Competency Based Learning Material (CBLM)

CNC Maching Centre Operation with CAD CAM
Level-4

Module: Using Hand Tools and Power Tools

Code: OU-LE-CNCCDM-01-L4-V1

National Skills Development Authority
Prime Minister's Office
Government of the People's Republic of Bangladesh

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This Competency Based Learning Materials (CBLM) on "Use Hand Tools and Power Tools" under the CNC Maching Centre Operation with CAD CAM, Level-4" qualification is developed based on the national competency standard approved by National Skills Development Authority (NSDA)

This document is to be used as a key reference point by the competency-based learning materials developers, teachers/trainers/assessors as a base on which to build instructional activities.

This Competency Based Learning Materials is a document for the development of curricula, teaching and learning materials, and assessment tools. It also serves as the document for providing training consistent with the requirements of industry in order to meet the qualification of individuals who graduated through the established standard via competency-based assessment for a relevant job.

This document has been developed by NSDA in association with industry representatives, academia, related specialist, trainer, and related employee.

Public and private institutions may use the information contained in this CBLM for activities benefitting Bangladesh.

Approved by the Authority meeting held on .....

How to use this Competency Based Learning Material (CBLM)

The module, Using Hand Tools and Power Tools contains training materials and activities for you to complete. These activities may be completed as part of structured classroom activities or you may be required you to work at your own pace. These activities will ask you to complete associated learning and practice activities in order to gain knowledge and skills you need to achieve the learning outcomes.

1. Review the **Learning Activity** page to understand the sequence of learning activities you will undergo. This page will serve as your road map towards the achievement of competence.

2. Read the **Information Sheets.** This will give you an understanding of the jobs or tasks you are going to learn how to do. Once you have finished reading the **Information Sheets** complete the questions in the **Self-Check.**

3. **Self-**Checks are found after each **Information Sheet**. **Self-Checks** are designed to help you know how you are progressing. If you are unable to answer the questions in the **Self-Check** you will need to re-read the relevant **Information Sheet**. Once you have completed all the questions check your answers by reading the relevant **Answer Keys** found at the end of this module.

4. Next move on to the **Job Sheets. Job Sheets** provide detailed information about *how to do the job* you are being trained in. Some **Job Sheets** will also have a series of **Activity Sheets**. These sheets have been designed to introduce you to the job step by step. This is where you will apply the new knowledge you gained by reading the Information Sheets. This is your opportunity to practice the job. You may need to practice the job or activity several times before you become competent.

5. Specification Sheet**s**, specifying the details of the job to be performed will be provided where appropriate.

6. A review of competency is provided on the last page to help remind if all the required assessment criteria have been met. This record is for your own information and guidance and is not an official record of competency

When working though this Module always be aware of your safety and the safety of others in the training room. Should you require assistance or clarification please consult your trainer or facilitator.

When you have satisfactorily completed all the Jobs and/or Activities outlined in this module, an assessment event will be scheduled to assess if you have achieved competency in the specified learning outcomes. You will then be ready to move onto the next Unit of Competency or Module

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Module Content

Unit of Competency	**Use Hand Tools and Power Tools**
Unit Code	**OU-LE-CNCCDM-01-L4-V1**
Module Title	**Using Hand Tools and Power Tools**
Module Descriptor	This module covers the skills, knowledge, and attitudes required to use hand tools and power tools. It specifically includes identifying and inspecting hand and power tools, using hand tools properly and safely, operating power tools properly and safely and cleaning and maintaining hand and power tools.
Nominal Hours	1**0** Hours
Learning Outcome	After completing the practice of the module, the trainees will be able to perform the following jobs: 1. Identify and inspect hand and power tools 2. Use hand tools properly and safely 3. Operate power tools properly and safely 4. Clean and maintain hand and power tools

Assessment Criteria

1. Appropriate hand tools and power tools are identified
2. Application of hand and power tools is recognized
3. Usability of hand and power tools is checked and verified
4. Appropriate hand tools are selected
5. Safety precautions are ensured before using hand tools
6. Unsafe or faulty hand tools are identified and marked for repair
7. Measuring tools are checked and calibrated before use
8. Use hand tools properly and safely to perform a work activity
9. Appropriate power tools are selected
10. Safe work practice is observed and Personal Protective Equipment (PPE) is worn as perusing power tools
11. Power supply outlet and electrical cord are inspected and confirmed safe for use following established workplace safety requirements
12. Safety precautions are ensured before using power tools following the manufacturer's operating specifications
13. The proper sequence of operation is applied for using power tools
14. Unsafe or faulty power tools are identified and marked for repair
15. Operate power tools properly and safely to perform a work activity
16. Dust and foreign matter are removed from hand and power tools following workplace standards
17. Condition of hand and power tools is checked after use and reported
18. Appropriate lubricant is applied after use and before storage
19. Measuring tools are checked and calibrated after use
20. Defective hand and power tools are inspected and repaired or replaced
21. Hand and power tools are stored and secured following workplace requirements

Learning Outcome 1: Identify and Inspect Hand and Power Tools

Assessment Criteria	1. Appropriate **hand tools** and **power tools** are identified 2. Application of hand and power tools is recognized 3. Usability of hand and power tools is checked and verified
Conditions and Resources	1. Workplace or Simulated Workplace 2. CBLM 3. Handout 4. Laptop 5. Multimedia Projector 6. Paper, Pen, Pencil, 7. Internet Facilities 8. White Board and 9. Audio Video Devices 10. Necessary PPE 11. Necessary hand and power tools
Contents	1. Define Hand Tools and Power Tools 2. Introduction and use of hand tools ▪ Ball pin hammer ▪ Mallet/soft hammer ▪ Bench Vice ▪ file set ▪ Punch set ▪ Chisel ▪ Open ended wrench ▪ Combination Wrench ▪ socket wrench ▪ Pliers set

	▪ Scraper ▪ Screwdriver set ▪ Tap and die set ▪ hack ▪ drill bit ▪ Tap Extractor ▪ Screw extractor ▪ rivet song ▪ Sledge hammer ▪ Wire cutters ▪ Wire stripper ▪ Hand shear ▪ clamp ▪ Allen key set. ▪ Hole saw cutter ▪ Ratchet wrench 3. Power Tools ▪ Power drill ▪ Hand Grinder ▪ Pneumatic wrench ▪ Bench drill ▪ Pedestal grinding machine ▪ Universal tool grinder ▪ Power torque wrench ▪ Blower ▪ Power saw 4. Air compressor and Aire dryer 5. Power supply source 6. Safety precautions 7. Measuring tools 8. Necessity to test and verify usability of tool
Job/Task/Activity	1. Identify and select Tools 2. Test and verify usability of tools
Training Method	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming 9. Role Play
Assessment Method	1. Written Test 2. Demonstration 3. Oral questioning 4. Portfolio

Learning Experience 1: Identify and Inspect Hand and Power Tools

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Activities	Recourses/Special Instructions
1. Trainee will ask the instructor about the learning materials	1. Instructor will provide the learning materials '**Identify and Inspect Hand and Power Tools**
2. Read the Information sheet and complete the Self Checks & Check Answer Sheets on "**Identify and Inspect Hand and Power Tools**	2. Information sheet 1: Use Hand Tools and Power Tools 3. Self-check 1: Use Hand Tools and Power Tools 4. Check your answer with Answer key 1: Use Hand Tools and Power Tools
3. Read the Job/Task Sheet and Specification Sheet and perform job/Task	5. Job/Task Sheet and Specification Sheet Job Sheet 1.1: Identify and select tools Specification Sheet 1.1: Identify and select Tools Job Sheet 1.1: Identify and Select Tools Specification Sheet 1.2: Identify and Select Tools. Job Sheet 1.2: Test and Verify Usability of Twist Drill Bit Specification Sheet 1.2 Test and Verify Usability of Twist Drill Bit

Information Sheet 1: Identify and Inspect Hand and Power Tools

Learning Objective: After completion of this information sheet, the learners will be able to explain, define, interpret the following contents:

1.1 Define hand tools and power tools
1.2 Introduction and use of hand tools
1.3 Introduction and use of power tools
1.4 Air compressor and aire dryer
1.5 Power supply source
1.6 Safety precautions
1.7 Measuring tools
1.8 Necessity to test and verify usability of tool

1.1 Define Hand Tools and Power Tools

Hand and power tools are two types of equipment used for different purposes in construction projects. Hand tools are operated manually, and examples include hammers, screwdrivers, wrenches, and more. Power tools, on the other hand, are electrically-powered equipment such as drills, saws, and sanders.

Both hand tools and power tools are used for a variety of purposes and have their strengths and weaknesses. Hand tools are more versatile and can be used for a wider range of tasks. They are also more affordable and easier to maintain. Power tools, on the other hand, are more powerful and can be used for more heavy-duty tasks.

1.2 Introduction and Use of Hand Tools

Hand tools

Hand tools are manually-operated tools that do not require any power source. They are often smaller and lighter than power tools, which makes them easier to maneuver and use for extended periods. Hand tools are also usually less expensive than power tools. On the downside, hand tools can be slower and more labor-intensive than power tools.

Use of Hand Tools

Ball pin hammer Ball-peen hammer is useful for striking punches and chiseling materials. The peening face is useful for rounding off edges of metal pins and fasteners such as rivets. It is also used for shaping, flattening, or removing dents from metal sheets.	
Mallet/soft hammer A rubber mallet is great for joining two pieces of wood together without damaging their surfaces and leaving ugly dents or scratches on them. It can also be used to drive nails into the wood without causing unwanted damage to the surface.	

Bench vice It is used to hold a specific thing to perform different tasks, such as gluing, filing, sawing, or pounding. A bench vice is used when you use a saw to cut metal or wood. A heavy-duty bench vice is used to grip the material effectively when you cut the object.	
File A hand file is a hardened steel tool used for cutting and shaping materials like metal, wood, plastic, and more. Hand files are typically long, with a handle at one end and a pointed tip at the other. Their surfaces are covered with ridges or teeth, which cut when the file is moved over a surface.	
Punch Punches are usually made from a hard metal rod with a pointy tip at one end and a dulled end at the other. They are often used in conjunction with other tools like hammer and chisel to cut and shape blocks of materials.	
Chisel A cold chisel is a hand tool used for cutting, shaping, and removing metal, stone, and other materials. It is a type of chisel that is designed for use on cold, hardened, or unheated materials, as opposed to hot chisels that are used on materials at high temperatures.	
Open ended wrench An open-ended wrench, also known as an open-end wrench or spanner, is a hand tool used for turning nuts and bolts. It has a U-shaped or open-ended design, with a jaw at each end that fits around the flats of a nut or bolt. The wrench is applied by placing the open ends over the fastener and turning it using leverage.	
Combination wrench A combination wrench is a versatile hand tool that combines the features of both an open-ended wrench and a box-end wrench. It has different-sized wrench heads at each end, with one end being an open jaw and the other end a closed, box-like structure. This dual design provides flexibility for different types of fasteners and applications.	
Socket wrench A socket wrench, also known as a ratchet or socket spanner, is a hand tool used for turning nuts, bolts, and other fasteners. It consists of a handle (ratchet) and detachable socket heads that fit over the fasteners. Socket wrenches are popular for their versatility and ease of use in various applications.	

