TECHNICAL REPORT ON STUDENT INDUSTRIAL WORK EXPERIENCE SCHEMES (SIWES)

HELD AT

MECHANICAL ENGINEERING WORKSHOP MINI CAMPUS IOT ILORIN, KWARA STATE

PRESENTED BY:

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SUBMITTED TO: DEPARTMENT OF MECHANICAL ENGINEERING INSTITUTE OF TECHNOLOGY (IOT) KWARA STATE POLYTECHNIC, P.M.B 1375 ILORIN KWARA STATE

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF NATIONAL DIPLOMA (ND) IN MECHANICAL ENGINEERING DEPARTMENT KWARA STATE, POLYTECHNIC ILORIN, NIGERIA.05 AUGUST – 05 DECEMBER 2024

This is to certify that I AROKOOLA SAMUEL OLAMILEKAN with matriculation number ND/23/MEC/FT/0005 compiled this report based on my five months Student Industrial Work Experience Scheme at MEECHANICAL ENGINEERING WORKSHOP MINICAMPUS (IOT) from August, 2024 to December, 2024

Student's Name ……

Student's Signature …….

School based supervisor ……

Supervisor's Signature ……..

DEDICATION

To my Dearest Parents, with boundless gratitude and immeasurable love. thought the journey of my SIWES experience, your unwavering support has been my guiding light. Your encouragement, sacrifices, and ceaseless belief in my aspirations have been the driving force behind every stride I've taken

Your steadfast encouragement, imparted wisdom, and endless motivation have been instrumental in navigating the challenges and triumphs of this experience. Your unwavering faith in my abilities has fortified my determination to excel and to pursue excellence in every endeavor

I dedicate this SIWES report to you, my pillars of strength. Your tireless efforts in shaping me into the person I am today have been the cornerstone of my success. Your teachings and values have been my compass, guiding me through the maze of professional growth and personal development.

I am profoundly grateful for your unyielding love and support, which have paved the way for my accomplishments. Your belief in me has instilled the confidence to face challenges and chase dreams.

ACKNOWLEDGEMENT

This SIWES work has been a great journey for me and has helped me to understand an area of work that is vast and wonderful. It has been completed with months of hard work and dedication and would not have been possible if not for the blessing and guidance l have received from a number of people. For this I am particularly indebted to all staffs of Mechanical Engineering Department of Kwara Poly who had earlier thought me all the basics involved with automobile engineering.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 History and background of SIWES scheme

The Structured Industrial Work Experience (SIWES) is a Skill training program designed to expose and prepare student of Universities, Polytechnics, and Colleges of Technology. Colleges of Agriculture and College of Education for the Industrial Work experience they are likely to meet after graduation. The scheme also afford student the opportunity of familiarizing and exposing themselves to the needed experience in handling equipment and machinery that are usually not available in their institute. Before the establishment of the scheme, there was a growing concern among industrialist that graduated of tertiary institution lacked adequate practical background (studies) preparatory for employment in industries. Thus, the employer were of the opinion that the theoretical education going on in institutions of higher learning was not responsive to their needs. It is against this background that the rotation for initiating and designing the scheme by the Fund during its formative year- 1973/74 was introduced to acquaint student with the skill of handling employers' equipment and machinery. The ITF solely funded the scheme during its formative years. But as the financial involvement become unbearable to Fund, it withdrew from the Scheme in 1978. The Federal Government handed over the scheme in 1979 to both the National Universities Commission (NUC) and the National Board for Technical Education (NBTE). Later, the Federal Government in November 1984 reverted the management and implementation of the SIWESS programme to ITF and effectively taken over by industrial Training Fund in July 1985 with the funding being solely borne by the Federal Government.

SIWES is a tripartite programme involving the student, the Polytechnic and the industries (employer of labour). The programme is funded by the Federal Government of Nigeria and jointly coordinated by Industrial Training Fund (ITF) and National Board for Technical Education (NBTE).

