North Dakota State University
Power Tool
Operations and Maintenance

I. Introduction

This NDSU procedure provides guidelines for the use of power tools. The intent is to establish proper safety procedures and practices as well as to promote and provide for a safer environment for students, faculty and staff.

II. Purpose

To ensure all employees know the correct and safe procedures for operating and maintaining power tools.

III. Goals

To reduce the risk of potential work related injuries associated with power tool operations and maintenance.

IV. Procedures

Click on the following to advance to a specific section.

A. Power Carpenter Tools - Three Types: Electrical, Pneumatic, and Hydraulic.

1. Operate power tools only if you are trained and completely familiar with the tool
2. Inspect all power tools and cords before using them. The tools should be clean and in good condition. Do not use a tool that has a damaged cord or hose.
3. Make sure the work area is well lit.
4. Do not operate power tools if you cannot see the working surface clearly.
5. Ensure that the power source is the proper voltage and current for the tool.
6. Make sure the tool is turned "OFF" before connecting it to a power source.
7. When using a power tool, give the tool your full and undivided attention.
8. Do not distract or disturb another worker who is operating a power tool.
9. Always disconnect a power source before cleaning or making adjustments to the tool.
10. Ensure that the power source for a hydraulic or pneumatic tool is the correct pressure for the tool.
11. Check electrical cords frequently and use only approved extension cords for temporary use.

12. Ensure that cords and hoses are positioned so they do not become tripping hazards.
13. Do not use electric tools in areas where water is present.

B. Air Compressors

1. Read all owners' manuals for this product carefully. Be thoroughly familiar with the controls and the proper use of the equipment.
2. Only trained personnel shall be allowed to use the compressor.
3. Keep visitors away and **NEVER** allow children in the work area during operation.
4. Wear the appropriate personal protective equipment when operating the unit.
5. Before each use, inspect compressed air system and electrical components for signs of damage, deterioration, weakness or leakage. Repair or replace defective items before operating.
6. Never weld or drill holes in the air tank.
7. Release air slowly when draining moisture or depressurizing the compressor system.
8. Keep fingers away from a running compressor, fast moving and hot parts will cause injury and /or burns.
9. Ensure all belt and pulley systems are properly guarded.
10. Never use air compressor for the purpose of supplying breathing air.
11. Never operate or repair in or near a flammable gas or vapor.
12. Never stand on or use the unit as a handhold.
13. Disconnect power and release all pressure from the system before attempting to install, service, relocate or perform any maintenance.
14. Do not use extension cords with this product. Use additional air hoses instead to avoid power loss and permanent motor damage.
15. Do not exceed pressure limits for any component in the system.

C. Table Saw

1. Always keep the blade guard and driving knife (splitter) in place and in working order. Keep tools and cords in good repair and clean for better and safe performance.
2. Keep work area clean and well lit. Don't use power tools in damp or wet locations.
3. Wear the appropriate personal protective equipment. Do not wear loose clothing or jewelry.
4. Disconnect tools when not in use, before servicing, or when changing attachments, blades, bits, or cutters.
5. Never yank electrical cord to disconnect from receptacle. Keep cord from heat, oil, and sharp edges.
6. Avoid accidental starting; be sure switch is "OFF" when plugging in.
7. Keep hands away from cutting area. Never touch blade or other moving parts during use.
8. Never use in explosive atmosphere.

9. Never leave tool running unattended.
10. Avoid cutting nails or screws.
11. Never start a tool when its rotating parts are in contact with the work piece.
12. Always secure work firmly against rip fence or miter fence.
13. Never stand or have any part of your body in line with the path of the saw blade. Do not reach over any moving parts.
14. Never attempt to free a stalled saw blade without first turning the saw off and disconnecting the saw from the power source.
15. Avoid kickbacks (work thrown back toward you) by:
    a. Keeping blade sharp
    b. Keeping rip fence parallel to the saw blade
    c. Keeping riving knife, anti-kickback pawls, and blade guard in place and operating
    d. Not releasing the work before it is pushed all the way past the saw blade using a push stick
    e. Not ripping work that is twisted or warped or does not have a straight edge to guide along the fence

D. Chainsaw

Only trained and authorized operators shall be permitted to operate the designated equipment.

PERSONAL PROTECTIVE EQUIPMENT IS <u>MANDATORY</u> AND SHALL INCLUDE THE FOLLOWING:

- Safety goggles
- Boots/Steel toe shoes
- Chaps
- Snug fitting clothes
- Hearing protection
- Gloves
- Hard hat with face protector

1. Keep bystanders and animals out of the work area.
2. Do not operate the unit when you are fatigued, ill, or if you are under the influence of alcohol, drugs, or medication.
3. Do not operate a chain saw that is damaged, improperly adjusted, or not completely and securely assembled.
4. Do no start cutting until you have a clear work area, secure footing, and a planned escape route.
5. Prior to starting the engine, ensure that the nose of the saw is free of contact with anything.
6. Keep the handles dry, clean, and free of oil or fuel mixture.
7. Operate the chain saw only in well-ventilated areas.
8. Keep all parts of your body away from the saw chain when the engine is running.
9. Carry the chain saw with the engine stopped, the guide bar and chain to the rear

with the muffler away from your body. Use the appropriate guide bar safety cover.