Pliers set A pliers set typically refers to a collection of various types and sizes of pliers bundled together as a set. Pliers are versatile hand tools used for gripping, bending, cutting, and manipulating materials. A pliers set is useful for a wide range of tasks in various fields, including automotive repair, construction, electrical work, and general household maintenance.	
Scraper A scraper is a hand tool designed for removing material from surfaces or for smoothing and shaping them. Scrapers are commonly used in various applications, including woodworking, metalworking, automotive repair, painting preparation, and other tasks where the removal of material or the cleaning of surfaces is necessary. There are different types of scrapers, each designed for specific purposes.	
Screwdriver set A screwdriver set is a collection of screwdrivers with various types and sizes, often bundled together for convenience. Screwdrivers are hand tools designed for turning screws to either tighten or loosen them. A well-equipped screwdriver set typically includes a variety of screwdriver types and sizes to handle different screw heads and applications.	
Tap and die set A tap and die set are a collection of tools used for cutting and threading external and internal threads on bolts, screws, and other cylindrical parts. This set is essential for tasks such as repairing damaged threads, creating new threads, or customizing the thread size and pitch on various materials. Tap and die sets are commonly used in metalworking, automotive repair, plumbing, and other precision machining applications.	
Hacksaw A hacksaw is a versatile hand tool designed for cutting various materials, particularly metal. It consists of a fine-toothed blade stretched across a U-shaped frame, with a handle at one end for gripping and applying force. The hacksaw is commonly used in metalworking, plumbing, and general cutting tasks where a manual saw is appropriate.	
Drill bit A drill bit is a cutting tool used with a drill to create holes in various materials. Drill bits come in a wide range of sizes, shapes, and materials, each designed for specific applications. They are an essential part of any toolkit and are used in woodworking, metalworking, construction, and various other	

tasks that involve creating holes.	
Tap extractor A tap extractor, also known as a broken tap extractor or screw extractor, is a tool designed for removing a broken tap, screw, or bolt from a threaded hole. When a tap breaks during the threading process, or a screw/bolt breaks off in a hole, extracting the broken piece can be challenging. Tap extractors are designed to grip onto the broken piece and allow for its removal.	
Screw extractor A screw extractor, also known as an easy out or screw extractor kit, is a tool designed to remove broken or stripped screws, bolts, or other threaded fasteners from a workpiece. When a screw breaks off or becomes stripped, a screw extractor provides a solution for extracting the remaining piece from the material. Here are the key features and considerations regarding screw extractors	
Rivet gun A rivet gun, also known as a pneumatic hammer or air riveter, is a tool used for installing rivets in various materials. Rivets are mechanical fasteners that consist of a cylindrical shaft with a head on one end. They are often used to permanently join two or more pieces of material together. A rivet gun is commonly used in construction, metalworking, and automotive industries.	
Sledge hammer A sledgehammer is a large, heavy-duty hammer characterized by its long handle and large, flat metal head. It is designed for heavy striking and demolition work. Sledgehammers come in various sizes and weights, and they are commonly used in construction, demolition, and other tasks that require powerful and forceful blows.	
Wire cutters Wire cutters, also known as wire cutting pliers or diagonal cutting pliers, are hand tools designed for cutting wires and small cables. They have sharp, beveled cutting edges that allow for precise and clean cuts. Wire cutters come in various sizes and designs to accommodate different types and sizes of wires. Here are some key features and uses of wire cutters:	

Wire stripper A wire stripper is a hand tool designed for removing the insulation or outer covering from electrical wires while leaving the conductor (wire) intact. Wire strippers come in various designs, and their primary function is to make it easy to expose the bare wire for electrical connections.	
Hand shear Hand shears, also known as hand snips or hand shears, are manual cutting tools designed for cutting various materials, including metal, plastic, or fabric. They are commonly used in metalworking, construction, and other applications where precise cutting by hand is necessary. Hand shears come in different designs to suit specific materials and cutting requirements	
Clamp A clamp is a mechanical tool designed to hold objects securely in place. Clamps are used in a wide range of applications, from metalworking to construction and various DIY projects. They come in various types and designs, each tailored to specific tasks and materials.	
Allen key set. Allen key set, also known as hex key set or Allen wrench set, is a collection of hexagonal-shaped tools used for turning screws and bolts with hexagonal sockets. Allen keys are often referred to by the generic term "hex keys" in the United States. These tools are commonly used in various applications, particularly in assembling furniture, bicycles, and machinery where hexagonal socket screws or bolts are prevalent.	
Hole saw cutter hole saw cutter, often referred to as a hole saw, is a cylindrical cutting tool used for drilling large-diameter holes in various materials. It consists of a circular saw blade with teeth on the outer edge and a central arbor that attaches to a drill or other rotary tool. Hole saws are commonly used in woodworking, metalworking, plumbing, and other applications where the creation of large, round openings is required.	
Ratchet wrench A ratchet wrench, also known as a socket wrench, is a hand tool that uses a ratcheting mechanism to allow for continuous rotation in one direction while preventing motion in the opposite direction. It is commonly used for tightening or loosening nuts and bolts in a variety of applications.	

1.3 Introduction and Use of Power Tools

Power Tools

Power tools are mechanical or electrical devices powered by a motor or battery. They are typically faster and more powerful than hand tools, making them ideal for larger projects. However, power tools can be more difficult to control than hand tools and can also be more expensive.

Use of Power Tools

Power drill Power tools are electric or battery-operated tools that are designed to perform a variety of tasks with greater speed, efficiency, and precision than traditional hand tools. These tools are commonly used in construction, woodworking, metalworking, automotive repair, and other industries. Power tools are available in both corded (electric) and cordless (battery-powered) versions.	
Hand grinder Hand grinder, often referred to as an angle grinder or side grinder, is a versatile handheld power tool used for cutting, grinding, polishing, and various other tasks in metalworking, construction, and fabrication. It typically features a motor-driven abrasive disc or wheel that rotates at high speeds, allowing it to remove material efficiently.	
Pneumatic wrench A pneumatic wrench, commonly known as an air impact wrench or pneumatic impact wrench, is a power tool that uses compressed air to deliver high torque for fastening or loosening nuts and bolts. These tools are widely used in automotive repair, construction, and other industries where high torque is required, and the efficiency of pneumatic tools is essential.	
Bench drill Bench drill, also known as a benchtop drill press, is a stationary power tool designed for precision drilling of holes in various materials. It is a versatile tool commonly used in woodworking, metalworking, and other applications where accurate and controlled drilling is required. The bench drill is mounted on a workbench or stand, providing stability and support during operation.	
Pedestal grinding machine Pedestal grinding machine is a type of bench-mounted grinding machine with a pedestal or column that supports the grinder's abrasive wheels. It is used for sharpening or grinding various tools, cutting tools, and other metal objects. The pedestal grinder	

is a stationary machine that is mounted on a pedestal, offering stability and support for the grinding operations.	
Universal tool grinder Universal tool grinder is a versatile grinding machine designed for sharpening and grinding various types of cutting tools, including drills, end mills, reamers, taps, and other precision tools. It is a highly accurate and efficient tool used in manufacturing, tool and die making, and metalworking applications. The term "universal" indicates that the grinder is adaptable to a wide range of tool shapes and sizes.	
Power torque wrench Power torque wrench is a specialized tool designed to apply a specific amount of torque (rotational force) to a fastener, such as a nut or bolt. It is used in various industries, including automotive, construction, and manufacturing, where precise torque application is crucial for proper assembly and maintenance.	
Power saw Power saw is a versatile and efficient cutting tool that uses motorized power to cut through various materials. Power saws are widely used in woodworking, metalworking, construction, and other applications, providing faster and more precise cutting compared to traditional hand saws. There are different types of power saws, each designed for specific cutting tasks and materials.	
Blower Blower is a mechanical device designed to produce a directed flow of air or gas. Blowers are used in various applications to move air or gas from one place to another, create air currents, or provide ventilation. They come in different types and sizes, each suited for specific purposes.	

1.4 Air Compressor and Air Dryer

An air compressor and an air dryer are two essential components often used together in compressed air systems. An air compressor is a mechanical device that compresses and pressurizes air to generate a continuous supply of compressed air. It draws in atmospheric air and compresses it to a higher pressure, storing it in a tank for various applications.

a. Components

- Compressor Unit: The core component that compresses the air. There are different types of compressors, including reciprocating, rotary screw, and centrifugal compressors.
- Motor or Engine: Provides the power needed to drive the compressor unit.
- Tank: Stores the compressed air, allowing for a reservoir of pressurized air that can be used when demand exceeds the compressor's capacity.

b. Applications

- Powering pneumatic tools in industries.
- Providing compressed air for manufacturing processes.
- Inflating tires and other inflatable objects.
- Supplying air for HVAC systems.
- Numerous other industrial and commercial applications.

c. Types of air compressors

- Reciprocating Compressors: Use pistons to compress air.
- Rotary Screw Compressors: Use rotating screws to compress air.
- Centrifugal Compressors: Use a rotating impeller to accelerate air.

1.5 Power Supply Source

A power supply source refers to a device or system that provides electrical energy to power electronic devices or equipment. Power supply sources come in various forms, and their design and characteristics depend on the specific application, requirements, and the type of devices they are intended to power.

1.6 Safety Precautions

a. Read the Manual: Always read and understand the manufacturer's instructions and safety guidelines provided in the tool's manual before use.
b. Personal Protective Equipment (PPE): Wear appropriate PPE, including safety glasses, hearing protection, gloves, and, if necessary, respiratory protection.
c. Inspect the Tool: Before each use, inspect the tool for damage, wear, or malfunction. Do not use a tool that is damaged or has missing parts.
d. Correct Tool for the Job: Select the right tool for the specific task. Ensure that the tool is suitable for the material and type of work you are performing.
e. Secure Work Area: Keep the work area well-lit, clean, and organized. Remove any potential tripping hazards and ensure there is adequate ventilation.
f. Stable Work Surface: Ensure that the workpiece is securely clamped or held in place. Use a stable work surface to prevent movement during operation.
g. Cord Management: Keep power tool cords away from the cutting area, and be aware of their location to avoid tripping. Use extension cords suitable for the tool's power requirements.
h. Switch Off Before Adjusting: Turn off and unplug the tool before making adjustments, changing accessories, or switching attachments.
i. Two-Handed Operation: Use both hands to operate a power tool when required. Maintain a firm grip and proper body stance to control the tool effectively.
j. Keep Hands Clear: Keep hands and other body parts away from moving parts and cutting areas. Do not reach over a moving blade or accessory.
k. Disconnect Power: When not in use or changing accessories, disconnect the power source. This applies to unplugging electrical tools or removing batteries from cordless tools.
l. Avoid Distractions: Stay focused on the task at hand. Avoid distractions and interruptions when operating power tools.
m. Proper Blade/Bit Installation: Ensure that blades, bits, or accessories are correctly and securely installed according to the manufacturer's instructions.

n. Use Dust Collection: When applicable, use dust collection systems to minimize airborne dust and debris. Wear a dust mask if necessary.
o. Training and Supervision: Ensure that users are properly trained in the operation of the specific power tool. Supervise inexperienced users until they are proficient.
p. Emergency Preparedness: Know the location of emergency exits, first aid supplies, and fire extinguishers. Be familiar with emergency procedures.
q. Respect Tool Limits: Operate power tools within their specified limits, including voltage, speed, and capacity. Overloading a tool can lead to malfunctions and accidents.

1.7 Measuring Tools

Measuring tools are instruments used to quantify, assess, or determine the dimensions, quantities, or capacities of objects or substances. These tools are essential in various fields, including construction, manufacturing, engineering, science, and everyday applications. Here are some common types of measuring tools:

1.8 Necessity to Test and Verify Usability of Tool

Testing and verifying the usability of a tool is crucial to ensure its effectiveness, safety, and user satisfaction. Usability testing involves evaluating a tool's design and functionality by observing how users interact with it in a controlled or real-world environment.

Self-Check Sheet 1: Identify and Inspect Hand and Power Tools

1. What is hand tools & power tools?
   Answer:

2. Write 10 (ten) hand tools name?
   Answer:

3. Write 5 (five) hand tools name?
   Answer:

4. What are the functions of the components of air compressor and an air dryer?
   Answer:

5. Write the types of air compressor?
   Answer:

6. What is the power supply source?
   Answer:

7. Write safety precautions?
   Answer:

8. What is measuring tools?
   Answer:

Answer Sheet 1: Identify and Inspect Hand and Power Tools

1. What is hand tools & power tools?

   Answer:

   Hand Tools: Hand tools are manually-operated tools that do not require any power source. They are often smaller and lighter than power tools, which makes them easier to maneuver and use for extended periods. Hand tools are also usually less expensive than power tools. On the downside, hand tools can be slower and more labor-intensive than power tools.

   Power Tools: Power tools are mechanical or electrical devices powered by a motor or battery. They are typically faster and more powerful than hand tools, making them ideal for larger projects. However, power tools can be more difficult to control than hand tools and can also be more expensive.