1.2 Objectives of the Structured Industrial Work Experience (SIWES)

The Industrial Training Fund's policy Document No. 1 of 1973 which established SIWESS outlined the objectives of the scheme. The objectives are to:

a. Provides an avenue for students in institutions of higher learning to acquire industrial skil and experience during their course of study.

b. It exposes Students to work methods and techniques in handling equipment machinery that may not be available in their institutions.

c. It makes the transition from school to the world of work easier and enhance students' contact for later job placements and a chance to evaluate companies for which they might wish to work.

d. It provides students with the opportunities to apply their educational knowledge in real work and industrial situations, there by bridging the gap between theory and practice.

e. The programme teaches the students on how to interact effectively with other workers and supervisors under various conditions in the organization

1.3 Aim of the Structured Industrial Work Experience (SIWES)

The primary goal of Structured Industrial Work Experience (SIWES) is to bridge the gap between theoretical knowledge gained in classrooms and real-world application within professional settings. This program aims to provide hands-on experience, allowing participants to develop industry-specific skills, understand workplace dynamics, and establish connections with industry professionals. Ultimately, SIWES prepares individuals for their future careers by offering practical insights and a deeper understanding of the demands and practices within their chosen field.

CHAPTER TWO

2.0 HISTORICAL BACKGROUND OF THE ORGANIZATION ATTACHMENT

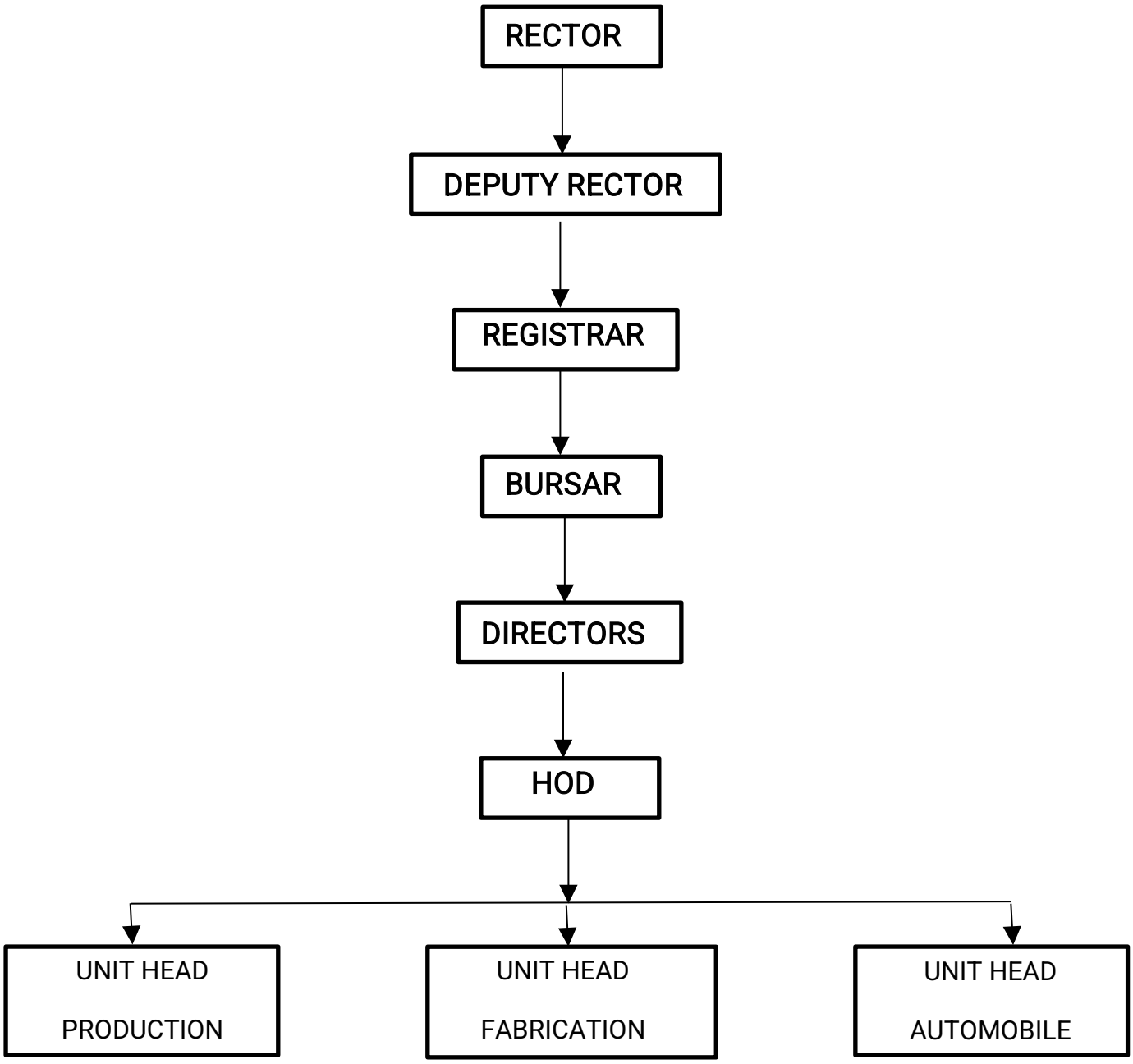
Kwara State Polytechnic commenced from the Government Technology Training School, which was upgraded to a College of Technology, this later metamorphosis into Kwara State Polytechnic through Edict, No J3 of 1987.

