

DESIGN AND FABRICATION OF PORTABLE AUTOMATIC STAMPING MACHINE

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering degree in Mechatronics Engineering
by

Sivasurya P (Reg. No. 38090019)

Sriram S (Reg. No. 38090013)



**DEPARTMENT OF MECHATRONICS ENGINEERING
SCHOOL OF MECHANICAL ENGINEERING**

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A" by NAAC

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119

MAY - 2022



SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

**Accredited "A" Grade by NAAC | 12B Status by UGC | Approved by AICTE
www.sathyabama.ac.in**

DEPARTMENT OF MECHATRONICS ENGINEERING

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of Sivasurya S (38090019), Sriram S (38090020) who carried out the project entitled "Design and fabrication of portable automatic stamping machine" under my supervision from 01.11.2021 to 10.05.2022.

Internal Guide

Dr. B. KANIMOZHI, M.E., Ph.D.,

Head of the Department

Dr. S. PRAKASH, M.E., Ph.D.,

Submitted for Viva voce Examination held on 10.05.2022

Internal Examiner

External Examiner

DECLARATION

I SIVASURYA.P (Reg.No.38090019), SRIRAM.S (Reg. No. 38090020) hereby declare that the Project Report entitled "Design and fabrication of portable automatic stamping machine"" done by me under the guidance of Dr. B.KANIMOZHI, M.E., Ph.D., is submitted in partial fulfilment of the requirements for the award of Bachelor of Engineering degree in Mechatronics.



SIGNATURE OF THE CANDIDATE

(SIVASURYA.P, Reg. No. 38090019)



SIGNATURE OF THE CANDIDATE

(SRIRAM.S, Reg. No. 38090020)

DATE: 10.05.2022
PLACE: CHENNAI

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. S. Prakash, M.E., Ph.D.**, Dean, School of Mechatronics Engineering for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide **Dr. B.KANIMOZHI, M.E., Ph.D.**, for her valuable guidance, suggestions and constant encouragement passed way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the Department of Mechatronics Engineering who were helpful in many ways for the completion of the project.

ABSTRACT

An Automated Stamping Machine was designed, fabricated, tested, and operated using pneumatic systems that included an air compressor, directional control valves, and an air service unit. The pneumatic circuit was designed and simulated using Festodidactic's FluidSim software and the cascade method. During the fabrication process, materials and methods were chosen based on engineering properties and design parameters such as safety factor, force of rotation, stress analysis, bending moments, and speed of travel.

Before beginning the stamping operation, the prepacked product is placed at the start of the belt travel, and the belt guide prevents the packed job from moving out of its travel due to any external constraints. The imprinted job was loaded into the stock hold plate on cylinder A. The compressor and the electric motor's start button were both turned on. The motor drives the roller, which in turn drives the conveyor belt. A compressor delivers compressed air to the system. The compressed air enters the system and is processed by the Filter-Regulator-Lubricator unit.

The FRL unit prepares compressed air for use by pneumatic components. When the FRL unit is started, the compressed air is led into the manifold or the air distributor. The compressed air is immediately taken in by the manifold and split into the required number depending on the number of components used, and the compressed air is sent to the components from the manifold. The compressed air is routed to the direction control valve, which regulates the cylinders. To stamp and eject the prepackaged items, the stamping machine employs two pneumatic cylinders. In order to execute the required operations, the two cylinders are configured to operate in a controlled sequential manner.

TABLE OF CONTENTS

Chapter	TITLE	Page. No
	ABSTRACT	V
	LIST OF FIGURES	IX
1	INTRODUCTION	1
	1.1 OVERVIEW OF PROJECT	1
	1.2 THE MAIN OBJECTIVES OF THE PROJECT	2
2	LITERATURE SURVEY	3
3	AIM AND SCOPE OF THE PROJECT	7
	3.1 AIM	7
4	MATERIALS AND METHODS	8
	4.1 COMPONENT DESCRIPTION	8
	4.1.1 DC motor - 12V	8
	4.1.2 Reversing the direction of DC motor	9
	4.1.3 Pulse width speed control	10
	4.1.4 12V Wiper motor	11
	4.1.5 12V Adaptor	13
	4.1.6 Switch mode power supply (SMPS)	16
	4.1.6.1 Parts at SMPS	17
	4.1.6.2 SMPS works	17
	4.1.6.3 Types of SMPS	17
	4.1.6.4 Merits of SMPS	17
	4.1.6.5 Demerits of SMPS	18

