9

TLE – Industrial Arts:

Electrical Installation and Maintenance

Quarter 1 – Module 5

Preparing Electrical Power Tools

(Week 5)

DepED
DEPARTMENT OF EDUCATION

What I Need to Know

This module contains information and suggested learning activities on the preparation of power tools. It includes instructions and procedures on how to prepare appropriate power tools in electrical wiring installation; and maintaining and storing power tools and equipment.

After going through this module, you are expected to:

1. prepare electrical power tools for a specific electrical operation;
2. perform proper maintenance of electrical power tools; and
3. inspect electrical power tools for damage prior to their use.

What I Know

Please do not forget to write the following in your answer sheet:

Name: _____ Yr. & Section: _____

Yr. Level & Subject (Specialization): _____ Module No: _____

Name of the Activity (e.g., What I know) _____ Date: _____

Multiple Choice

Directions: Read each statement carefully. Write the letter of your correct answer in your answer sheet.

1. What is the purpose of turning the drill on before attempting to drill a hole _____.
   A. check if the power cord is good C. see if the drill bit is running true.
   B. make sure the chuck key has been removed. D. see if the drill operates.
2. The purpose of moving the drill and the bit up and down often while drilling deep holes is to _____.
   A. help keep the hole centered.
   B. give the drill operator better drilling leverage.
   C. ream the hole slightly larger.
   D. reduce overheating in the drill bit.
3. What will likely happen if a large capacity portable drill bit jams during the drilling operation?
   A. The bit will break.
   B. The hole will become badly distorted.
   C. The drill will rotate in the opposite direction to the bit causing injury to the user's wrist.

D. The drill will likely stall out and overheat.

4. What kind of pressure should be applied to a drill during the drilling operation?
   A. Heavy, even B. Light, even C. Medium, even D. Moderate, even
5. What type of drill speed is needed for wood drilling operation?
   A. High B. Low C. Low-medium D. Medium
6. What type of drill speed is needed for most metal drilling operations?
   A. High B. Low C. Medium-high D. Medium-low
7. What is the purpose of a pilot hole when drilling?
   A. to allow the final hole to be drilled at a faster revolution per minute (rpm) and to finish smoothly.
   B. To guide the final drilling operation and achieve a more accurately placed hole.
   C. to make the final hole drilling operation easier.
   D. to reduce the feed pressure needed to drill a hole.
8. What should the operator do to prevent seizing when drilling?
   A. Lubricate the drill bit.
   B. Reduce the rpm of the portable electric drill
   C. Reduce the feed pressure when the bit is about to finish drilling.
   D. Use a high-speed drill bit.
9. What is used to tighten or loosen the chuck of the drill?
   A. Chuck B. Chuck Wrench C. Cord Strain Relievers D. Pistol Grip
10. It is used to reverse the rotation of the drill bit during operation.
   A. Pistol Grip B. Reversing Switch C. Switch Lock D. Trigger Switch

What's In

Power tools are capable of performing many complex tasks that can't be performed with hand **tools**. They make it easier for the workers to complete several difficult tasks in less time and with lesser effort. These **tools** can go a long way when it comes to increasing the efficiency of workers by simplifying their work.

What's New

IDENTIFYING ELECTRICAL POWER TOOLS

COMMON ELECTRICAL POWER TOOLS

Electrical tools are used to multiply the manual work of humans. Tools can be considered as extension of the human hand thereby increasing its speed, power, and accuracy.

Advantages of using proper electrical tools

1. Efficiency of the work is met.
2. High quality of work is achieved.
3. Accomplishment of a task is faster.
4. Accuracy is obtained.
5. It is less stressful on the part of the user.

However, these advantages depend upon the three factors, namely:

- availability and sufficiency of materials,
- experience and skill of the workers in using the tools, and
- quality of tools and equipment

Different kinds of construction tools may be classified according to the different kinds of trade namely:

- carpentry tools
- masonry tools
- tinsmith tools
- painters' tools
- plumbing tools
- electrical tools
-

General safety rules for using power equipment

- Always follow the manufacturer's operating instructions.
- Never place hands in a pinch point. Use eye protection.
- Wear gloves when working with hot equipment or materials.
- Always secure loose clothing such as shirt sleeves and shirttails.
- Tie back long hair and do not wear dangling jewelry.
- Never exceed rated capacity of the equipment.
- Never remove protective guards from the equipment.
- Be prepared for an unexpected event.

Portable Electric Drill is a small drilling machine with a chuck of ¼" and 3/8". It is used to bore holes on lighter metal work.