At present the polytechnic is made up of various institutes. The institution also engages in other activities which differs from its academics activities. Great breakthroughs in innovation have been recorded in its history. To mention a few, these includes:

The construction of tire pyrolysis plant

The production of a complete industrial plant for processing garri The construction of tricycle which intended to promote transport The construction of street light, charcoal stove, and inverters

2.1 ORGANIZATION CHART OF THE ORGANIZATION



2.2 MAJOR ACTIVITIES OF THE ORGANIZATION

The organization specializes basically on two sections which include:

- ❖ Production section
- ❖ Fabrication section

Production section:

They deal with manufacturing of various component parts of a

Particular system by the use of machine tools.

Fabrication section: They deal with the construction and designing of machines.

2.3 SECTIONS OF THE ORGANIZATION AND THEIR SPECIFIC FUNCTION Basically, the organization comprises two different sections which also contain several units. These sections include:

o Production section

o Fabrication section

o Automotive section

2.4 THE PRODUCTION SECTION

The Production Section is a department in which various parts and components majorly metals are being machined to obtain a required shape, dimensions and surface finish by the use of machine tools such as Lathe Machine, Milling Machine, Drilling Machine, and Shaping Machine

e.t.c

The machine tools in production sections can perform various types of machining operation, for examples:

The Lathe Machine: it operations include Turning, Threading, Parting-off, Knurling, Drilling, Facing, Boring etc

The Milling Machine can perform operations like gears, Keyways, Plain surfaces etc

The Drilling Machine: it performs several operations like Drilling, Boring, Counter Sinking, Counter Boring, Reaming etc

2.5 FABRICATION SECTION

This section deals with forming and joining of metals together by different methods such as welding grooving, casting. These various machines can be found in the fabrication section: Arc Welding Machine, Guillotine Machine, Bending Machine, Roller, Electrical Furnace, Drilling

Machine, Power Hacksaw e.t.c

2.6 ACTIVITIES CARRIED OUT IN THE AUTOMOTIVE WORKSHOP

There are various activities carried out in the automobile workshop due to time constrain we are able to go through few of them. They are General car cleaning and maintenance

- General car servicing

Changing of car brake pad

Changing of shock absorber

• changing of Air filter

General car cleaning and maintenance

Like all other machine, the car also need to be cleaned and maintained if not it will develop faults and cost us some money. Therefore I was taught how to clean the car both the interior and exterior and the car engine.

General car servicing

This has to do with changing of car oil and, checking of brake fluid, the spark plugs etc. The general car servicing has to be done at regular intervals weather at an interval of 3 to 4 months.

Changing of the car brake pad

Changing of the car brake pad also falls among the general servicing but it was also treated independently. I was also taught on how to know when the brake pads are due to change and also how to change them.

2.7 COMPONENT OF A CAR ENGINE AND THEIR FUNCTIONS.

1. Air filter
2. Spark plug
3. Fan

CHAPTER THREE

3.0 STUDENT SPECIFIC INVOLVEMENT AT VARIOUS SECTIONS I was involved in two sections namely: Production and Fabrication section

3.1 PRODUCTION SECTION

In this section we are able to know the art of machining by the use of machine tools to produce parts by metal removal through cutting.