10. Shut off the engine before setting the chain saw down.
11. Use caution when cutting small size brush; slender material may catch the saws chain pulling you off balance.
12. When cutting a limb that is under tension be alert for spring back so that you will not be struck when the tension in the wood fibers are released.
13. Do not operate a chain saw in a tree unless you have been specifically trained.
14. All chain saw service should be performed by competent chain saw service personnel.
15. Kick back safety
    a. Keep a good firm grip on the saw with both hands when the engine is running. Use the chain brake and kickback guard.
    b. Do not let the nose of the saw contact a log, branch, or any other object in the cutting path which may cause kickback.
    c. Cut at high engine speeds to reduce possibility of kickback.
    d. Do not over extend or cut above shoulder height.
    e. Keep the chain sharp and properly adjusted.
16. Specialty Items
    a. Avoid making cuts with the saw between your feet and legs, always cut with the saw to the outside of your legs.
    b. Never position yourself or others in line with the chain. A broken chain will fly forward in the direction the guide bar is pointing.
    c. Keep the chains clean to prolong its life and to reduce the hazard of debris being thrown.

E. Drill Press

1. Only authorized personnel shall operate specific pieces of equipment or power tools.
2. Know your equipment - read and understand the owner's manual and labels affixed to the tools. Learn its applications and limitations.
3. All electrical or mechanical repairs should be attempted only by trained repair people.
4. Keep children away from all operating equipment.
5. Do not let visitors come in contact with tools or extension cords. All visitors shall be kept out of the immediate work area.
6. Use the drill press in a well lit area and on a level, clean and smooth surface to reduce the risk of trips and falls around running equipment.
7. Do not use power tools in damp or wet locations.
8. Do not use the tool in the presence of flammable fluids or gases.
9. Equipment Awareness
    a. Don't overreach while using tools and equipment. Keep proper footing and balance at all times. Adjust the work area height as needed.
    b. Never place your fingers in a position where they could contact the drill bit or other cutting tool parts.

c. Use the appropriate personal protective equipment - do not wear loose clothing or jewelry and restrain long hair which can be caught in moving parts.
d. Disconnect tools from power source when not in use, before servicing, when changing wheels, etc.
e. Keep all machine guards in place, in proper adjustment and alignment.
f. Ensure the switch is in the "OFF" position before plugging in the tool.
g. Before connecting the tool to a power source, be sure the voltage supplied is the same as that specified for the tool.
h. Check the tool for damage or needed repairs prior to use.
i. Do not leave a tool until it comes to a complete stop. Do not lay it down to stop it.
j. Keep the tool dry, clean and free from oil and grease.

10. Safe Work Surface
    a. Always support the work piece so it doesn't shift or bind on the tool.
    b. Always position backup material underneath the work piece.
    c. Use a drill press vise, do not do any work "free hand", always fasten your stock to the table. Use fixtures to adequately hold, guide and position the work piece.
    d. Never move the head or table support while the tool is running.
    e. Before starting operation, jog the motor switch to make sure the drill bit or other cutting tools do not wobble or cause vibration.
    f. Use the bit and speed recommended for the job and work piece material. Remember, the longer the bit, the slower the drill speed.
    g. Never climb on the drill press table, it could break or pull the entire drill press down.
    h. To avoid injury from thrown work or tool contact, do not perform layout, assemble or setup work on the table while the cutting tool is rotating.
    i. When drilling wood or metal, raise the drill bit frequently to clean chips from the hole.
    j. Prior to start, center punch the area to be drilled for an easier start and less chance of slippage.

F. Belt Grinder (Free standing or hand held)

1. Always wear approved eye, respiratory, and hand protection when working with or near grinders. The most common injury is from flying particles in the eye. Kick back causes the severest grinder injuries.
2. Visually inspect wheels for damage before mounting and using them. Chipped or cracked wheels will shatter and cause injury so they must be discarded.
3. Do not stand directly in line with a newly-mounted wheel when beginning start-up. Before grinding, always test run a newly-mounted wheel at full speed for the following :
    a. Thirty (30) seconds for reinforced discs.
    b. Sixty (60) seconds for stand-mounted grinders.
4. Make sure the rpm of the machine does not exceed the rate wheel speed. The

governor mechanism should be checked to make sure it is functioning properly.

5. Rests used on grinders shall not be more than1/8” from the face, fastened securely and must not be adjusted while the wheel is in motion.
6. All spindles, adapters, flanges, and other parts should be inspected periodically and maintained to size and in good conditions.
7. Proper lubrication of the motor and bearing is essential.
8. Use proper safety guards on grinders. Special guards are available for all grinders when working in confined areas. Make sure the guards are properly secured.
9. Grind only on the face of a straight wheel. Use disk wheels or angle grinders for side grinding. Light side grinding is permitted with a cup or saucer wheel.
10. Make sure the wheel has stopped before putting the grinder down as it can travel, thus injuring a person or damaging equipment. Lay the machine down with the disk up.
11. Avoid dropping or bumping the wheel. Do not allow anything to strike a wheel which is not in use. Handle and store wheels carefully, following manufacturer’s specifications.