2. Write some hand tools name?

   Answer:

Ball pin hammer	Chisel	Scraper
Mallet/soft hammer	Open Ended Wrench	Screwdriver Set
Bench Vice	Combination Wrench	Tap and Die Set
File	Socket Wrench	Hacksaw
Punch	Pliers Set	Drill Bit

3. Write some power tools name?

   Answer:

Power drill	Hand Grinder	Pneumatic wrench
Bench drill	Pedestal grinding machine	Power torque wrench
Power saw	Universal tool grinder	Blower

4. What are the functions of the components of air compressor and an air dryer?

   Answer: Components:

   a. Compressor Unit: The core component that compresses the air. There are different types of compressors, including reciprocating, rotary screw, and centrifugal compressors.
   b. Motor or Engine: Provides the power needed to drive the compressor unit.
   c. Tank: Stores the compressed air, allowing for a reservoir of pressurized air that can be used when demand exceeds the compressor's capacity.

5. Write the types of air compressor?

   Answer: Types of Air Compressors:

   a. Reciprocating Compressors: Use pistons to compress air.
   b. Rotary Screw Compressors: Use rotating screws to compress air.
   c. Centrifugal Compressors: Use a rotating impeller to accelerate air.

6. What is the power supply source?

Answer:

A power supply source refers to a device or system that provides electrical energy to power electronic devices or equipment. Power supply sources come in various forms, and their design and characteristics depend on the specific application, requirements, and the type of devices they are intended to power.

7. Write safety precautions?

Answer:

a. Read the Manual: Always read and understand the manufacturer's instructions and safety guidelines provided in the tool's manual before use.
b. Personal Protective Equipment (PPE): Wear appropriate PPE, including safety glasses, hearing protection, gloves, and, if necessary, respiratory protection.
c. Inspect the Tool: Before each use, inspect the tool for damage, wear, or malfunction. Do not use a tool that is damaged or has missing parts.
d. Correct Tool for the Job: Select the right tool for the specific task. Ensure that the tool is suitable for the material and type of work you are performing.
e. Secure Work Area: Keep the work area well-lit, clean, and organized. Remove any potential tripping hazards and ensure there is adequate ventilation.
f. Switch Off Before Adjusting: Turn off and unplug the tool before making adjustments, changing accessories, or switching attachments.
g. Two-Handed Operation: Use both hands to operate a power tool when required. Maintain a firm grip and proper body stance to control the tool effectively.
h. Keep Hands Clear: Keep hands and other body parts away from moving parts and cutting areas. Do not reach over a moving blade or accessory.
i. Disconnect Power: When not in use or changing accessories, disconnect the power source. This applies to unplugging electrical tools or removing batteries from cordless tools.
j. Use Dust Collection: When applicable, use dust collection systems to minimize airborne dust and debris. Wear a dust mask if necessary.
k. Emergency Preparedness: Know the location of emergency exits, first aid supplies, and fire extinguishers. Be familiar with emergency procedures.
l. Respect Tool Limits: Operate power tools within their specified limits, including voltage, speed, and capacity. Overloading a tool can lead to malfunctions and accidents.

8. What is measuring tools?

Answer:

Testing and verifying the usability of a tool is crucial to ensure its effectiveness, safety, and user satisfaction. Usability testing involves evaluating a tool's design and functionality by observing how users interact with it in a controlled or real-world environment.

Job Sheet 1.1: Identify and Select Tools

Working Procedure:

1. Read Job Sheet and Specification Sheet.
2. Collect all Tools & Equipment.
3. Follow OSH.
4. Wear the PPE.
5. Identify all hand tools in the work.

Sl No	Name of the tools	Application of the tools
a.		
b.		
c.		
d.		
e.		
f.		
g.		
h.		

i.		
j.		
k.		
l.		

6. Be sure to use every hand tool.
7. After complete identification and using cutting tools the clean work area.
8. Clean tools and equipment.
9. Store all tools and equipment safely.

Specification Sheet 1.1: Identify and Select Tools

Name of Job: Identify and select Tools as per specification

Conditions for the job: You must always practice safe operation procedures during the assessment. You will be required to demonstrate OSH competencies to Identify and select Tools as per specification.

Diagram / Design:

1 No

2 No

3 No

4 No

5 No

6 No

7 No

8 No

9 No

10 No

11 No

12 No

Required Personal Protective Equipment (PPE): Pre/Person

Sl.	Name of the PPE	Specification	Unit	Quantity	Remarks
1	Hand Gloves	Cotton	pair	01	
2	Mask	N 95	Nos	01	
3	Safety shoe	As required	pair	01	
4	Safety goggles	Standard	Nos	01	
5	Apron	Standard	Nos	01	

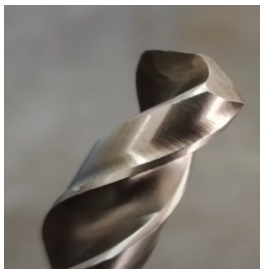
Required Tools and Equipment

Sl.	Name of tools and equipment	Specification	Unit	Quantity	Remarks
1	Spanner	6 Inch	Pcs	01	
2	File	6 Inch	Pcs	01	
3	Socket Wrench	10-23	Pcs	01	
4	Tap & Die	10 mm	Pcs	01	
5	Hacksaw	12 Inch	Pcs	01	
6	Power Drill	6 Inch	Pcs	01	
7	Hand Grinder	900 w	Pcs	01	
8	Pneumatic wrench	6 Inch	Pcs	01	
9	Chisel	6 Inch	Pcs	01	
10	Punch	6 Inch	Pcs	01	
11	Rivet Gun	6 Inch	Pcs	01	
12	Hammer	1.5 lb	Pcs	01	

Job Sheet 1.2: Test and Verify Usability of Twist Drill Bit

Working Procedure

1. Follow OSH
2. Read Job Sheet and Specification Sheet.
3. Collect Tools & Equipment.
4. Wear the PPE.
5. Check drill bit tip
6. Check drill bit boddy
7. Check drill bit shank
8. Check usability of all parts of drill bit



Step 5

Step 6

Step 7

Step 8

9. Clean work area
10. Store tools and equipment

Specification Sheet 1.2 Test and Verify Usability of Twist Drill Bit

Name of Job: Test and verify usability of of twist drill bit

Conditions for the job: You must practice safe operation procedures at all times during the assessment. You will be required to demonstrate OSH competencies Test and verify usability of tools as per specification

Diagram / Design:

Required Personal Protective Equipment (PPE): Pre/person

Sl.	Name of the PPE	Specification	Unit	Quantity	Remarks
1	Hand Gloves	Cotton	pair	01	
2	Mask	N 95	Nos	01	
3	Safety shoe	As required	pair	01	
4	Safety goggles	Standard	Nos	01	
5	Apron	Standard	Nos	01	

Required Tools and equipment

Sl.	Name of tools and equipment	Specification	Unit	Quantity	Remarks
1		China	Pcs	01	
2		China	Pcs	01	
3		China	Pcs	01	

Learning Outcome -2: Use Hand Tools Properly and Safely

Assessment Criteria	1. Appropriate hand tools are selected 2. Safety precautions are ensured before using hand tools 3. Unsafe or faulty hand tools are identified and marked for repair 4. Measuring tools are checked and calibrated before use **5.** Use hand tools properly and safely to perform a work activity
Conditions and Resources	1. Workplace or Simulated Workplace 2. CBLM 3. Handout 4. Taptop 5. Multimedia Projector 6. Paper, Pen, Pencil, 7. Internet Facilities 8. White Board and 9. Audio Video Devices 10. Necessary hand and measuring tools 11. Necessary PPE
Contents	1. Hand tools 2. Importance of correct and safe use of hand tools 3. Safety precautions in using hand tools 4. Unsafe or defective tools 5. Measuring Tools ▪ Measuring tape ▪ Sprit level ▪ Vernier caliper ▪ Vernier Bevel Protector ▪ Vernier height gauge ▪ Inside vernier micrometer ▪ Outside vernier micrometer ▪ Thread gauge ▪ Radius gauge ▪ Filler gauge ▪ Surface plate ▪ Tri Square ▪ Dial indicator ▪ Multimeter ▪ Weight Scale (High Accuracy) ▪ Torque wrench 6. Measurement requirements 7. How to take accurate measurements 8. Correct and safe use of measuring tools

Job/Task/Activity	1. Use hand tools 2. Identify unsafe or defective tools 3. Make geometric measurements by proper use of measuring tools
Training Method	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming 9. Tole Play
Assessment Method	1. Written Test 2. Demonstration 3. Oral questioning 4. Portfolio

Learning Experience 2: Use Hand Tools Properly and Safely

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Activities	Recourses/Special Instructions
1. Trainee will ask the instructor about the learning materials	1. Instructor will provide the learning materials '**Use hand tools properly and safely'**
2. Read the Information sheet and complete the Self Checks & Check Answer Sheets on "**Use hand tools properly and safely**"	2. Information sheet 1: **Use hand tools properly and safely** 3. Self-check 1: **Use hand tools properly and safely** 4. Check your answer with Answer key 1: Use hand tools properly and safely
3. Read the Job/Task Sheet and Specification Sheet and perform job/Task	5. Job/Task Sheet and Specification Sheet Job Sheet 2.1: Cut MS Plate by using Hack Saw as per specification Specification Sheet 2.1: Cut MS Plate by using Hack Saw as per specification Job Sheet 2.2: Identify unsafe or defective tools Specification Sheet 2.2: Identify unsafe or defective tools Job Sheet 2.3: Make geometric measurements by using outside micrometer Specification Sheet 2.3: Make geometric measurements by using outside micrometer

Information sheet 2: Use Hand Tools Properly and Safely

Learning Objective:

After completion of this information sheet, the learners will be able to explain, define and interpret the following contents:

2.1 Hand tools
2.2 Importance of correct and safe use of hand tools
2.3 Safety precautions in using hand tools
2.4 Unsafe or defective tools
2.5 Measuring Tools
2.6 Measurement requirements
2.7 How to take accurate measurements
2.8 Correct and safe use of measuring tools

2.1 Hand Tools

Hand tools are simple tools which you use with your hands , and which are usually not powered also Hand tools is any tool that is powered by hand rather than a motor examples are chopping, chiseling, , cutters, files, striking tools, struck or hammered tools, screwdrivers, vises, clamps, snips, saws, and drills.

2.2 Importance Of Correct and Safe Use of Hand Tools

One needs to know how to properly use the tool in order to avoid injury to oneself or others while working with it and to ensure the proper operation of the tool. Hand tool misuse occurs when an employee misplaces, loses, or mishandles a tool, or uses it for unintended purposes (elements of error).

2.3 Safety Precautions in Using Hand Tools

a. Always wear eye protection.
b. Wear the right safety equipment for the job.
c. Use tools that are the right size & right type for your job.
d. Follow the correct procedure for using every tool.
e. Keep your cutting tools sharp and in good condition.
f. Don’t work with oily or greasy hands.
g. Handle sharp-edged and pointed tools with care.
h. Always carry pointed tools with the points and heavy ends down.
i. Secure all small work and short work with a vise or clamp.
j. Never carry tools in your pockets.
k. Don’t use tools that are loose or cracked.
l. Keep your punches & chisels in good condition. Mushroomed heads can chip & cause injuries.
m. Don’t use a file without a handle.
n. Don’t pry or hammer with a file. It may shatter.
o. Don’t use screwdrivers as chisels or pry bars.

p. Don’t try to increase your leverage by using a “cheater” with a wrench. Wrenches need the right strength for their size and length.
q. After using a tool — clean it and return it to its proper storage place.
r. If anything breaks or malfunctions — report it to your supervisor at once.
s. Use the right type of tools for the job.
t. Never place tools and materials where they hang on the edge of a bench.
u. Don’t use tools for jobs they aren’t supposed to handle.
v. Store tools and materials vertically, with the points and heavy end down.
w. Cut away from yourself when you use chisels and other edged tools.
x. Don’t force screws; make sure you use the correct screw for the job.

2.4 Unsafe or Defective Tools

Defective tools can cause serious and painful injuries. If a tool is defective in some way, DON'T USE IT.