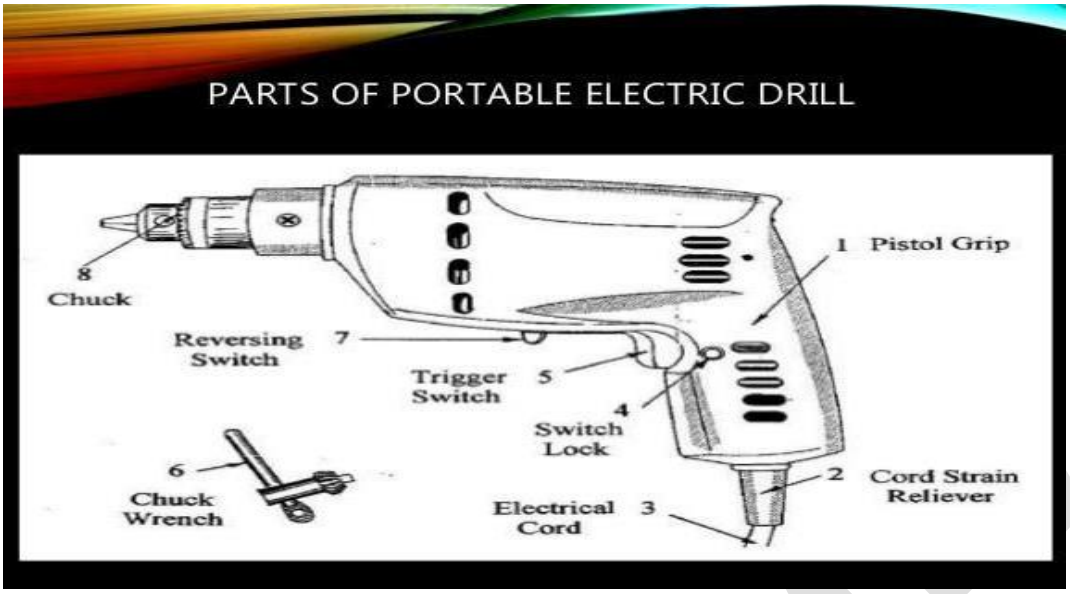


Figure 1. Parts of a Portable Electric Drill

Safety Precautions in Using Portable Electric Drill

1. Wear safety glasses when operating the portable electric drill.
2. Disconnect the drill from the electrical supply when installing the bits.
3. Clamp stock so it will not move during the drilling operation.
4. Before drilling, turn the drill on to see if the bit is centered and at place.
5. Align the bit with the desired hole location before turning on the drill.
6. Hold the drill firmly with both hands while drilling.
7. When drilling deep holes with a twist drill, move the bit up and down several times while drilling to remove cuttings and reduce overheating in the bit.
8. Avoid the cord to wrap around the drill when working.
9. If the electrical cord becomes frayed or begins to separate from the drill housing, repair it immediately.
10. Remove the bit from the drill as soon as the work is completed.
11. Select the correct bit for the finish and material being drilled. Make sure that the bit is securely tightened in the drill chuck.
12. Be extremely careful when using larger portable electric drills (3/8" and 1/2"). If the bit hangs or gets caught the drill will twist in the operator's hands causing a sprain or bruise.
13. Always remove the key from the chuck before drilling.
14. To prevent seizing, reduce the feed pressure when the drill bit is about to come through the material.

Procedure in using Portable Electric Drill

1. Always put the punch at the center or make a starting indentation in the material being drilled to get an accurate starting point for the drill bit.
2. Tighten the drill bit by rotating the chuck key to all three holes in the chuck. This will help you to keep the drill bit centered.
3. Use only straight shank or silver and deming drill bits in portable electric drills.
4. Apply moderate pressure to the drill during the drilling operation. If excessive pressure is required to make the bit cut, it means that the bit needs to be sharpened.
5. Maintain good balance at all times when drilling.
6. Use slow drill speed for drilling metal and fast speeds for drilling wood.
7. To obtain holes that are placed accurately, drill a small pilot first. Then, drill the final hole.

Portable Grinder is a hand-held rotating machine used for grinding and cutting processes depending on the type of disc fitted to the machine. For cutting concrete , a "diamond" cutting disc is used.