4.2	MACHINES USED	18
4.2.1	Portable metal cutter	18
4.2.2	Angle cutter	20
4.2.3	Drilling machine	22
4.2.4	Radial drilling machine	23
4.2.5	Arc welding	25
4.2.6	Gas welding	27
4.3	METHODOLOGY	28
4.3.1	Scotch yoke mechanism	28
4.3.1.1	<i>Advantages of Scotch yoke mechanism</i>	28
4.3.1.1	<i>Disadvantages of Scotch yoke mechanism</i>	28
5	SIMULATION AND ANALYSIS	29
5.1	CONSTRUCTION	29
5.1.1	Working	30
5.2	CALCULATION	30
6	RESULT AND DISCUSSIONS	31
6.1	RESULT OF PORTABLE AUTOMATIC STAMPING MACHINE	31
6.2	RESULT OF SCOTCH YOKE MECHANISM	32
7	SUMMARY AND CONCLUSION	33
7.1	SUMMARY	33
7.2	CONCLUSION	33
7.3	FUTURE ENHANCEMENT	33
	REFERENCES	34

LIST OF FIGURES

FIGURE NO:	FIGURE NAME	PAGE NO
4.1.1	DC MOTOR - 12V	8
4.1.2	DC MOTOR DIRECTIONAL CONTROL	10
4.1.3	PULSE WIDTH SPEED CONTROL	11
4.1.4	12V WIPER MOTOR	13
4.1.5	12V ADAPTOR	15
4.1.6	SWITCH-MODE POWER SUPPLY (SMPS)	16
4. 2.1	PORTABLE METAL CUTTER	20
4.2.2	ANGE CUTTER	21
4. 2.3	DRILLING MACHINE	23
4. 2.4	RADIAL DRILLING MACHINE	24
4.2.5	ARC WELDING	26
4.2.6	GAS WELDING	27
5.1.1	CONSTRUCTION OF SCOTCH YOKE MECHANISM	30
6.1	RESULT OF PORTABLE AUTOMATIC STAMPING MACHINE	31
6.2	RESULT OF SCOTCH YOKE MECHANISM	32

CHAPTER 1

INTRODUCTION

1.1 OVERVIEW OF PROJECT

One of the most important manufacturing processes is packaging. It is a value-added activity that the manufacturer frequently employs to effectively project its brands. The stamping process is used in the packaging operation to identify and confirm important data such as the product registration number, manufacturing date, and expiration date, which meets the legal and statutory requirements of the food industry. As a result, the significance of packaging cannot be overstated.

[1] In today's fast-paced world of new and cutting-edge technologies, everyone strives for perfection and speed. Stamping is currently done manually by operatives in the food packaging industry, and may require up to seven operatives per line if a higher output is required. This single action takes time, increases expenditure, and results in poor finishing by operatives during the manual stamping process to meet production targets. Automatic stamping is required for small scale industries to remain competitive while maximising profit in order to achieve higher productivity and save tremendous costs. Automation is defined as "the application of control systems such as pneumatics, hydraulics, electrical, electronics, and computers to control industrial machinery and processes." lowering the need for human intervention Small and medium-sized food packaging industries frequently require stamping machines to imprint images or data on their cartons after packaging.

[2] By automating the machine, it is possible to achieve a fully automated state in which there is no worker interface until the machine's inventory is depleted, at which point a worker is removed from the machine cell and employed in a cell where a worker is required. The manual system would have been replaced by a pneumatic system because it is less expensive, lowering the overall cost of the automated machine and making it more accessible to small-scale industries. The growing use of cartons for product identification in the food packaging industry cannot be overstated.

Small-scale businesses cannot afford to purchase and maintain imported automated stamping machines. At the same time, they cannot rely on the few industries that have stamping machines to meet their production targets due to high transportation costs, automation costs, labour costs, and so on. Furthermore, stamping machines in industries are running at low capacity due to frequent breakdowns caused by a lack of spare parts for worn-out parts that are imported.

These issues necessitated the need for this work, which aimed to design and build a low-cost automated stamping machine. It is expected that the automated stamping machine will give the successive action to quickly imprint images on material with ease, less bottleneck, and human error by the application of pneumatics, the pneumatics cylinder with piston, which is operated by an air compressor.

1.2 THE PRIMARY GOALS OF THIS PROJECT

(a) to design and manufacture a low-cost automated stamping machine as an improvement over the existing coding machine and injet printers used in large-scale food packaging industries, which are controlled by Programmable Logic Control and are quite expensive.

(b) to design and fabricate a machine with improved technical efficiency and technology simplicity than existing stamping machines by incorporating belt and rollers to increase machine speed and also the incorporation of a pneumatics control systems to perform automatic stamping through an inserted rubber ink and to build/manufacture a product that complies with Nigeria's food regulatory body.