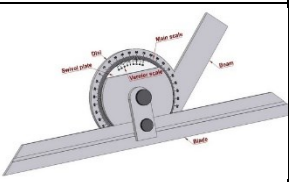
Be aware of problems like:

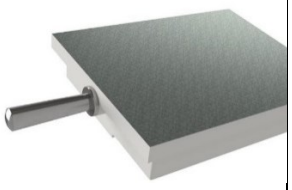
- Chisels and wedges with mushroomed heads
- Split or cracked handles
- Chipped or broken drill bits
- Wrenches with worn out jaws
- Tools which are not complete, such as files without handles

To ensure safe use of hand tools, remember:

- Never use a defective tool
- Double check all tools prior to use
- Ensure defective tools are repaired

2.5 Measuring Tools

Measurement tap Measurement Tape for measuring distances. It can be retractable or non-retractable.	
Spirit level (bubble level) A level containing a vial of liquid with an air bubble, used to ensure surfaces are horizontal or vertical.	
Vernier caliper: A tool with two jaws for measuring the distance between them. There are various types, including Vernier calipers and digital calipers.	
Vernier bevel protractor The Vernier bevel protractor is a precision instrument meant for measuring angles to an accuracy of 5 minutes i.e. (1/12) ° i.e. 12th part of 1°. Uses: Apart from being used for measuring angles, vernier bevel protractor is also used for setting work holding devices on machine tools, work tables etc.	

Vernier height gauge Vernier height gauge is a special type of vernier instruments which is used to measure heights of different engineering objects up to high precision and accuracy during many of industrial jobs where measuring process is require	
Inside micrometer Inside Micrometer is a precision measuring tool used to accurately measure the internal diameter of cylinders, pipes, and other cylindrical objects. It is an essential tool for machinists, mechanics, and technicians who need to ensure precise measurements for proper assembly and operation of equipment.	
Outside micrometers Outside Micrometers are used for measuring the thickness or outside diameter of small parts. They are industry standard measuring tools because of their high accuracy/resolution and ease of use.	
Thread gauge Thread Gauge is a tool for checking the pitch and size of screw threads.	
Radius gauge Radius gauge is a measuring instrument for measuring the radius of a curved part. It is used to measure the dimensions of workpieces, dies and wooden patterns. The gauge is applied directly to the object and dimensions are read visually.	
Feeler gauge Feeler Gauge A set of thin blades or wires of known thickness used to measure gaps or clearances	
Surface plate Surface plate is used as a baseline for all workpiece measurements. Though it may look like a simple block of stone, it is actually as precise an instrument as any other in the factory. Without an accurate surface plate, even some of the most complex inspection instruments are useless.	
Try square Try-square is a woodworking tool used for marking and checking 90° angles on pieces of wood. Though woodworkers use many different types of square, the try square is considered one of the essential tools for woodworking.	
Dial indicator Dial, and dial test indicators, are used for precise comparisons or measurements of workpiece surfaces, machine, equipment, part tolerances, alignment of your machine's components, or the general deviation of any object from an expected standard.	

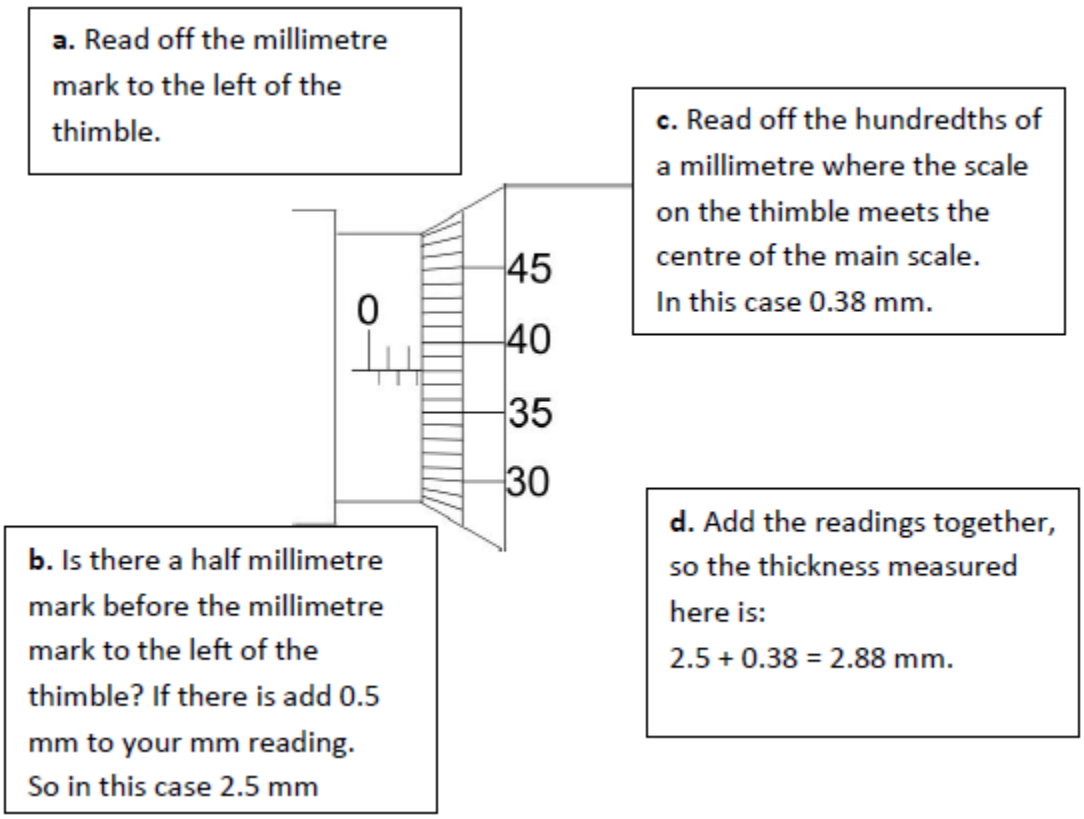
Multimeters A digital multimeter is a test tool used to measure two or more electrical values—principally voltage (volts), current (amps) and resistance (ohms). It is a standard diagnostic tool for technicians in the electrical/electronic industries.	
Weight scale (high accuracy) A scale or balance is a device used to measure weight or mass. These are also known as mass scales, weight scales, mass balances, and weight balances.	
Torque wrench A torque wrench is a tool used to tighten nuts and bolts to a predetermined torque value. This instrument allows fasteners to be tightened to the proper tension, helping avoid damage from over tightening or joints coming apart from under tightening.	

2.6 Measurement Requirements

Two main requirements must be met in the act of measurement. They are; • The standard used for comparison must be accurately defined and commonly accepted. The procedure employed for the measurement & the apparatus used for comparison must be provable.

2.7 Use Micrometer to Take Accurate Measurements

a. Open the micrometer by turning the thimble or ratchet.
b. Place the object to be measured between the spindle and anvil.
c. Close the spindle by turning the ratchet, not the thimble. The ratchet prevents excess pressure on the object being measured, so you don't squash it and get a false reading.
d. Now read the scale



2.8 Correct and Safe Use of Measuring Tools

Accurate measurements are crucial as they ensure that the results are reliable and that decisions made on the basis of these measurements are sound. Inaccurate measurements can lead to significant problems and it is important to understand the implications of such errors.

Self-Check 2: Use Hand Tools Properly and Safely

1. What are hand tools?
   Answer:

2. Write the importance of correct and safe use of hand tools.
   Answer:

3. Write down the Safety precautions in using hand tools.
   Answer:

4. Define unsafe or defective tools.
   Answer:

5. Write 10 (ten) measuring tools name.
   Answer:

6. How to take accurate measurements?
   Answer:

7. Write correct and safe use of measuring tools.
   Answer:

Answer Sheet 2: Use Hand Tools Properly and Safely

1. What is hand tools?

   Answer: Hand tools are simple tools which you use with your hands , and which are usually not powered also Hand tools is any tool that is powered by hand rather than a motor example are chopping, chiseling, , cutters, files, striking tools, struck or hammered tools, screwdrivers, vises, clamps, snips, saws, and drills.

2. Write the importance of correct and safe use of hand tools.

   Answer: one needs to know how to properly use the tool in order to avoid injury to oneself or others while working with it and to ensure the proper operation of the tool. Hand tool misuse occurs when an employee misplaces, loses, or mishandles a tool, or uses it for unintended purposes (elements of error).

3. Write down the Safety precautions in using hand tools.

   Answer:

   a. Always wear eye protection.
   b. Wear the right safety equipment for the job.
   c. Use tools that are the right size & right type for your job.
   d. Follow the correct procedure for using every tool.
   e. Keep your cutting tools sharp and in good condition.
   f. Don’t work with oily or greasy hands.
   g. Handle sharp-edged and pointed tools with care.
   h. Always carry pointed tools with the points and heavy ends down.
   i. Secure all small work and short work with a vise or clamp.
   j. Never carry tools in your pockets.
   k. Don’t use tools that are loose or cracked.
   l. Keep your punches & chisels in good condition. Mushroomed heads can chip & cause injuries.
   m. Don’t use a file without a handle.
   n. Don’t pry or hammer with a file. It may shatter.
   o. Don’t use screwdrivers as chisels or pry bars.
   p. Don’t try to increase your leverage by using a “cheater” with a wrench. Wrenches need the right strength for their size and length.
   q. After using a tool — clean it and return it to its proper storage place.
   r. If anything breaks or malfunctions — report it to your supervisor at once.
   s. Use the right type of tools for the job.
   t. Never place tools and materials where they hang on the edge of a bench.
   u. Don’t use tools for jobs they aren’t supposed to handle.
   v. Store tools and materials vertically, with the points and heavy end down.
   w. Cut away from yourself when you use chisels and other edged tools.
   x. Don’t force screws; make sure you use the correct screw for the job.

4. Define unsafe or defective tools.

   Answer: The following are examples of power tool defects that can cause serious injuries: Malfunctioning safety switches. Lack of adequate safety warnings. Insufficient amount of fluid in hydraulic power tools. Missing safety guards.

5. Write some measuring tools name.

   Answer:

   a Measurement Tap:
   b Spirit Level (Bubble Level):
   c Vernier Caliper:
   d Vernier bevel protractor
   e Vernier height gauge
   f Inside Micrometer
   g Outside Micrometers
   h Thread Gauge:
   i Radius
   j Feeler Gauge:
   k Surface plate
   l Try square

6. How to take accurate measurements?

   Answer:

   Two main requirements must be met in the act of measurement. They are;

   The standard used for comparison must be accurately defined and commonly accepted. The procedure employed for the measurement & the apparatus used for comparison must be provable.

7. Write correct and safe use of measuring tools.

   Answer: Accurate measurements are crucial as they ensure that the results are reliable and that decisions made on the basis of these measurements are sound. Inaccurate measurements can lead to significant problems and it is important to understand the implications of such errors.

Job Sheet 2.1: Cut the MS Plate Using by Hack Saw as per Specification

Working Procedure:

1. Read Job Sheet and Specification Sheet.
2. Collect all Tools & Equipment.
3. Follow OSH.
4. Wear the PPE.
5. Measure and mark the material to be cut.
6. Choose the right blade for the material you are going to cut.
7. Keep blade rigid, and frame properly aligned.
8. Step up the material to be cut. If you don't have a vise, clamp the material to the edge of a table.
9. Cut the material with even strokes and slight pressure against the material (use a reasonable amount of pressure along the direction of the cut).
10. Do not apply too much pressure on the blade as the blade may break.
11. After complete Keep saw blades clean and lightly oiled.
12. Clean working area.
13. Store all equipment safely.