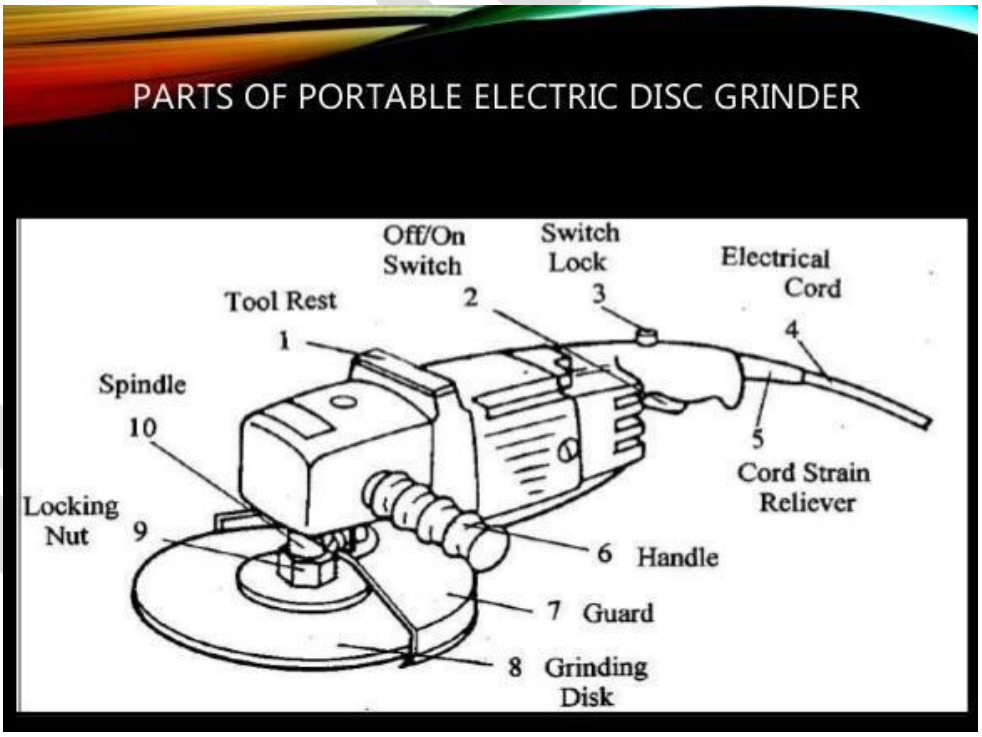


Figure 2. Parts of a Portable Grinder

Safety Precautions in Using the Portable Disc Grinder

1. Wear safety glasses, or face shield at all times when using the portable disc grinder.
2. Wear hearing protection when grinding operating the portable disc grinder.
3. Position the grinder so that sparks and grits thrown during grinding will not hit you or the other people working in the area.
4. Make sure the material being ground is well secured.
5. Never grind with the portable disc grinder in an area with flammable materials or combustible gases.
6. Replace the grinding disk when half its original diameter is worn out.
7. Wear long sleeve leather gloves when grinding to protect hands and forearms from injury.
8. Hold the portable disk grinder with both hands when grinding.
9. Never lay the portable disc grinder down until the disk stopped rotating.
10. Keep the electrical cords and extension cords out of the way when grinding.
11. When using the wire brush attachment on the portable disc grinder, hold the grinder firmly to prevent it from being thrown away and from causing an accident.
12. Caution others in the work area to wear safety glasses, hearing protection and to watch out for any thrown sparks and grits.

Procedure in using Portable Disc Grinder

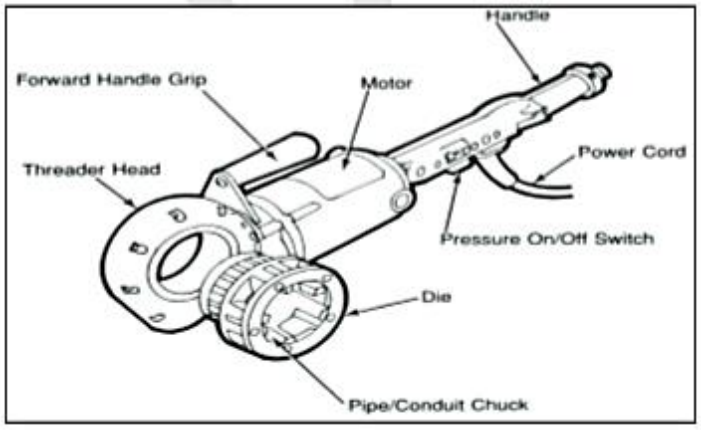
1. Tighten the grinding disk snuggly when mounting it on the portable disc grinder. The disk will tighten itself during normal operation.
2. Be sure to hold the portable disc grinder firmly when the switch is turned on. The centrifugal force created by the rotating disk will cause the portable disc grinder to move or jump.
3. For extended periods of grinding, the operator may lock the switch on position to avoid fatigue from holding the switch on manually.
4. When an extension cord is used with the portable disc grinder, make sure that the cord is sufficiently large in size for the grinder. A #14 (2.0mm2) gauge extension cord is minimum and #12 (3.5mm2) gauge is preferred.
5. Keep the electrical and extension cords away from the grinding area. Cords can be damaged by the portable disc grinder.
6. When laying the portable disc grinder down, always position it on the tool rest.
7. Before using the switch lock on the portable disc grinder, always check to make sure the lock is functioning properly.
8. Hold the portable disc grinder so that sparks and grit are thrown away from the others who are working in the area.
9. Operating the portable disc grinder is hard work and causes fatigue. Take rest and don't be exhausted.