BASIC PRODUCTION HAND TOOLS

The following are the most common hand tools in the production workshop

Hacksaw: The hacksaw consist of the frame, handle and the blade, it is used in cutting of metal plate, rod, pipes of small thickness.

Hammers: it is used in striking and driving in materials such as nail into a particular work piece

Tin snips: tin snips are use for cutting tin sheet metals.

Hand files: files are use for reducing and smoothing metal surfaces.

Pliers: are use for griping, cutting small flat or round materials

Screw driver: is used in driving out screws from a particular surface

Vervato

Benvdio

3.2 MACHINE TOOLS

Are power driven apparatus (or tools) designed to perform certain metal removing operations and produce a desired form on the surface being machined. Machine tools are used for must possess like: precision, speed that enhance mass production, versatility and simplicity. mass produce, accurate and uniform parts. There are some

basic requirements a machine tool Examples of machine tools include: Lathe Machine, Drilling Machine, Milling Machine, Shaping Machine, Grinding Machine e.t.c

3.3 LATHE MACHINE

The lathe machine is known as the father of all machine tools due to it versatility i.c ability to perform different operations, operations like: Turning, Threading, Parting-off, Knurling, Drilling, Facing etc.

A LATHE MACHINE

The machine comprise of three major parts which include: The Headstock, Saddle and the Tail stock.

The Headstock: it a compartment made of cast iron which is in the left side of the bed it comprises the speed control level, gears, spindle, electric motor, switch and thread chart

The Saddle: The saddle comprises the carriage wheel, cross slide, compound slide, tool post, intermediate switch, automatic feeds (for both carriage wheel and cross slide).

The Tail stock: The tail stock is use to support long work piece, it is also use in performing long taper turning. The tailstock comprises the calibrated spindle, locks and the wheel.

TYPES OF LATHE MACHINES

Centre lathe machine

Turret lathe machine

Heavy duty lathe machine

Computer numerical control fame machine(CNC)

- Bench lathe machine

LATHE OPERATIONS

Drilling: is the process of originating hole in a work piece by mounting the work piece on

the rotating chuck, and mounting the drill chuck on the tailstock spindle.

Boring: is the process of enlarging an already drilled hole by the use of boring tool

➤ Parallel turning: is the process of reducing the external diameter of a work piece to

produce a cylindrical shape

➤ Facing: is the process of reducing the length of a work piece

LATHE ACCESSORIES

● Lathe centres (live and dead): It is fitted into the tailstock (dead centre) and the spindle

(live centre) in other to support a long work piece firmly from vibrating.

• Chucks: It is located on the spindle, it is used to hold the work piece that is been

machined on the lathe.

• Face plate: It is used in holding work piece that cannot be held on the chuck.

• Tool post: It function is to support the cutting tool in a rigid manner.

• Catch plates and carriers: They are use in holding a work piece that is turned between

centres.

• Steadies (fixed and moving): they are use in supporting a long work piece that cannot be supported on the tailstock.

SAFETY PRECAUTION TO BE OBSERVED WHEN OPERATING A LATHE MACHINE

Always wear an apron, roll up your sleeves, and do not put on a tie -- if you must, tuck it carefully inside the overall

Always stop the machine before making adjustment of any kind Never attempt to take any reading while the machine is turning Grind your cutting tool to the correct shape and angle

Avoid touching any movable part of the machine while turning

DRILLING MACHINE

Drilling is the process of creating hole on a component. Drilling machine is the machine tool used in accomplishing the task of originating hole, reaming, boring, counter boring and other

drilling operations.

TYPES OF DRILLING MACHINE

➤ Pillar drilling machine

Radial arm drilling machine

➤ Sensitive drilling machine

DRILLING MACHINES

TYPES OF DRILLS

Drills are multi point cutting tools used in performing drilling operation. The common

types are:

The Twist Drills (both parallel and taper shank) and

The Centre Drills

DRILLING OPERATIONS

Drilling operations includes:

Boring ⁘

Reaming ⁘

Counter sinking

Counter boring

FABRICATION SECTION

This section deals with joining of metals together by different method such as welding grooving and forging. There are various machines in the fabrication section this include: Arc Welding Machine, Guillotine Machine, Bench Shear, Bending Machine, Electrical Furnace, Drilling Machine, Punching Machine, Power Hacksaw etc.