Specification Sheet 2.1: Cut MS Plate by Using Hack Saw as per Specification

Name of Job: Cut the MS Plate using by Hack Saw as per specification

Conditions for the job: You must always practice safe operation procedures during the assessment. You will be required to demonstrate OSH competencies to cut the MS Plate using by Hack Saw as per specification

Diagram / Design:

Required Personal Protective Equipment (PPE): Pre/Person

Sl.	Name of the PPE	Specification	Unit	Quantity	Remarks
1	Hand Gloves	Cotton	pair	01	
2	Mask	N 95	Nos	01	
3	Safety shoe	As required	pair	01	
4	Safety goggles	Standard	Nos	01	
5	Apron	Standard	Nos	01	

Required Tools and Equipment

Sl.	Name of tools and equipment	Specification	Unit	Quantity	Remarks
1	Adjustable Hacksaw	China	Pcs	01	
2	Hack Saw Blade	China	Pcs	01	

Required Materials

Sl.	Name of Materials	Specification	Unit	Quantity	Remarks
1	MS Shaft	As required	Pcs	01	
2	Cotton west	As required	gm.	100	

Job Sheet 2.2: Identify Unsafe or Defective Tools

Working Procedure:

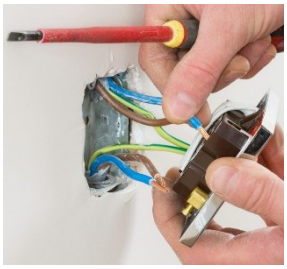
1. Read Job Sheet and Specification Sheet.
2. Collect all Tools & Equipment.
3. Follow OSH.
4. Wear the PPE.
5. Inspect hand tools for damage checking.
6. Identify parts that are damaged. Based on the severity of the damage, decide if it'sfor repair or replacement.
7. Check for loose parts. Loose parts should be tightened.
8. Dull or blunt edges should be sharpened or replaced.
9. Remember that if the damage is beyond repair, it should be replaced.

Step 5

Step 8

Step 9

Step 9



Step 10

B: **Electric Powered Tools and Equipment**

10. Identify parts that are damaged. Based on the severity of the damage, decide if it's for repair, replacement, or disposal.
11. Inspect parts such as electric cords and connections of electric-powered tools for damage checking.
12. After complete work clean working area.
13. Clean tools and equipment.
14. Store all equipment safely.

Specification Sheet 2.2: Identify Unsafe or Defective Tools

Name of Job: Identify unsafe or defective tools

Conditions for the job: You must always practice safe operation procedures during the assessment. You will be required to demonstrate OSH competencies to Identify unsafe or defective tools as per specification

Diagram / Design:

Required Personal Protective Equipment (PPE): Pre/Person

Sl.	Name of the PPE	Specification	Unit	Quantity	Remarks
1	Hand Gloves	Cotton	pair	01	
2	Mask	N 95	Nos	01	
3	Safety shoe	As required	pair	01	
4	Safety goggles	Standard	Nos	01	
5	Apron	Standard	Nos	01	

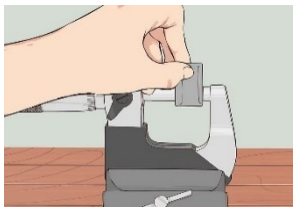
Required Tools and equipment

Sl.	Name of tools /equipment	Specification	Unit	Quantity	Remarks
1	Drill Bit	China	No	01	
2	Chisel	China	No	01	
3	Bench Vice	China	No	01	
4	Hammer	China	No	01	

Job Sheet 2.3: Take Geometric Measurements by Using Outside Micrometer as per Specification

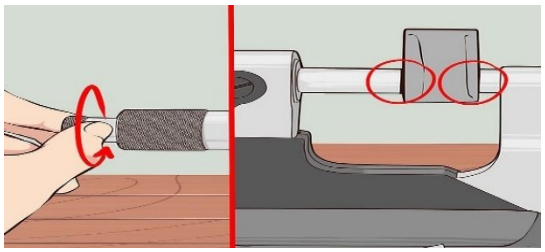
1. Read Job Sheet and Specification Sheet.
2. Collect all Tools & Equipment.
3. Follow OSH.
4. Wear the PPE.
5. Clean the anvil and spindle before beginning
6. Position object to be measured
7. Clamp object between anvil and spindle
8. Read the measurement
9. Clean tools and equipment.
10. Store all equipment safely.

Step 4

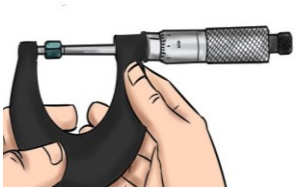


Step 5

Step 6



Step 6



Step 7

Specification Sheet 2.3: Take Geometric Measurements by Using Outside Micrometer as per Specification

Name of Job: Make geometric measurements by using outside as per specification

Conditions for the job: You must practice safe operation procedures at all times during the assessment. You will be required to demonstrate OSH competencies to make geometric measurements by using outside as per specification

Diagram / Design:

Required Personal Protective Equipment (PPE): Pre/Person

Sl.	Name of the PPE	Specification	Unit	Quantity	Remarks
1	Hand Gloves	Cotton	pair	01	
2	Mask	N 95	Nos	01	
3	Safety shoe	As required	pair	01	
4	Safety goggles	Standard	Nos	01	
5	Apron	Standard	Nos	01	

Required Tools And Equipment

Sl.	Name of tools and equipment	Specification	Unit	Quantity	Remarks
01	Micrometer	0-25mm	No	01	

Learning Outcome -3: Operate Power Tools Properly and Safely

Assessment Criteria	1. Appropriate power tools are selected 2. Safe work practice is observed and **Personal Protective** Equipment (PPE) is worn as perusing power tools 3. Power supply outlet and electrical cord are inspected and confirmed safe for use following established workplace safety requirements 4. Safety precautions are ensured before using power tools following the manufacturer's operating specifications 5. The proper sequence of operation is applied for using power tools 6. Unsafe or faulty power tools are identified and marked for repair 7. Operate power tools properly and safely to perform a work activity
Conditions and Resources	1. Workplace or Simulated Workplace 2. CBLM 3. Handout 4. Taptop 5. Multimedia Projector 6. Paper, Pen, Pencil, 7. Internet Facilities 8. White Board and 9. Audio Video Devices 10. Necessary power tools 11. Necessary PPE
Contents	1. Power Tools 2. Policies and procedures for occupational safety and health 3. Proper use of power tools 4. Types of power tools 5. Safe handling of power tools 6. Equipment management 7. Reporting and documentation

	8. Precautions for use of power tools 9. Unsafe or defective tools 10. Maintenance and storage of tools
Job/Task/Activity	1. Identify Power Tools 2. Use the following power tools ▪ Angle grinder ▪ Bench grinder ▪ Pedestal drill ▪ Hand drill ▪ Pneumatic wrench ▪ Power saw ▪ Universal cutter grinder 3. Identify unsafe or faulty tools
Training Method	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming
Assessment Method	1. Written Test 2. Demonstration 3. Oral questioning 4. Portfolio

Learning Experience 3: Operate Power Tools Properly and Safely

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Activities	Recourses/Special Instructions
1. Trainee will ask the instructor about the learning materials	1. Instructor will provide the learning materials '**Operate power tools properly and safely**'
2. Read the Information sheet and complete the Self Checks & Check Answer Sheets on **"Operate power tools properly and safely"**	2. Information sheet 1: Operate power tools properly and safely 3. Self-check 1: Operate power tools properly and safely 4. Check your answer with Answer key 1: Operate power tools properly and safely
3. Read the Job/Task Sheet and Specification Sheet and perform job/Task	5. Job/Task Sheet and Specification Sheet Job Sheet 3.1: Identify power tools Specification Sheet 3.1: Identify power tools Job Sheet 3.2: Hole the MS flat bar using by hand drill machine as per specification Specification Sheet 3.2: Hole the MS flat bar using by hand drill machine as per specification

Information sheet 3: Operate Power Tools Properly and Safely

Learning Objective: After completion of this information sheet, the learners will be able to explain, define and interpret the following contents:

3.1. Power Tools
3.2. Policies and procedures for occupational safety and health
3.3. Proper use of power tools
3.4. Types of power tools
3.5. Safe handling of power tools
3.6. Equipment management
3.7. Reporting and documentation
3.8. Precautions for use of power tools
3.9. Unsafe or defective tools
3.10. Maintenance and storage of tools

3.1 Power Tool

Electric power tools are those that are portable. Typically for home use, these are the most wanted and accessible to the average Joe looking for home DIY power tools. These cordless tools are given power through an electric motor used for the machining of materials. Electric power tools use battery platform systems to manage the rechargeable batteries by monitoring its state, protecting the battery, controlling its environment, and/or balancing it. Basically, protecting the tool from volt damage

3.2 Policies And Procedures For Occupational Safety And Health

a. Creating comprehensive policies and procedures for occupational safety and health (OSH) in a CNC workshop is crucial for maintaining a safe working environment for employees. Here are some key areas to consider when developing OSH policies and procedures specifically for a CNC workshop:

b. Ensure proper machine guarding and emergency stop mechanisms are in place.
c. Use of appropriate PPE, such as safety glasses, hearing protection, gloves, and steel-toed shoes, based on the tasks performed and potential hazards present in the workshop.
d. Provide training on the selection, use, and maintenance of PPE.
e. Develop procedures for the inspection, handling, and maintenance of cutting tools.
f. Emphasize proper tooling techniques and tool change procedures.
g. Establish guidelines for safe lifting, handling, and storage of materials and workpieces.
h. Implement measures to prevent trips, slips, and falls in work areas.
i. Develop and communicate emergency procedures for fires, spills, and medical incidents.
j. Conduct regular drills to ensure all employees understand their roles during emergencies.
k. Label hazardous materials and chemicals properly.
l. Provide employees with access to safety data sheets (SDS) and training on chemical hazards.
m. Maintain clean and organized work areas to minimize tripping hazards and improve overall safety.
n. Establish procedures for the proper disposal of waste and debris.

o. Provide comprehensive training on CNC machine operation, safety protocols, and OSH regulations.
p. Offer ongoing education to keep employees informed about new safety procedures and technologies.
q. Conduct regular inspections of machinery, tools, and work areas to identify potential hazards.
r. Document inspection findings and take corrective actions promptly.
s. Encourage employees to participate in safety programs and report safety concerns.
t. Establish a culture of safety where employees feel empowered to contribute to workplace safety.

3.3 Proper Use of Power Tools

a. Preparation and Inspection
b. Workspace Setup
c. Power Source Connection
d. Personal Protective Equipment (PPE)
e. Tool Operation
f. Proper Technique
g. Monitoring and Adjustment
h. Post-Operation Procedures
i. Training and Education

3.4 Types of Power Tools

Pedestal grinding machine	A pedestal grinding machine is a stationary machine used for grinding, sharpening, shaping, or polishing various tools and materials. It typically consists of a grinding wheel mounted on a pedestal or benchtop.	
Drill machine	A drill machine is a power tool used for drilling holes in various materials such as wood, metal, plastic, and masonry. It consists of a motor that drives a rotating drill bit to create holes.	
Universal tool grinder	A universal tool grinder is a versatile machine used for sharpening and regrinding cutting tools such as drills, milling cutters, and lathe tools. It allows for precise sharpening of various types of cutting edges.	

Power torque wrench	A power torque wrench is a specialized wrench that applies torque to fasteners such as nuts and bolts. Unlike manual torque wrenches, power torque wrenches use motorized mechanisms to apply controlled torque accurately.	
Blower machine	A blower machine is a power tool used for generating a stream of air at high velocity. Blower machines are commonly used for cleaning surfaces, removing debris, drying surfaces, inflating objects, and other applications requiring directed airflow.	

3.5 Safe Handling of Power Tools

a. Read the manual
b. Inspect the tool
c. Wear personal protective equipment (ppe)
d. Secure workpiece
e. Power off when not in
f. Use the right tool for the job
g. Maintain control
h. Keep workspace clean
i. Use proper technique
j. Avoid overexertion
k. Monitor tool condition
l. Proper storage

3.6 Equipment Management

Effective equipment management using power tools in CNC machining is crucial for ensuring efficient production, maintaining high-quality standards, and promoting operator safety. Here are some key aspects to consider:

Tool Selection and Inventory Management:	▪ Choosing the right tool for the job ▪ Maintaining an organized inventory ▪ Inventory control	
Tool Maintenance and Inspection	▪ Regular cleaning and inspection ▪ Preventative maintenance ▪ Record keeping	

Operator Training and Safety	▪ Proper training ▪ Following safety protocols ▪ Regular safety assessments	

3.7 Reporting and Documentation

Here are some key aspects of reporting and documentation for CNC machines:

Machine setup reports	a. Document all parameters and settings used for each job setup, including: • Material type and dimensions • Tool selection and configuration • Cutting speeds and feeds • Coolant type and flow rate • Fixture details and program information b. This information allows for consistent setup across similar jobs, facilitates troubleshooting, and enables future reference and optimization.
Production Reports	c. Track and record production data, including: • Number of parts produced • Cycle times per part • Machine run time and idle time • Scrap rates and reasons for rejection d. Utilize this data to analyze production efficiency, identify bottlenecks, and make informed decisions about production scheduling and resource allocation.
Maintenance logs	e. Maintain detailed logs of all maintenance activities performed on the CNC machine, including: • Date and time of maintenance • Type of maintenance performed (e.g., preventative maintenance, repairs) • Parts replaced • Technician notes and observations f. These logs help track the machine's maintenance history, identify recurring issues, and schedule future maintenance tasks effectively.
Machine performance reports	g. Regularly generate reports that capture key performance indicators (KPIs) for the CNC machine, such as: • Overall Equipment Effectiveness (OEE) • Availability • Performance • Quality h. Utilize this data to monitor machine health, identify areas for improvement, and demonstrate the machine's overall effectiveness to stakeholders.

