear loose fitting clothing. There must be no ragged or flying ends, torn, unbuttoned or loose sleeves which may catch in the machinery.
4. Do not oil bearings of several counter-shafts from one position of ladder. Change position of ladder and oil those bearings within reach.
5. Step ladders must not be so placed as to straddle machines in motion.
6. Do not walk or stand on machines.
7. Do not use a ladder that is too short so that you have to strain to reach oil cups.
8. Report all dangerous conditions to your immediate supervisor.
9. Do not reach over pulleys or between belts to reach a bearing.
10. Never wipe oil from pulleys when pulleys is running.

POURING HOT LEAD OR BABBITT

1. Always wear goggles when pouring molten metal.
2. When babbitting bearings, see that there is no moisture in the mould previous to pouring, as this could cause an explosion. If possible, heat the mould before pouring.

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3. Always make sure proper air vent has been allowed.
4. When making a pipe joint pour slowly and steadily. When pouring into a wall or concrete floor, pour slowly and at intervals. Be sure that the place to be leaded is perfectly dry. A few drops of machine oil in the place where lead is to be poured will prevent splattering.

PUNCH PRESS

DO NOT USE STEEL PLIERS

1. You must wear your goggles.
2. No one shall be permitted to operate a punch press until they have been thoroughly instructed by their supervisors.
3. Always shut off the power when setting up tools.
4. Do not keep your foot on treadle while performing second operations on parts. Remove your foot after each stroke of the press.
5. Do not remove dirt or chips from the punch and die with your hands during any operation. Use a tool provided for that purpose.
6. Under no circumstances shall the hands or fingers be placed between the punch and die.
7. Soft metal safety pliers, tweezers, and tongs will be provided by your super-

BETTER GLAD THAN SAD

visor. They keep your hands away from the dies. You must use these on all second operation jobs. **GET THEM. USE THEM AND SAVE YOUR FINGERS.**

8. Try clamps with hand, also when clamping punch press die see that screw holes in Bolster Plate are clear to assure tight clamping.
9. Do not wear gloves while operating a punch press except on jobs authorized by your supervisor.
10. Keep press free from wrenches, material, etc., that may fall and strike tripping mechanism.

RIGGING

1. All rigging to be done under direct supervision of supervisor in charge of job and to be inspected by section chief of chief of department before work is started.

SAFE WORKING LOADS FOR CHAINS

1. Chains made of standard links and used for hoisting or similar purposes shall not be subjected to over load.
2. The capacity of chain used with a commercial hoist shall be that shown on the hoist.

SHEAR-POWER

1. Keep your hands a safe distance from blades.

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2. Make sure that the material to be sheared is within capacity of machine that is being used.
3. The knives should be blocked up when any adjustments or repairs are being made.

SIGNS-DANGER

1. Always place "Hands Off" sign on the starting apparatus of a machine or other equipment before starting work on it.
2. Always place "Hands Off" sign on distribution panels and circuits before working on them.
3. The standard "Hands Off" sign shall show operator's name and department number and shall be supplied to all operators who may have occasion to use them.
4. Always place "Danger" signs on work extending in the aisle.

TOOLCRIBS & STOREROOMS

1. Material and tools in a storeroom should be stored in a safe and careful manner. They should not be placed where there is any danger of their falling or being knocked down. Heavy articles should not be placed in such a position that a strain or other injury is likely to occur when handling.

BE ALERT-DON'T GET HURT



*Use the Leg Muscles in Lifting
and Avoid Straining*

2. Sharp or pointed tools or parts should be stored in such a manner as to prevent persons from coming in contact with them.
3. Never attempt to catch falling material.
4. Do not pile a large box on a small one nor allow one box to over-hang another.
5. Do not leave long narrow boxes standing on end. Lay them flat.
6. Identification tags must be placed on all pans, drawers, boxes, etc., so that marking is visible.
7. Be careful in handling and lifting heavy boxes. Lift them with the leg and arm muscles, not with the back.
8. When carrying load with fellow employee, do not drop your end without warning.
9. Avoid storing tools or material on the tops of lockers, cabinets, etc. They may cause injury to someone or damage to the property.
10. Issue only those tools that you know are safe.
11. Permit no tool with mushroomed head, dull or chipped cutting edge to leave the tool crib. Have them redressed.
12. Keep jaws of wrenches in good condition.
13. Extreme care shall be used in storing grinding wheels. They shall be stored

MAKE A STRANGER OF DANGER

in dry places and shall be supported on edge in racks. Straight-sided elastic and rubber-bonded wheels of 1/4 inch or less in thickness shall be laid flat on a level surface to prevent warping.