Safety Precautions in using a hammer drill

- Always hold the drill steady and perpendicularly to prevent the bit from breaking or binding.
- Always use a T-handle when drilling to allow you to secure the drill when it encounters hard surfaces.
- Never lock the trigger to the “on” position.
- Never drill while not in a balanced position.
- Always wear eye protection.

Portable Power Threader

Safety Precautions in Using Portable Power Threader



If you spend your day operating a drill press thinking that your hand drill may not cause any danger, think again. It is estimated that about 8% of industrial accidents involve the unsafe use of hand tools (both manual and power). These accidents result from using the wrong tool for the job, or using the right tool incorrectly, failure to wear personal protective equipment, or failure to follow approved safety guidelines. The following checklist provides some basic rules for the safe use of portable power tools. Take a moment to review this list and use the tips here whenever you use a portable power tool.

Power Tool Rules

- Use your tool only for the specific task it was designed for.
- Read the owner's manual before using your tool.
- Never use any tool (power or manual) unless you are trained to do so.
- Inspect before each use and replace or repair if parts are worn out or damaged.
- Inspect screws, nuts, bolts and moveable parts to make sure they are tightened.
- Before plugging or unplugging tools, make sure that the power switch is turned "OFF."
- Never disconnect power by pulling out the cord. Remove the plug from the outlet.

- Never clean or repair a tool in use unless power is disconnected. (Repair tools only if you are trained to do so.)
- When working on ladders or scaffolding, rest power tools on a flat surface or in a bin secured to the ladder itself. (A falling tool can seriously injure a coworker or a bystander)
- Use a ground fault circuit interrupter when working with power tools.
- Avoid wearing rings, jewelry, or loose clothing when operating power tools.
- Wear Personal Protective Equipment (PPE) such as face shields, safety goggles, disposable masks, and other required PPE

Common Defects of Electrical Power Tools

1. Mechanical Parts
   a. Chuck – rusted or stock – up
   b. Bearing – worn – out
   c. Rotor Shaft – worn – out
2. Electrical Parts
   a. Switch (lock, reversing and trigger) – defective
   b. Line cord – open line
   c. Carbon brush – worn – out
   d. Rotor winding – shorted / open
   e. Stator winding – shorted / open

NOTE: In servicing electrical power tools, always replace parts according to the manufacturer's specification.

REQUISITION SLIP FORM

Requisition slip form is a written or printed request of something that is needed.

REQUISITION SLIP FORM (SAMPLE)

Name: **Juan dela Cruz** Date:

Project: **Extension wire**

Location: **School Campus**

Classification: **Electrical Installation and Maintenance NC II**

Purpose: **For Electrical laboratory use**

NO.	QUANTITY	UNIT	DESCRIPTION	UNIT COST	TOTAL COST

1	10	mtrs	Flat cord wire #14 AWG		
2	1	pc	3 Gang outlet (surface type)		
3	1	Pc	Male plug (heavy duty)		

_____ _____

Requisitioner Teacher

INVENTORY FORM (SAMPLE)

Inventory form is a list of tools, materials, property and other resources.

Name: Juan dela Cruz

Section: _____

School: _____

Shop Lab: Electricity

Purpose: _____

Tools/ Equipment	Quantity	No. of Functional	No. of Not Functional but Repairable	No. of Condemnable	No. of Borrowed	No. of Missing
Pliers	13	12		1	0	0
Power Drill	5	4	1		0	0
Hacksaw	11	10		1	0	0

_____ _____

Requisitioner Teacher

What's More

Please do not forget to write the following in your answer sheet:

Name: _____ Yr. & Section: _____

Yr. Level & Subject (Specialization): _____ Module No: _____

Name of the Activity (e.g., What I know) _____ Date: _____

PREPARING REQUISITION SLIP FORM

Direction: Using the given format below, make a requisition for your electrical project which is wiring up a small room with a lamp controlled by a switch. The activity will involve embedding a rigid conduit on the concrete wall and wooden ceiling.