CUTTING OF METAL

Cutting involves removing a layer of metal from a work piece to obtain a part of the required shape. Cutting is done by the use of various hand tools and machines, this include: Hacksaw: The hacksaw consist of the frame, handle and the blade, it is used in cutting of metal plate, rod, pipes of small thickness.

HACKSAWS

Precautions to Be Taken When Using Hacksaw

➤ Place the work low in the vice and parallel with the vice top.

➤ Take a comfortable position, not too close to the work nor too far from it, and wit weight of the body balanced evenly on both feet.

➤ Apply pressure on the forward stroke, easing the pressure and lifting very slightly c back stroke.

➤ Less pressure should be applied when cutting to prevent the teeth from breaking becau is very brittle.

GUILLOTINE MACHINE: is a manual or electrical machine which is use to cut up to 2mm and above thickness of a metal.

Precautions to be Taken While Using Guillotine machine

One must carefully set the marked plate to it cutting mouth.

One must avoid playing with the machine especially the cutting mouth with unnecessary

materials e.g. wood.

One must not contemplating of using the machine if he has less experienced of operating it Bench shear: is a table mounted device used for cutting or shearing metal plate or rod. The cropping blade of bench shear can cut up to 2mm and below the thickness of metal. It capacity and efficacy of cutting is less than that if guillotine.

BENCH SHEAR

Precautions to Be Taken While Using Bench shears

➤ One must not place his/her hand near the cutting tool.

➤ Adequate pressure must be applied to it handle for easy cutting.

> Using the machine to cut above it normal metal cutting thickness (2mm) may damage the

machine cutting mouth.

METAL JOINING

Metal can be joined using various methods like: Reverting, Soldering, Grooving, and Welding. The most common type is that of welding metal joining process.

WELDING

Welding is a metallurgical bound accomplished by the attracting force between atoms,

under the effect of heat and pressure.

ELECTRIC ARC WELDING

Arc welding is a process in which fusion is obtained by heat produced from electric arc between the work piece and the electrode.

Arc Welder

TONG

ELECTRIC ARC WELDING MACHINE

The arc is produce between the electrode tip and the parent metal. The temperature of arc produced from the arc welding exceeds 3000°C and this causes the metal to melt instantly and form a liquid pool. The movement of the electrode along the line to be joined result in the deposition if the metal liquid along the line to be joined and thus, fusion welding is produce in the

line to be joined.

WELDING ACCESSORIES AND EQUIPMENT

The following are welding accessories and equipment

❖ Electrode: it consists of a metal wire surrounded by thick coated flux.

❖ Electrode Holder: is use in holding the electrode and as an insulator for safe handling.

❖ Face Shield and Helmet: use in protecting the eyes and face from the effect of arc ray.

❖ Chipping Hammer: use in removing slag's and spatters.

❖ Wire Brush: use to remove small particles of slag remaining after chipping.

☆ Apron: it a protective cloth used to prevent burning and other injuries that may result from the heat produce from the ray.

SAFETY PRECAUTION DURING WELDING OPERATION

☆ Adequate protective cloth and gloves must be worn during welding operation to prevent burns and other form of injuries that may result.

❖ Recommended face shield and helmet must be worn to protect the eye from sparks and

brightness of the arc ray which can damage the eye

Handling equipment like pliers must be used to pick hot metal that is been weld

The working environment must be safe, properly arrange, any naked wire should be insulated by tape to prevent electric shock.

Any inflammable substance should be out of reach in the welding area to prevent Explosion

CONSTRUCTION AND DESIGN OF PROJECTS

It an opportunity for me doing my SIWES program in precision component nig ltd It gives me the privilege of having general understanding in constructing and designing of some projects

I participated in the construction of the following projects:

1. Fabrication of Coal Pots: I assisted in metal cutting, rolling and welding.

2. Production of cone: I assisted in production of the cone using the lathe machine and drilling machine respectively.

CHAPTER FOUR

EXPERIENCE GAINED

During the twelve weeks (3 months) program, I gained a lot especially in the Fabrication section whereby we fabricated various machines like animal feed greater, cassava grinding machine, communal waste bin, pepper grinding machine, charcoal pots and garri fryer. All this gives me the clue and knowledge of constructing and designing a project.