14. Tools and equipment must be inspected at storeroom and not given out unless in good condition.
15. Arrange your tool crib so that all heavy and cumbersome tools and machine parts are in convenient places so that excessive lifting is not necessary.
16. Tools and equipment frequently used should be placed toward the front of shelves and bins; those used less often should be stored in the rear.
17. All liquid containers should be kept clean, properly marked and neatly stored.

TOOLS-SMALL

1. Hand tools such as screwdrivers, hack saws, etc., with transparent handles of a nitro cellulose composition or any other highly flammable material shall not be carried into, used or stored within the works.
2. Keep tools clean and free from rust, as infection may result from a slight scratch or cut.
3. When tools are put in tool box or drawer, place them with points and cutting edges down. This will prevent needless injuries.

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4. Tools or materials should not be thrown to another person.
5. Do not leave tools strewn about the floor or hanging loose; also avoid leaving them on tops of lockers, cabinets, ladders, scaffolds, etc. They may fall and injure someone.
6. When tools are not in use, arrange them in a safe and orderly manner in tool drawer or tool chest.
7. Never use any tool if it is not in an absolutely first class condition.
8. Do not use sledges, hammers, chisels, star drills, or other tools with mushroomed or broken heads. Have them properly dressed.
9. Do not use tools with rough or splintered handles. Get a new handle.
10. Be sure the handles of all your tools are of good material and are properly fitted and securely fastened.
11. Hardened faced hammers should not be used on tempered tools, hardened pins, etc. Use brass hammers.
12. Never use mushroomed piece of brass or copper to receive the blow of a hammer when striking hard metal. A piece may fly off and injure you or someone else.
13. Keep all keen edged tools sharp. A sharp tool is safer than a dull one.

BE CAREFUL TODAY AND
SAFE TOMORROW

14. Never leave sharp tools lying around where they may be stepped on or struck against. When possible, put tool back into box, drawer, pouch or leather pocket so sharp edges are not exposed.
15. Hammers with cracked heads and handles are particularly dangerous and should be discarded.
16. Always keep bearing scrapers in leather holders when not in use.
17. Never use a dull screwdriver or one with a rounded point.
18. Never hold a screwdriver in one hand and the material being worked on in the other. The screwdriver may slip and injure your hand.
19. A screwdriver should not be used as a chisel.
20. Long screwdrivers should not be carried in workmen's pockets, as the projecting point may cause serious injury.
21. A screwdriver should not be used while you are in such a position that if it slips it may strike your face or body.
22. Screwdrivers with shanks extending all the way through the handle should never be used on electrical work.
23. Never use a file unless it is provided with a handle.
24. Never use a file or drill as a center punch.
25. Keep your thumb away from the teeth

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when starting a saw. Always pull saw toward you on the first stroke.

26. Do not perform any chipping operation without wearing goggles and providing a shield to chip against.
27. All tools and equipment should be inspected periodically and any found defective should be repaired or discarded.
28. Never use a file as a pry bar because it may snap and hit yourself or some other person causing an injury.

WELDING

SMALL NEGLECTS ARE APT TO CAUSE SERIOUS ACCIDENTS.

1. The following safety clothing and equipment is provided for your protection. Use it and be safe: goggles, helmets, hand shields, asbestos blankets, asbestos gloves, leather gloves, leather sleeves, and leather leggings.
2. No torch shall be used outside of regular authorized department without first calling the Works Inspection Department so they may make an inspection of the area to be worked in for fire protection purposes.
3. Only properly trained and instructed operators shall be permitted to use oxy-acetylene apparatus. Proper skid must be used to transport tanks.