CHAPTER 2

LITERATURE SURVEY

T Sheela, S.Shivraman, and colleagues proposed a system that uses Raspberry Pi 3 in their paper titled "Low Cost Automation for Sorting of Objects on Conveyor Belt." Making the model generally sense the colour of the object is a significant challenge due to the possibility of high uncertainty due to external lighting conditions and each nose. Similarly, when a linear actuator collects objects from a conveyor belt, the weight and size of the objects vary. Further improvements to this system can be made to improve its ability to segregate and sort large and heavy objects. Once the objects are on the conveyor belt, the subsequent assembly makes sorting the objects very efficient. According to the paper, The author has revealed that they have proposed a system that sorts objects based on their colour, which can be enhanced in the future to sort them based on their size and shape with the help of an infrared sensor for near-infrared communication requirements.

Amruta Pandit, Jyoti Rangole, and colleagues describe Image Processing techniques that are useful for object counting and effectively reduce counting time in their paper titled "Object Counting using Image Processing Techniques." Object counting requires accurate recognition of the object. The algorithm's accuracy is determined by the camera used, the size of the object, whether or not the objects are touching, and the lighting conditions. Object counting using an image processing system has numerous applications where automation is to be introduced and counting time is to be reduced linearly, reducing the amount of manpower required behind the counting, sorting, and identification mechanisms. These authors have used the most efficient and effective technique to provide the aforementioned platform in order to complete the tasks effectively.

Avadhoot R. Telepatil, Prashant M. Jadhav, and colleagues proposed in their paper "Colour Object Counting and Sorting Mechanism Using Image Processing Approach" that colour object counting and sorting is the most important task that must be completed at the final dispatch section. Manual sorting is the traditional method that industries prefer. Visual inspection is performed by human operators in this approach. This traditional method is inefficient and inconsistent. As a result, efforts are made to design and implement an automatic technique for determining the colour of an object, color-based object counting using

image processing. In implemented system, image of a coloured object which is rolling over a conveyer belt has been captured using suitable image acquisition device.

Stamping is a method of reproducing text and images by using templates. Cylinder seals and objects such as Cyrus Cylinder are examples. Printing includes movable type. Bi Sheng was the first to develop it in China. In the 15th century, mechanical movable type printing was introduced to Europe, and the printing press played an important role in the development of the Renaissance, reformation, scientific resolution, and material basis for the modern knowledge-based economy. The most common material is paper, but it can also be done on metals, plastics, cloth, and composite materials. The printing press quickly spread throughout Europe, leading up to the Renaissance, and later all over the world. The invention of movable type printing has been dubbed the most significant of the second millennium. This is cost effective, requires little maintenance, and produces a significant amount of output We have added three modes of operation to this machine: manual mode, signal auto, and continuous auto.

Mr. Ravipothina, B. Raju, and colleagues published "Automatic Pneumatic Stamping Machine" in this paper. Because of its precision and low cost, pneumatic systems have become increasingly important in industries in recent years. There is generally no need for skilled operators. The main benefit of this machine is that it can operate at low pressure (upto 6 bar). The stamping machine employs a quick retrieval mechanism powered by pressurised air. For operation, solenoid valves are used as direction control valves. We can also elaborate other applications by replacing some attachments. The system's secondary goal is to be capable of low manufacturing costs in terms of both cost and labour, and As a result, such automatic stamping machines can be sold at low prices to the general public, making them very affordable to the general public.

" A Gundawar, Y Shahane”; In this paper titled "Pneumatic Stamping Machine, and others The goal of the project is to build a low-cost pneumatic stamping machine. Pneumatic control systems are widely used in our society, particularly in the industrial sectors for automatic machine driving. The general goal of the present invention, which will be described in greater detail later, is to provide a portable automatic pneumatic stamping machine with many advantages such as low power consumption and high efficiency.

performance and many specified system features, which were not anticipated. Another goal of the system is that it is susceptible to low manufacturing costs in terms of both cost and labour, and that it is thus susceptible. Because of the low prices of sale to the public, such automatic stamping machines are very economically available to the public.

Mr.Arun S, Sree Rajendra, and Vijayavithal Bongale are all members of the team. The proposed work describes the design and fabrication of a prototype of an automatic punching machine controlled by a PLC, as well as the system's working principle and hardware structure. One of the most important and necessary processing steps in the sheet metal industry is punching or pressing. By automating this process, one gains greater control over the process. For system control, Programmable Logic Controllers are used. This system can be used to replace existing punching and pressing machines that are manually fed and operated. By integrating PLC controls with traditional machines, good results can be obtained in the form of shorter manufacturing lead times, lower costs, and increased worker safety.