3.8 Precautions for Use of Power Tools

a. Read the manual
b. Inspect the tool
c. Choose the right tool
d. Wear proper personal protective equipment (PPE)
e. Maintain a firm grip and proper body position
f. Keep bystanders at a safe distance
g. Never carry a plugged-in tool by the cord
h. Don't force the tool
i. Be mindful of cords and hoses
j. Be aware of your surroundings
k. Never use power tools in wet or damp conditions
l. Use a ground fault circuit interrupter (GFCI)
m. Disconnect the tool before making adjustments or changing accessories
n. Never leave a running power tool unattended
o. Report any malfunctions immediately
p. Clear the work area

3.9 Unsafe or Defective Tools

Unsafe or defective tools in CNC (Computer Numerical Control) machining refer to tools and equipment that pose hazards to operators, the machining process, or the quality of machined parts due to wear, damage, malfunction, or improper usage. These tools can include cutting tools, tool holders, coolant systems, electrical components, and safety devices.

3.10 Maintenance and Storage Of Tools

Here's a breakdown of key practices for tool maintenance and storage:

A. **Maintenance**

- Regularly clean tools after use to remove dirt, dust, debris, and any harmful substances. Use appropriate cleaning methods and materials based on the specific tool type.
- Lubricate moving parts according to manufacturer recommendations to reduce friction, prevent wear, and ensure smooth operation.
- Sharpen blades (e.g., drills, knives) as needed to maintain their cutting efficiency and prevent them from dulling and requiring more force to operate.
- Regularly inspect tools for damage, wear, or malfunctioning components. Replace worn parts or repair damaged tools promptly to ensure safety and functionality.

B. **Storage**

- Store tools in a dry, cool, and well-ventilated area to prevent rust and corrosion. Avoid storing them in damp basements, garages, or near excessive heat sources.
- Organize tools using toolboxes, cabinets, pegboards, or shadow boards for easy identification and retrieval. Label tools clearly for quick access and proper inventory management.

Self-Check Sheet 3: Use Hand Tools Properly and Safely

1. What is the power tools?
   Answer:

2. Write the types of power tools.
   Answer:

3. How to safely handling of power tools?
   Answer:

4. What is the unsafe or defective tools
   Answer:

Answer Sheet 3: Use Hand Tools Properly and Safely

1. What is the power tools?
   Answer: Power tools in CNC (Computer Numerical Control) machines refer to the various cutting and shaping instruments utilized to process materials such as wood, metal, plastic, and composites. These tools are typically controlled by the CNC machine's computerized system to execute precise cuts, drills, carvings, and other machining operations.

2. Write the types of power tools.
   Answer:
   - Pedestal grinding machine
   - Drill machine
   - Universal tool grinder
   - Power torque wrench
   - Blower machine
3. How to safely handling of power tools?
   Answer:
   - Read the manual
   - Inspect the tool
   - Wear personal protective equipment (ppe)
   - Secure workpiece
   - Power off when not in
   - Use the right tool for the job
   - Maintain control
   - Keep workspace clean
   - Use proper technique
   - Avoid overexertion
   - Monitor tool condition
   - Proper storage

4. What is the unsafe or defective tools
   Answer: Unsafe or defective tools in CNC (Computer Numerical Control) machining refer to tools and equipment that pose hazards to operators, the machining process, or the quality of machined parts due to wear, damage, malfunction, or improper usage. These tools can include cutting tools, tool holders, coolant systems, electrical components, and safety devices.

Job Sheet 3.1: Identify Power Tools

Working Procedure:

1. Read Job Sheet and Specification Sheet.
2. Collect all Tools & Equipment.
3. Follow OSH.
4. Wear the PPE.
5. Identify all power tools from the mentioned picture.

Sl No	Name of the tools	Application of the tools
A.		
B.		
C.		
D.		
E.		
F.		

G.		
H.		

6. Be sure to use every power tool.
7. After complete identification clean work area.
8. Clean tools and equipment.
9. Store all equipment safely.

Specification Sheet 3.1: Identify Power Tools

Name of Job: Identify Power Tools

Conditions for the job: You must practice safe operation procedures at all times during the assessment. You will be required to demonstrate OSH competencies to Identify Power Tools as per specification.

Diagram / Design:

1 No

2 No

3 No

4 No

5 No

6 No

7 No

8 No

Required Personal Protective Equipment (PPE): Pre/Person

Sl.	Name of the PPE	Specification	Unit	Quantity	Remarks
1	Hand Gloves	Cotton	pair	01	
2	Mask	N 95	Nos	01	
3	Safety shoe	As required	pair	01	
4	Safety goggles	Standard	Nos	01	
5	Apron	Standard	Nos	01	

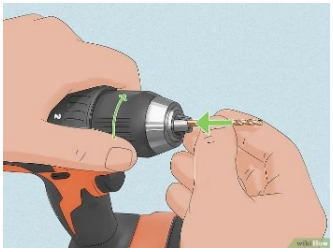
Required Tools and Equipment

Sl.	Name of tools and equipment	Specification	Unit	Quantity	Remarks
1	Bench Grinding Machine	China	Pcs	01	
2	Hand Drill Machine	China	Pcs	01	
3	Universal tool grinder	China	Pcs	01	
4	Blower machine	China	Pcs	01	
5	Power torque wrench	China	Pcs	01	
6	Power Saw Machine	China	Pcs	01	
7	Planner Machine	China	Pcs	01	
8	Bench Drill Machine	China	Pcs	01	

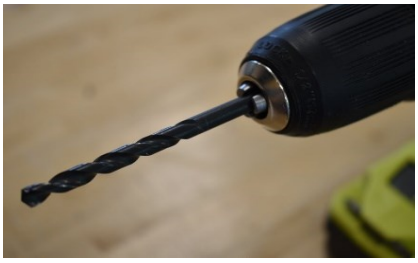
Job Sheet 3.2: Hole MS Flat Bar by Using Hand Drill Machine as per Specification

Working Procedure:

1. Read Job Sheet and Specification Sheet
2. Wear safe clothing and eye protection.
3. Wear ear protection if drilling regularly.
4. Follow OSH
5. Choose the correct drill bit.
6. Fit the drill bit firmly into the chuck.
7. Prepare the materials
   Drill a pilot hole
8. Drill with steady pressure
9. Examine the Hole
10. Be sure to use every power tool.
11. After complete hole and off power the clean work area.
12. Clean tools and equipment.
13. Store all equipment safely.



Step 4



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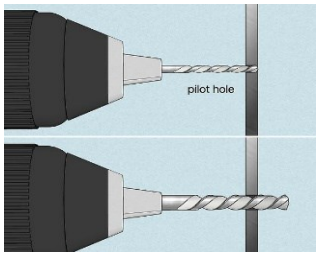

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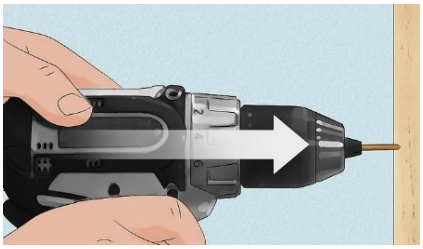

Step 8

Specification Sheet 3.2: Hole the MS Flat Bar Using by Hand Drill Machine as per Specification

Name of Job: Hole the MS Flat bar using by hand drill machine as per specification

Conditions for the job: You must practice safe operation procedures at all times during the assessment. You will be required to demonstrate OSH competencies to Hole the MS Flat bar using by hand drill machine as per specification

Diagram / Design:

Required Personal Protective Equipment (PPE): Pre/Person

Sl.	Name of the PPE	Specification	Unit	Quantity	Remarks
1	Hand Gloves	Cotton	pair	01	
2	Mask	N 95	Nos	01	
3	Safety shoe	As required	pair	01	
4	Safety goggles	Standard	Nos	01	
5	Apron	Standard	Nos	01	

Required Tools and Equipment

Sl.	Name of tools and equipment	Specification	Unit	Quantity	Remarks
1	Hand Drill	BOSCH	No	01	

Learning Outcome -4: Clean and Maintain Hand and Power Tools

Assessment Criteria	1. Dust and foreign matter are removed from hand and power tools following workplace standards 2. Condition of hand and power tools is checked after use and reported 3. Appropriate lubricant is applied after use and before storage 4. Measuring tools are checked and calibrated after use 5. Defective hand and power tools are inspected and repaired or replaced 6. Hand and power tools are stored and secured following workplace requirements
Conditions and Resources	1. Workplace or Simulated Workplace 2. CBLM 3. Handout 4. Laptop 5. Multimedia Projector 6. Paper, Pen, Pencil, 7. Internet Facilities 8. White Board and 9. Audio Video Devices 10. Necessary hand and power tools 11. Necessary PPE
Contents	1. Importance of cleaning hand and power tools 2. Requirement to check condition of hand and power tools after use 3. Requirement to apply suitable lubricant after use and before storage 4. Requirement to check and calibrate measuring tools after use 5. Requirement to inspect defective hand and power tools 6. Difference and scope of repair or replacement 7. Safe storage of tools 8. 5S of Housekeeping.
Job/Task/Activity	1. Remove dust and foreign particles from hand and power tools 2. Check condition of hand and power tools after use 3. Apply suitable lubricant after use and before storage 4. Check and calibrate measuring tools after use 5. Inspect and repair or replace defective hand and power tools 6. Store and secure hand and power tools following workplace requirements

Training Method	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming
Assessment Method	1. Written Test 2. Demonstration 3. Oral questioning

Learning Experience 4: Clean and Maintain Hand and Power Tools

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Activities	Recourses/Special Instructions
1. Trainee will ask the instructor about the learning materials	1. Instructor will provide the learning materials 'Clean and maintain hand and power tools'
2. Read the Information sheet and complete the Self Checks & Check Answer Sheets on "Clean and maintain hand and power tools"	2. Information sheet 1: Clean and maintain hand and power tools 3. Self-check 1: Clean and maintain hand and power tools 4. Check your answer with Answer key 1: Clean and maintain hand and power tools
3. Read the Job/Task Sheet and Specification Sheet and perform job/Task	5. Job/Task Sheet and Specification Sheet Task sheet 4.1: Remove dust and foreign particles from hand and power tools Specification Sheet 4.1: Remove dust and foreign particles from hand and power tools Job Sheet 4.2: Apply suitable lubricant after use and before storage Specification Sheet 4.2: Apply suitable lubricant after use and before storage Job Sheet 4.3: Check and calibrate measuring tools after use Specification Sheet 4.3: Check and calibrate measuring tools after use Job Sheet 4.4: Inspect and repair or replace defective hand and power tools Specification Sheet 4.4: Inspect and repair or replace defective hand and power tools Job Sheet 4.5: Store and secure hand and power tools following workplace requirements Specification Sheet 4.5: Store and secure hand and power tools following workplace requirements

Information sheet 4: Clean and Maintain Hand and Power Tools

Learning Objective:

After completion of this information sheet, the learners will be able to explain, define and interpret the following contents:

4.1. Importance of cleaning hand and power tools
4.2. Requirement to check condition of hand and power tools after use
4.3. Requirement to apply suitable lubricant after use and before storage
4.4. Requirement to check and calibrate measuring tools after use
4.5. Requirement to inspect defective hand and power tools
4.6. Difference and scope of repair or replacement
4.7. Safe storage of tools
4.8. 5S of Housekeeping.