**YOU SIMPLY OWE IT TO YOURSELF
TO WORK SAFELY**

4. Only men thoroughly familiar with the operation of regulators and the method of attaching fittings shall be allowed to instruct others.
5. Tanks should be handled carefully; knocks, falls or rough handling are liable to damage the cylinders, valves or fuse plugs and cause leakage.
6. Unless cylinders are on a suitable carrying device, regulators should be removed.
7. Place tanks in a location where no moving objects can strike or knock them over.
8. Do not use copper fittings on acetylene tanks. Copper and acetylene form an explosive mixture.
9. Do not use oil or grease on cylinder caps, regulators, gauges or fittings. Oil or grease when combined with oxygen under pressure will cause an explosion.
10. Glycerine should be used whenever it is necessary to lubricate the adjusting screw or any part of the equipment.
11. Do not allow rags or other material to rest on top of tanks.
12. Do not handle tanks with oily or greasy gloves, as oil or grease will make them difficult to handle safely.
13. The inside of new hose is covered with talc, be sure to blow it out before using.
14. Hose should be inspected each day before using.

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15. Never repair hose with tape; standard fittings are made for that purpose.
16. Never use a match to light a torch. Friction lighters are provided for this purpose.
17. Do not light torch with both valves open, as it may cause a backfire.
18. Always blow out tank valve before attaching regulator.
19. Always point acetylene outlet away from oxygen tank and never face gauge while opening tank so you will not be injured if a gage bursts
20. Do not attempt to repair a leaking tank. Remove it from the building immediately.
21. Always make sure that hose is properly connected and that all connections are tight.
22. Under no condition shall a tank be carried by a crane or hoist.
23. Never use a wrench or other tool on valve, USE KEY.
24. Always make sure that all pressure is released from both diaphragms after shutting off tank valve.
25. Acetylene should never be used at a pressure exceeding 15 pounds per square inch.
26. Never use oxygen pressure higher than acetylene pressure when welding.
27. Torches should never be hung from regulators or fittings.



Protective Clothing

28. Be sure that gases have been completely shut off before putting torch down.
29. In case of backfire always close oxygen valve first.
30. The following are frequent causes of backfire:
 1. Permitting tip to get too hot.
 2. Holding tip too close to job.
 3. Knocking or rubbing the tip when welding.
 4. Permitting tip to get corroded.
 5. Insufficient pressure of acetylene when lighting torch.
 6. Not opening valves and letting air and gas flow into lines before lighting, after changing either of the tanks.
31. Backfire frequently burns inner wall of hose and tends to make the hose unsafe. Check hose after a backfire.
32. When two or more sets of tanks are stored they should be at least ten feet apart.
33. All tanks shall be securely fastened to prevent falling or rolling.
34. Do not store tanks where grease or oil will drop on them. **EXPLOSIONS MAY RESULT.**
35. Never use a match to test for leaks, use soapy water.

**THERE IS A SAFE WAY
-DO IT THAT WAY**

36. All welding work should be done behind a screen whenever possible so as to protect other employees from danger of eye flashes, flying sparks or other particles.
37. Employees who use welding equipment should avoid wearing loose or frayed clothing as it may catch fire.
38. There is danger from flying sparks in burning operations. See that your eyes and ears are properly protected with shields or helmets.
39. Flames are dangerous to watch without suitable eye protection. Wear dark glass goggles.
40. Never use compressed air for blowing out oxygen line as the air may contain oil, moisture or scale; use oxygen.
41. Do not use hose that is kinked or damaged.
42. New hose shall be tagged with date when placed in service. Hose shall be junked after two years' service.
43. Tanks should not be subjected to excessive changes in temperature.
44. Tanks should be kept away from inflammable material such as: oil, gasoline, waste, etc., and away from corrosive chemicals and fumes.
45. Tanks (unless empty) should be stored in an upright position. Tanks when empty shall be immediately removed to storage.

... Safety Supervisor-Phone 3434

46. Tanks stored in the open during the summer should be protected from the continuous rays of the sun and excessive heat and in winter protected against accumulations of ice and snow.
47. Cylinders of oxygen shall never be stored in the same room or compartment used for the storage of calcium carbide or cylinders of fuel gases.
48. Acetylene is fuel gas and must be kept away from fire.
49. Empty cylinders in storage or shipment shall have their valves closed.
50. Caps should be kept on cylinders except when they are in actual use.
51. Never tamper with safety devices in valves on cylinders.