Also in production section, I learnt how to operate various types of machine like the Lathe, Shaping, Grinding and Drilling and their various operations.

4.1 INTERPERSONAL RELATIONSHIP WITHIN THE ORGANIZATION

My four months SIWES program has equipped me the knowledge of mechanical engineering design in terms of fabrication and production of a particular project

During the course of staying with the coordinators in the various sections has turn a new moment in my course of study, like the production section in person of Engr. Adeshina Dayo, ,in fabrication.

4.2 SUGGESTION FOR IMPROVEMENT OF THE PROGRAMME

These are my few suggestions for the improvement of the program

• The federal government in collaboration with the industrial training fund (ITF) to increase the student allowance for the program as this will encourage them in active participation

The industrial training fund should have up and hold committee on inspecting the student in their various organizations that they are attached to as this will improve the level of seriousness of the student to the program

CHAPTER FIVE

5.0 PROBLEMS ENCOUNTERED DURING SIWES PROGRAMME.

If I say that I encountered no problem during the training program that means the SIWES program was 100% which is a lie. But the problem I encountered were just minor problem usually encountered by first timers in the workshop.

5.1 RECOMMENDATION

The experience I gained during my SIWES program cannot be over emphasized. I was practically oriented, I humbly recommend that the SIWES program should be made compulsory for students of engineering fields in order to gain more experience in their course of study.

5.1 CONCLUSION

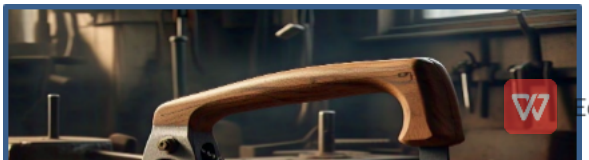
This SIWES program has turn out to be more interesting, educative due to the nature of the program itself. I found it interesting and I fully participated in it which in turn yields a

Successful result, indeed it prepares me for future challenge in my chosen field.

APPENDIX

LATHE MACHINE

Welding MACHINE

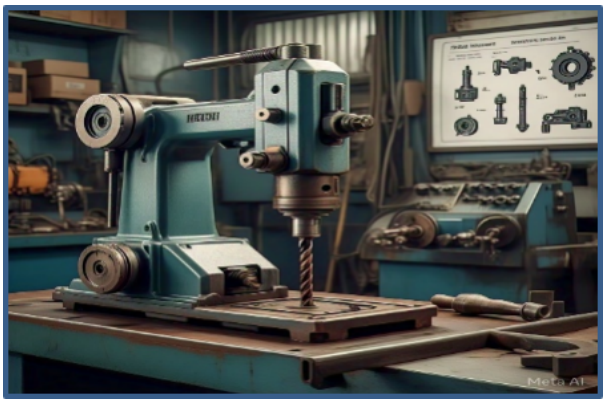


HACK SAW

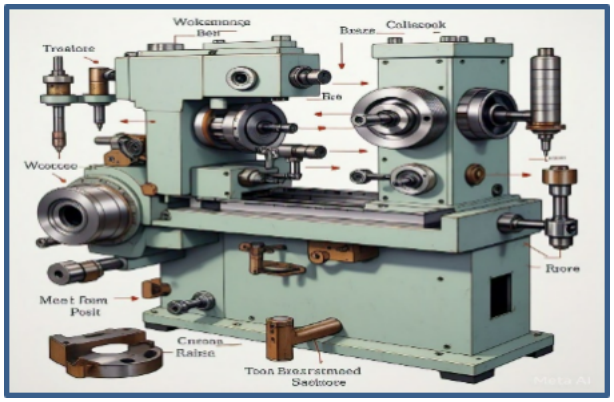
Bench Sharing Machine

TONGS

Guillotine Machine



Drilling Machine



Machine Tool