Vijay Pratap, Mr.Raj Kumar Sharma, Rakesh Patwal, Rakesh Kumar Yadav This project is essentially a control system based on automation. The project is completed by combining a cam and follower driven stamping machine. This machine will perform several processes, including paper feeding and stamping. The goal of this project is to generate the correct sequence of events for a stamping machine by designing the cam and follower and controlling the motions of the cam, conveyor, and printer that is used for paper feeding using circuit mechanisms such as relays, electronic timers, and so on. When compared to a human, the cost of stamping paper by machine is very low. The machine takes longer to stamp than the human to mankind. Our machine can only stamp A4 sheets (depending on the printer), but a human can stamp any size of paper. Machines can work for long periods of time without rest, but humans require breaks. The speed of the machine to stamp is constant, but the speed of man slows over time. Our machine required electricity to function, whereas man does not. Our machine can only stamp in a specific position, but man is adaptable, so he can stamp in any position.

Stamping is a craft in which dye or pigment ink is applied to an image or pattern carved, moulded, laser engraved, or vulcanised onto a sheet of rubber. Rubber is frequently mounted on a more stable object, such as wood, brick, or acrylic block. The vulcanised rubber image with an adhesive foam backing is increasingly being attached to a cling vinyl sheet, allowing it to be used with an acrylic handle for support. These cling rubber stamps take up less space

and are typically less expensive than wood mounted versions. The ink-coated rubber stamp is pressed onto any type of medium, transferring the coloured image to it the intermediary In most cases, the medium is fabric or paper. Wood, metal, glass, plastic, and rock are among the other materials used. In high-volume batik, liquid wax is used instead of ink on a metal stamp.

CHAPTER 3

AIM AND SCOPE OF THE PROJECT

3.1 AIM

The project's goal is to fabricate portable automated stamping machines. Packaging is one of the end processes of every manufacturing industry because outputs must be stored, protected, and shipped according to customer specifications. Due to the high cost of using automated means of stamping cartons, papers, and nylons, most small scale industries have outsourced the end process of manufacturing. In order to meet the needs of their customers, small-scale industries have relied on manual stamping methods with low machine efficiency, longer delivery times, and high labour costs. Because of the current trend of stamping problems, small scale enterprises have lost a significant amount of market share to large scale manufacturing outfits. The requirement to make the stamping process affordable and simple. The need for this work was necessitated by the need to maintain machines as well as comply with rood regulatory bodies.

CHAPTER 4

MATERIALS AND METHODS

4.1 COMPONENT DESCRIPTION

4.1.1 DC motor 12V

DC motors are electromechanical devices that convert electrical energy into rotary mechanical energy through the interaction of magnetic fields and conductors. Continuous actuators that convert electrical energy into mechanical energy are known as direct current motors. The DC motor accomplishes this by generating a continuous angular rotation that can be used to rotate motors, fans, compressors, wheels, and other similar devices.

In addition to conventional rotary DC motors, linear motors capable of producing continuous linear movement are available. Conventional electrical motors are classified into three types: AC type motors, DC type motors, and stepper motors.

A Common Small DC Motor AC Motors are commonly used in high power single or multi-phase industrial applications that require a constant rotational torque and speed to control large loads such as fans or motors.

In this electrical motor tutorial, we will only look at simple light duty DC motors and stepper motors, which are used in a variety of electronic, positional control, microprocessor, PIC, and robotic type circuits.

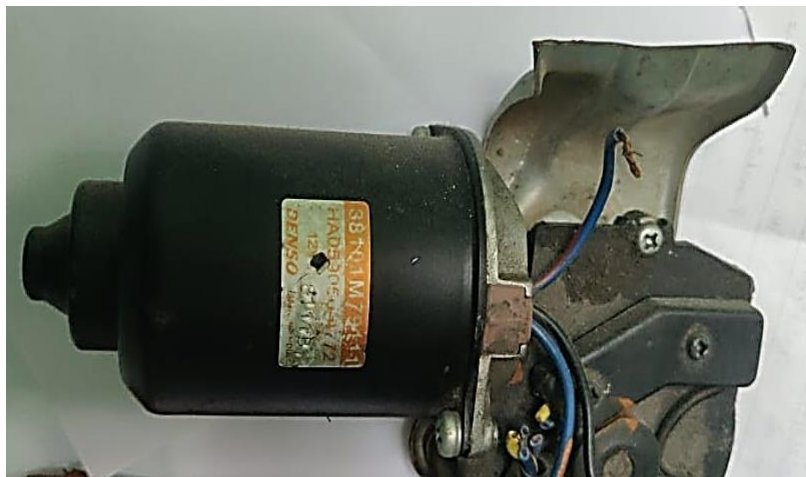


Fig 4.1.1: DC MOTOR - 12V

4.1.2 Reversing the direction of DC motor

While controlling the speed of a DC motor with a single transistor has many advantages, it also has one major disadvantage: the rotational direction is always the same, resulting in a "Uni-directional" circuit. In many applications, the motor must be operated in both forward and reverse directions.