WRENCHES

1. Keep wrenches in good condition.
2. Do not use a nail, piece of wood, or other article as a shim for a wrench that is too large. **GET THE' PROPER WRENCH.**
3. Never use a wrench as a hammer.
4. Always put a wrench on the right way so that you do not spread the jaws.
5. Be sure the pipe wrench you are using is the right size.
6. Never use any wrench with worn jaws.

GET FIRST AID FOR CUTS AND
SCRATCHES-NOT SOMETIMES.
BUT EVERY TIME

7. Do not pull down on wrenches or chain tongs when they are directly over your head. Stand to one side.
8. Be careful when using a wrench, while standing on a ladder, scaffolds or other high places, that you do not slip or fall.
9. When using a wrench or chain tongs always be sure you have a good purchase before trusting any weight on the wrench.
10. Use socket wrenches as much as possible.

SAFETY AT HOME

1. Observing the following few simple safety suggestions can prevent a large number of home accidents.
2. See that toys and other things are in a safe place after children have finished playing with them.
3. Keep stairways and hallways well-lighted and free from obstructions.
4. Keep steps and guard railings in good repair.
5. Tack down or use backing on all loose rugs.
6. Cover icy steps and walks with sand.
7. Never stand on a rocking chair or a piano bench to hang a picture-use a step-ladder.
8. Keep matches out of reach of children.
9. Keep cooking utensils well back on the stove where children cannot reach them.
10. Never use gasoline or benzine indoors.
11. Carry on your cleaning operations with these liquids out of doors. It is much safer to have the cleaning done by an establishment as they have the proper equipment.
12. Never use gasoline, kerosene, etc., to start a fire.
13. Use a screen in front of an open fireplace.
14. Never start your car in a closed garage, due to the possibility of carbon-monoxide gases being present and your becoming asphyxiated.
15. Keep poisons out of children's reach and where there is no danger of them being picked up by mistake.
16. Never leave shells in a gun when it is not in use, and never look into a gun when cleaning same unless it has been taken apart. It is a good practice to take a gun apart when it is not in use.
17. Take no chances with cuts and bruises. Clean cuts thoroughly and remember that a bruise over a bone may cause a bone abscess.
18. Inspect lamp cords and any open wiring periodically. They may be broken or frayed causing possible shock or fire hazard.

A LITTLE SCRATCH
IGNORED TODAY MAY BECOME A
SERIOUS INFECTION TOMORROW

SUPERVISORS

1. In a great many cases the responsibility of accidents rests upon your shoulders.
2. See that all safety rules are followed,
3. Accidents are caused by lack of thought and lack of information; much of this can be eliminated by proper training.
4. A new employee should be introduced to his fellow worker. Make him feel at home in his new environment and be sure he has attended the safety lecture in the Shoe Store, Building 38-3.

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SAFETY ON THE JOB MEANS HAPPINESS TO YOU AND THE EMPLOYEE

Linear Measure

12 inches = 1 foot 5½ yards = 1 rod
3 feet = 1 yard 40 rods = 1 furlong
8 furlongs = 1 mile

Square Measure

144 sq. inches = 1 sq. foot 4840 sq. yards = 1 acre
9 sq. feet = 1 sq. yard 640 acres = 1 sq. mile

Cubic Measure

1728 cubic inches = 1 cubic ft.
27 cubic feet = 1 cubic yd.
268.8 cubic inches = 1 std. gallon (dry measure)
128 cubic feet = 1 cord (wood)
1 cubic foot = 4/5 bushel (about.)

Circular Measure

To find the diameter of a circle multiply circumference by .31831.

To find circumference of a circle multiply diameter by 3.1416.

To find area of a circle multiply square of diameter by .7854.

To find surface of a ball multiply square of diameter by 3.1416.

To find side of a square of equal area, multiply diameter by .8862.

To find cubic inches in a ball multiply cube of diameter by .5236.

1 Doubling the diameter of a pipe increases its capacity four times.