4.1. Importance of Cleaning Hand and Power Tools

Keeping your hand and power tools clean is crucial for several reasons:

Longevity: Regular cleaning removes dirt, debris, and grime that can build up on tools over time. This buildup can wear down the tool's surface, making it less effective and more susceptible to damage. For example, sawdust on a saw blade can dull the teeth, while oil and grease on a wrench can make it difficult to grip. By cleaning your tools regularly, you can help them last longer and perform better.

Safety: A dirty tool can be a dangerous tool. For example, a clogged saw blade can create kickback, which can injure the user. Additionally, sharp objects like screws and nails can become hidden beneath debris, increasing the risk of cuts and punctures. Keeping your tools clean helps to ensure that they are safe to use.

Efficiency: Clean tools are simply easier to use. A clean saw blade will cut smoother, and a clean wrench will grip better. This can help you to complete tasks more quickly and efficiently.

Overall Condition: Regular cleaning allows you to inspect your tools for any damage, such as cracks, rust, or loose parts. Addressing these issues promptly can prevent them from becoming more serious problems down the road.

Here are some tips for cleaning your hand and power tools:

- Clean your tools after each use.
- Use the appropriate cleaning method for the type of tool.
- Dry your tools thoroughly before storing them.
- Inspect your tools regularly for damage.

4.2. Requirement to Check Condition of Hand and Power Tools After Use

Checking the condition of your hand and power tools after each use is **highly recommended** for several reasons, although it may not be strictly **required** in all situations. Here's why

Safety: Damaged tools can pose a significant safety risk. For example:

- Cracked or broken handles on hand tools can increase the chance of slipping or losing control, leading to cuts, bruises, or other injuries.
- Dull or damaged blades on saws or knives can become unpredictable and increase the risk of kickback or uncontrolled cuts.
- Frayed or damaged cords on power tools can pose a risk of electric shock or fire.

Performance: Tools that are not in good condition will not perform as well as they should. This can lead to:

- Decreased efficiency and productivity, as tasks may take longer to complete.
- Poor quality results, such as uneven cuts or finishes.
- Increased wear and tear on the tool itself, shortening its lifespan.

Early detection of problems: Regularly checking your tools allows you to identify minor issues before they become major problems. This can save you time and money in the long run, as minor repairs are usually cheaper and easier than major ones.

4.3. Requirement to Apply Suitable Lubricant After Use and Before Storage

Applying suitable lubricant to hand and power tools after use and before storage is important for several reasons:

Prevention of corrosion: Lubricants help create a protective barrier that prevents moisture and rust from forming on metal surfaces. This is particularly crucial for tools that may be exposed to humid or damp environments.

Maintenance of moving parts: Many hand and power tools have moving parts such as gears, bearings, and hinges. Applying lubricant to these components reduces friction, wear, and heat generation, which helps extend their lifespan and ensures smooth operation.

Ease of use: Lubricated tools operate more smoothly and require less force to use, reducing operator fatigue and strain. This is especially important for hand tools that are used frequently or for extended periods.

Prevention of seizing and sticking: Without proper lubrication, moving parts in tools can seize up or become stuck over time. Lubricants help prevent this by keeping components moving freely and preventing them from binding together.

Protection of rubber and plastic parts: Some tools contain rubber or plastic components that can degrade over time if they become dry or brittle. Applying lubricant can help keep these parts flexible and prevent cracking or deterioration.

Preservation of tool performance: Regular lubrication helps maintain the performance and efficiency of hand and power tools. By reducing friction and wear, lubricants help ensure that tools operate at their optimal level, delivering consistent results over time.

Prevention of contamination: Lubricants can help seal out dirt, dust, and other contaminants that can compromise the performance and longevity of tools. By creating a barrier between moving parts and the external environment, lubricants help keep tools clean and functioning properly.

Facilitation of storage: Properly lubricated tools are better protected during storage, especially if they are stored for extended periods. Lubricants help prevent corrosion and

deterioration while the tools are not in use, ensuring that they remain in good condition and ready for use when needed.

When applying lubricant to tools, it's important to use the appropriate type of lubricant recommended by the tool manufacturer. Different types of lubricants are designed for specific applications and materials, so using the wrong type of lubricant can potentially damage the tool or compromise its performance.

4.4. Requirement to check and calibrate measuring tools after use

Here are several reasons why it's important to perform these checks:
Accuracy Assurance: Measuring tools are relied upon to provide accurate and precise measurements. Regular checking and calibration ensure that the measurements obtained from these tools remain within acceptable tolerances and standards.

Compliance with Standards: Many industries have specific standards and regulations regarding the accuracy and calibration of measuring instruments. Regular calibration ensures that the tools meet these requirements and comply with industry standards.

Quality Control: In manufacturing and production environments, accurate measurements are essential for ensuring the quality and consistency of products. Calibrated measuring tools help maintain tight tolerances and prevent defects or variations in product specifications.

Reliability and Consistency: Calibrated measuring tools provide consistent and reliable measurements over time. This reliability is crucial for making informed decisions, troubleshooting problems, and ensuring consistency in processes and products.

Risk Mitigation: In critical applications such as healthcare, aerospace, and automotive industries, inaccurate measurements can lead to serious consequences, including safety hazards, product failures, or regulatory non-compliance. Regular calibration helps mitigate these risks by ensuring the accuracy and reliability of measuring tools.

Preventive Maintenance: Calibrating measuring tools can help identify potential issues or deviations before they affect measurement accuracy. Early detection of problems allows for timely maintenance or adjustments, minimizing downtime and reducing the risk of costly errors or rework.

Traceability and Documentation: Calibration processes often include documentation of calibration results, traceability to national or international standards, and certification of compliance. This documentation provides assurance of the quality and reliability of measurements and supports regulatory compliance and audits.

Optimized Performance: Properly calibrated measuring tools perform optimally, providing accurate and precise measurements with minimal variability. This helps improve efficiency, productivity, and confidence in measurement results.

4.5. Requirement to Inspect Defective Hand and Power Tools

Here's why it's important to inspect defective tools:

Safety concerns: Defective tools can pose significant safety risks to users and those around them. Inspecting defective tools allows you to identify hazards such as broken parts, frayed cords, or malfunctioning components that could cause accidents, injuries, or property damage.

Compliance with regulations: Many industries and workplaces are subject to regulations and standards governing the use of tools and equipment. Inspecting defective tools helps ensure compliance with these regulations, which may require regular maintenance, repair, or replacement of faulty equipment.

Prevention of accidents and injuries: By promptly identifying and addressing defective tools, you can prevent accidents and injuries caused by malfunctioning equipment. Proactive inspection and maintenance contribute to a safer work environment and reduce the likelihood of workplace incidents.

Minimization of downtime: Defective tools can disrupt workflow and productivity, leading to delays and increased costs. Inspecting and addressing defects promptly minimizes downtime by resolving issues before they escalate and impact operations.

Optimal performance: Functional tools are essential for achieving optimal performance and quality in various tasks and projects. Inspecting defective tools helps maintain their functionality, ensuring that they operate efficiently and produce the desired results.

4.6. Difference and Scope of Repair or Replacement

Here is a breakdown of the differences and scope of repair versus replacement:

Maintenance	Repair
Maintenance includes procedures that are undertaken based on a	Repair procedures are undertaken after the equipment, or a part of it breaks down completely or partially.
Maintenance procedures are planned as per a fixed time schedule or factory schedule.	Repair procedures are unplanned and need to be taken care of immediately.
Maintenance procedures are of several types, such as predictive, preventive, reactive, and more.	Repair procedures are of two: partial repair and complete repair.
The cost of maintenance is less as compared to repairs.	Unplanned repairs can cost you almost ten times more than maintenance.

4.7. Safe Storage of Tools

Here are some key practices for safely storing tools:

- Clean Tools before Storage
- Proper Organization
- Secure Storage
- Protection from Elements
- Avoid Overcrowding
- Proper Handling and Placement
- Use Protective Cases or Covers
- Labeling and Identification
- Regular Maintenance
- Follow Manufacturer Guidelines

4.8. 5S of Housekeeping.

The 5S pillars, **Sort (Seiri), Set in Order (Seiton), Shine (Seiso), Standardize (Seiketsu), and Sustain (Shitsuke)**, provide a methodology for organizing, cleaning, developing, and sustaining a productive work environment.

Sort – sort through all your stuff. Throw away any rubbish and archive anything you might need. Then, determine what you need on a daily or weekly basis. All other items must be removed. This is not a place where sentiment can play a role. It's a manufacturing environment.

Set in Order – Take the items that you use in the area daily or weekly and locate the best homes. Label, mark locations, color code – Make it clear for anyone who enters the area where they should be.

Shine and Clean – After you have set a place for each item, wipe it down and make sure it is in good working order. Broken items should be repaired. You should allow more time to clean up if your work area is very dirty.

Standardization – The new layout and standard of cleanliness are our new standards for each area. Display photos of the area and talk about 5S activities in your toolbox talks, and daily meetings, and share ideas throughout the factory. This will help you create 5S standards for the factory and ensure consistency.

Sustain – If the first four S's are done well, it becomes easier to maintain cleanliness and origination. Each person in an area will know where things go and where they can be returned at the end of a shift or at the job's end. For example, simple audits can be used to track our progress in maintaining our 5S baseline every week and also to identify areas for improvement.

Self -Check Sheet 4: Clean and Maintain Hand and Power Tools

1. Write down the importance of cleaning hand and power tools.
   Answer:

2. Write requirement to check condition of hand and power tools after use.
   Answer:

.

3. How to apply suitable lubricant after use and before storage?
   Answer:

4. How to check and calibrate measuring tools after use?
   Answer:

5. How to inspect defective hand and power tools?
   Answer:

6. What is safe storage of tools
   Answer:

7. Short brief the 5S of Housekeeping.
   Answer:

Answer Sheet 4: Clean and Maintain Hand and Power Tools

1. Write down the importance of cleaning hand and power tools.

   Answer

   a. **Longevity:** Regular cleaning removes dirt, debris, and grime that can build up on tools over time. This buildup can wear down the tool's surface, making it less effective and more susceptible to damage. For example, sawdust on a saw blade can dull the teeth, while oil and grease on a wrench can make it difficult to grip. By cleaning your tools regularly, you can help them last longer and perform better.

   b. **Safety:** A dirty tool can be a dangerous tool. For example, a clogged saw blade can create kickback, which can injure the user. Additionally, sharp objects like screws and nails can become hidden beneath debris, increasing the risk of cuts and punctures. Keeping your tools clean helps to ensure that they are safe to use.

   c. **Efficiency:** Clean tools are simply easier to use. A clean saw blade will cut smoother, and a clean wrench will grip better. This can help you to complete tasks more quickly and efficiently.

   d. **Overall Condition:** Regular cleaning allows you to inspect your tools for any damage, such as cracks, rust, or loose parts. Addressing these issues promptly can prevent them from becoming more serious problems down the road.

2. Write requirement to check condition of hand and power tools after use.

   Answer

   Safety: Damaged tools can pose a significant safety risk. For example:

   a Cracked or broken handles on hand tools can increase the chance of slipping or losing control, leading to cuts, bruises, or other injuries.

   b Dull or damaged blades on saws or knives can become unpredictable and increase the risk of kickback or uncontrolled cuts.

   c Frayed or damaged cords on power tools can pose a risk of electric shock or fire.

   Performance: Tools that are not in good condition will not perform as well as they should. This can lead to:

   a Decreased efficiency and productivity, as tasks may take longer to complete.

   b Poor quality results, such as uneven cuts or finishes.

   c Increased wear and tear on the tool itself, shortening its lifespan.