Requisition Slip Form

Name: _____

Project: _____

Location: _____

Classification: _____

Purpose: _____

No.	Quantity	Unit	Description	Unit Cost	Total Cost

_____ _____

Requisitioner Teacher

PREPARING AN INVENTORY FORM

Direction: Using the given format below, make an inventory of your electrical tools at home.

Inventory Form of Tools

Name: _____

Project: _____

Location: _____

Classification: _____

Purpose: _____

Tools Equipment	Quantity	No. of Functional Items	No. of Not Functional but Repairable Items	No. of Condemnable Items	No. of Borrowed Items	No. of Missing Items

_____ _____

Inventory by Teacher

What I Have Learned

Please do not forget to write the following in your answer sheet:

Name: _____ Yr. & Section: _____

Yr. Level & Subject (Specialization): _____ Module No: _____

Name of the Activity (e.g., What I know) _____ Date: _____

A. The advantages of using proper electrical tools are:

1. _____
2. _____
3. _____
4. _____
5. _____

B. Construction tools may be classified according to the different kinds of trade namely:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

C. Directions: Identify the parts of a portable electric drill. Write on your paper the letter of the correct answer.

A. Chuck

B. Chuck Wrench

C. Cord Strain Relievers

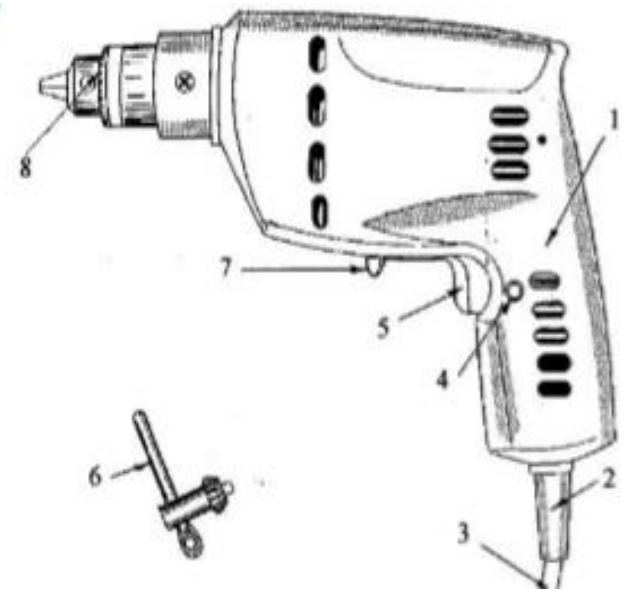
D. Electrical Cord

E. Pistol Grip

F. Reversing Switch

G. Switch Lock

H. Trigger Switch



Assessment

Please do not forget to write the following in your answer sheet:

Name: _____ Yr. & Section: _____

Yr. Level & Subject (Specialization): _____ Module No: _____

Name of the Activity (e.g., What I know) _____ Date: _____

Multiple Choice

Directions: Read each statement carefully. Write the letter of your correct answer in your answer sheet.

1. What type of drill speed is needed for most metal drilling operations?
   A. High B. Low C. Medium-high D. Medium-low
2. What is the purpose of a pilot hole when drilling?
   A. To make the final hole drilling operation easier.
   B. To reduce the feed pressure needed to drill a hole.
   C. To guide the final drilling operation and achieve a more accurately placed hole.
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   A. Lubricate the drill bit.
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   A. Pistol Grip B. Reversing Switch C. Switch Lock D. Trigger Switch
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   A. To see if the drill operates
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   C. To reduce overheating in the drill bit.
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   A. The bit will break.

B. The hole will become badly distorted.
C. The drill will likely stall out and overheat.
D. The drill will rotate in the opposite direction to the bit causing injury to the user's wrist.

9. What kind of pressure should be applied to a drill during the drilling operation?
A. Heavy, even B. Light, even C. Medium, even D. Moderate, even

10. What type of drill speed is needed for wood drilling operation?
A. High B. Low C. Low-medium D. Medium

Answer Key

What I Have Learned

A. Efficiency of the work is met.
High quality of work is achieved.
Accomplishment of a task is faster.
Accuracy is obtained.
It is less stressful on the part of the user.

B. Carpentry Tools
Masonry Tools
Tinsmith Tools
Painter's Tools
Plumbing Tools
Electrical Tools

Reference

Department of Education Learner's Material, first edition 2014