3. How to apply suitable lubricant after use and before storage?

   Answer: Applying suitable lubricant to hand and power tools after use and before storage is important for several reasons:

   a Prevention of Corrosion

   b Maintenance of Moving Parts

   c Ease of Use

   d Prevention of Seizing and Sticking

   e Protection of Rubber and Plastic Parts

   f Preservation of Tool Performance

   g Prevention of Contamination

4. How to check and calibrate measuring tools after use?
   Answer: Here are several reasons why it's important to perform these checks:
   - Accuracy Assurance
   - Compliance with Standards
   - Quality Control
   - Reliability and Consistency
   - Risk Mitigation
   - Preventive Maintenance
   - Traceability and Documentation
   - Optimized Performance:

5. How to inspect defective hand and power tools?

   Answer: Here's why it's important to inspect defective tools:
   - Safety Concerns
   - Compliance with Regulations
   - Prevention of Accidents and Injuries
   - Preservation of Equipment
   - Minimization of Downtime
   - Optimal Performance
   - Long-Term Cost Savings
   - Enhanced Reputation and Trust.

6. What is safe storage of tools

   Answer: Here are some key practices for safely storing tools:
   - Clean Tools before Storage
   - Proper Organization
   - Secure Storage
   - Protection from Element
   - Avoid Overcrowding
   - Proper Handling and Placement
   - Use Protective Cases or Covers
   - Labeling and Identification
   - Labeling and Identification

7. Short brief the 5S of Housekeeping.
   Answer: The 5S pillars, **Sort (Seiri), Set in Order (Seiton), Shine (Seiso), Standardize (Seiketsu), and Sustain (Shitsuke)**, provide a methodology for organizing, cleaning, developing, and sustaining a productive work environment.

   Sort (Seiri) – Items for keeps and items for wastebasket.

   Set in Order (Seiton) – Arranged in order for easy use.

   Shine (Seiso) – Cleaning the workplace.

   Standardize (Seiketsu) - Hogh standard of housekeeping.

   Sustain (Shitsuke) – Training and disciplining people to follow 5S.

Job Sheet 4.1: Remove Dust and Foreign Particles from Hand and Power Tools

Working procedure:

1. Read the Job Sheet and Specification Sheet.
2. Follow OSH
3. Wear PPE.
4. Clean all tools and place back into proper locations
5. Use rag to soak up oil and coolant
6. From top to bottom, use the hand broom to brush all large shavings off machine onto the floor
7. Sweep up shavings off of floor
8. Vacuum all remaining shavings (on and off machine)

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9. Scan 360 degrees around machine
10. Clean tools and equipment
11. Store all equipment safely.

Specification Sheet 4.1: Remove Dust and Foreign Particles from Hand and Power Tools

Name of Job: Remove dust or clean workshop as per specification

Conditions for the job: You must practice safe operation procedures at all times during the assessment. You will be required to demonstrate OSH competencies Remove dust or clean workshop as per specification

Diagram / Equipment:

Required Personal Protective Equipment (PPE): Pre/person

Sl.	Name of the PPE	Specification	Unit	Quantity	Remarks
1	Hand Gloves	Cotton	pair	01	
2	Breathing mask	N 95	Nos	01	
3	Ear plugs	As required	Nos	01	
4	Safety shoe	As required	pair	01	
5	Safety goggles	Stranded	Nos	01	
6	Apron	Stranded	Nos	01	

Required Tools and Equipment

Sl.	Name of tools and equipment	Specification	Unit	Quantity	Remarks
1	Adjustable wrench	150 mm	Pcs	01	
2	Emery Cloth	As per required	Nos	01	
3	Clean cloth	As per required	Set	01	
4	Broom	BD	Pcs	01	
5	Liquid Savlon	BD	liter	01	
6	Spanner Set	Chine	Nos	01	

Job Sheet 4.2: Apply Suitable Lubricant After Use and Before Storage

Working Procedure:

1. Ware PPE.
2. Read Job Sheet and Specification Sheet
3. Identify way oiling

Step 3

Step 4

4. Lubrication point of machine (such as: bed, spindle, tool post etc.)
5. Clean tools and equipment
6. Store all equipment safely.

Specification Sheet 4.2: Apply Suitable Lubricant After Use and Before Storage

Diagram / Equipment:

Required Personal Protective Equipment (PPE): Pre/person

Sl.	Name of the PPE	Specification	Unit	Quantity	Remarks
1	Hand Gloves	Cotton	pair	01	
2	Breathing mask	N 95	Nos	01	
3	Ear plugs	As required	Nos	01	
4	Safety shoe	As required	pair	01	
5	Safety goggles	Stranded	Nos	01	
6	Apron	Stranded	Nos	01	

Required Tools and Equipment

Sl.	Name of tools and equipment	Specification	Unit	Quantity	Remarks
1	Oil Can	Stranded	Nos	01	

Job Sheet 4.3: Check and Calibrate Measuring Tools After Use

Working Procedure:

1. Ware PPE.
2. Read job sheet and specification sheet
3. Clean the measuring tools after use.
4. Inspect the tool for any visible signs of wear, damage, or corrosion.
5. Ensure that any moving parts are operating smoothly without excessive play or stiffness.
6. Use the appropriate reference standards for the specific tool you are calibrating.
7. Take measurements using the tool and compare them to the reference standards.
8. Perform Measure standard gauge blocks.
9. Compare the tool's readings with the reference standard values to determine the deviation.
10. Adjust the tool to bring its readings within acceptable limits of accuracy.
11. Use adjustment screws or calibration nuts.
12. Measure again to ensure that the adjustments have corrected the deviation.
13. Put the oil parts of measuring tools.
14. Store the specific box of the measuring instrument.
15. Clean tools and equipment.
16. Store all equipment safely.

Specification Sheet 4.3: Check and Calibrate Measuring Tools After Use

Diagram / Equipment:

Required Personal Protective Equipment (PPE): Pre/person

Sl.	Name of the PPE	Specification	Unit	Quantity	Remarks
1	Hand Gloves	Cotton	pair	01	
2	Breathing mask	N 95	Nos	01	
3	Ear plugs	As required	Nos	01	
4	Safety shoe	As required	pair	01	
5	Safety goggles	Stranded	Nos	01	
6	Apron	Stranded	Nos	01	

Required Tools and Equipment

Sl.	Name of tools and equipment	Specification	Unit	Quantity	Remarks
1	Oil Can	Stranded	Nos	01	

Job Sheet 4.4: Inspect and Repair or Replace Defective Hand and Power Tools

Working Procedure:

1. Ware PPE.
2. Read Job Sheet and Specification Sheet.
3. Take tools and drill machine as per specification.
4. Removing working chuck to unscrew the chuck by hand; put a large Allen key or Hex key in the chuck and tighten the jaws on the Allen key


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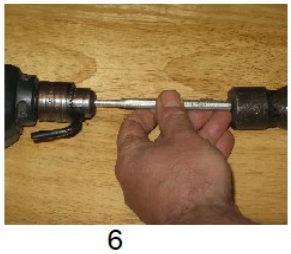
5. Place the key in the chuck, and turn the key counterclockwise as you tap on the ends of the jaws with a hammer
6. Remove the set screw turning it clockwise use by hammer and chuck key
7. The new chuck replaces on the spindle easily turning it clockwise and the setscrew goes in easily screwing it counterclockwise.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8. Removing a keyless chuck is the same as removing a keyed chuck. Open the jaws fully, with the drill pointed at you, unscrew the setscrew out clockwise, and unscrew the chuck off the spindle counterclockwise.


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9. Have a new chuck on drill machine then storing proper box.
10. Clean tools and equipment.
11. Store all equipment safely.

Specification Sheet 4.4: Inspect and Repair or Replace Defective Hand and Power Tools

Diagram / Design

Required Personal Protective Equipment (PPE): Pre/person

Sl.	Name of the PPE	Specification	Unit	Quantity	Remarks
1	Hand Gloves	Cotton	pair	01	
2	Safety shoe	As required	pair	01	
3	Safety goggles	Stranded	Nos	01	
4	Apron	Stranded	Nos	01	

Required Tools and Equipment

Sl.	Name of tools and equipment	Specification	Unit	Quantity	Remarks
1	Hammer	2 Ibs	Pcs	01	
2	Allan key	As per required	Pcs	01	
3	Screw Driver	As per required	Pcs	01	
4	Chuck key	As per required	Nos	01	

Job Sheet 4.5: Store and Secure Hand and Power Tools Following Workplace Requirements

Working Procedure:

1. Read Job Sheet and Specification Sheet.
2. Take tools and drill machine as per specification
3. Ware PPE.
4. Follow OSH
5. Select item of tools


Step 7

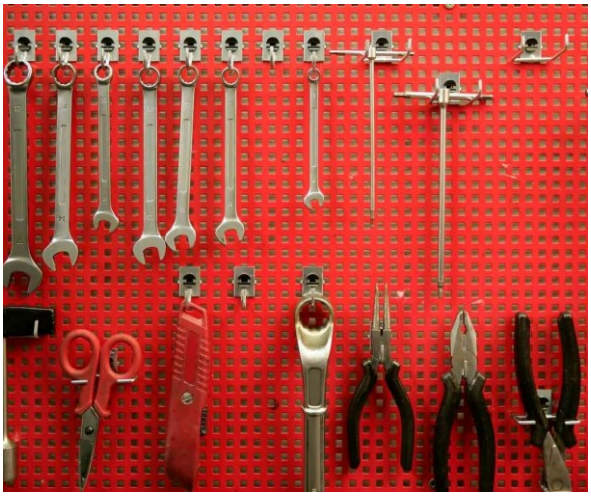
6. Select oil or lubricant
7. Store specific booth/place of tools
8. Clean tools and equipment

Specification Sheet 4.5: Store and Secure Hand and Power Tools Following Workplace Requirements

Name of Job: Store and secure hand and power tools following workplace requirements

Conditions for the job: You must practice safe operation procedures at all times during the assessment. You will be required to demonstrate OSH competencies Store and secure hand and power tools following workplace requirements

Diagram / Design



Required Personal Protective Equipment (PPE): Pre/person

Sl.	Name of the PPE	Specification	Unit	Quantity	Remarks
1	Hand Gloves	Cotton	pair	01	
2	Safety shoe	As required	pair	01	
3	Safety goggles	Stranded	Nos	01	
4	Apron	Stranded	Nos	01	

Review of Competency

Below is yourself assessment rating for module "**Using Hand Tools and Power Tools"**

Assessment of performance Criteria	Yes	No
1. Appropriate **hand tools** and **power tools** are identified	☐	☐
2. Application of hand and power tools is recognized	☐	☐
3. Usability of hand and power tools is checked and verified	☐	☐
4. Appropriate hand tools are selected	☐	☐
5. Safety precautions are ensured before using hand tools	☐	☐
6. Unsafe or faulty hand tools are identified and marked for repair	☐	☐
7. Measuring tools are checked and calibrated before use	☐	☐
8. Use hand tools properly and safely to perform a work activity	☐	☐
9. Appropriate power tools are selected	☐	☐
10. Safe work practice is observed and Personal Protective Equipment (PPE) is worn as perusing power tools	☐	☐
11. Power supply outlet and electrical cord are inspected and confirmed safe for use following established workplace safety requirements	☐	☐
12. Safety precautions are ensured before using power tools following the manufacturer's operating specifications	☐	☐
13. The proper sequence of operation is applied for using power tools	☐	☐
14. Unsafe or faulty power tools are identified and marked for repair	☐	☐
15. Operate power tools properly and safely to perform a work activity	☐	☐
16. Dust and foreign matter are removed from hand and power tools following workplace standards	☐	☐
17. Condition of hand and power tools is checked after use and reported	☐	☐
18. Appropriate lubricant is applied after use and before storage	☐	☐
19. Measuring tools are checked and calibrated after use	☐	☐
20. Defective hand and power tools are inspected and repaired or replaced	☐	☐
21. Hand and power tools are stored and secured following workplace requirements	☐	☐

I now feel ready to undertake my formal competency assessment.

Signed:

Date:

Development of CBLM

The Competency based Learning Material (CBLM) of '**Using Hand Tools and Power Tools' (Occupation: CNC Maching Centre Operation with CAD CAM, Level-4)** for National Skills Certificate is developed by NSDA with the assistance of SIMEC System Ltd., ECF Consultancy & SIMEC Institute of Technology JV (Joint Venture Firm) in the month of June, 2024 under the contract number of package SD-9B dated 15th January 2024.

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