To control the direction of a direct current motor, reverse the polarity of the direct current power applied to the motor's connections, allowing the shaft to rotate in the opposite direction.

The first circuit controls the polarity of the motor connections with a single double-pole, double-throw (DPDT) switch. The supply to the motor terminals is reversed and the motor reverses direction by switching the contacts. The second circuit is slightly more complex, utilising four single-pole, single-throw (SPST) switches arranged in a "H" configuration.

One very simple and inexpensive method of controlling the rotational direction of a DC motor is to use the following switches in the following order:

The first circuit controls the polarity of the motor connections with a single double-pole, double-throw (DPDT) switch. The supply to the motor terminals is reversed and the motor reverses direction by switching the contacts. The second circuit is slightly more complex, utilising four single-pole, single-throw (SPST) switches arranged in a "H" configuration.

The mechanical switches are arranged in pairs and must be operated in a specific order to operate or stop the DC motor. As shown, switch combinations A + D control forward rotation while switches B + C control reverse rotation. Shorting out the motor terminals with switch combinations A + B or C + D causes it to brake quickly. However, using switches in this manner has risks, as operating switches A + C or B + D simultaneously would short out the power supply.

While the two circuits above would be adequate for most small DC motor applications, do we really want to operate various combinations of mechanical switches just to reverse the direction of the motor? We could replace the manual switches with a set of electromechanical relays, or we could use a solid state CMOS 4066B quad bilateral switch.

However, connecting a motor into a Transistor H-bridge type circuit arrangement, as shown below, is another excellent way of achieving bi-directional control of a motor (as well as its speed).

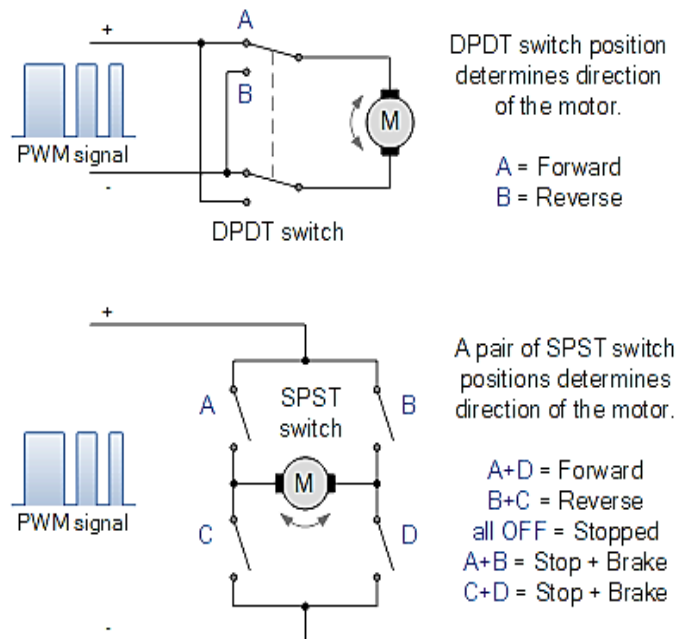


Fig: 4.1.2 : DC Motor Directional Control

4.1.Pulse width speed control

The rotational speed of a DC motor is directly proportional to the mean (average) voltage value on its terminals, and the higher this value, up to the maximum allowed motor volts, the faster the motor will rotate. In other words, higher the voltage, the higher the speed. The average value of the motor voltage and thus its rotational speed can be varied by varying the ratio between the "ON" (t_{ON}) and "OFF" (t_{OFF}) time durations, known as the "Duty Ratio", "Mark/Space Ratio" or "Duty Cycle".

The duty ratio for simple unipolar drives is given as: and the mean DC output voltage fed to the motor is given as: $V_{mean} = x V_{supply}$. The motor voltage and thus the power applied to the motor can then be controlled by varying the width of pulse a , and this type of control is known as Pulse Width Modulation (PWM).

Another method for controlling the rotational speed of the motor is to vary the frequency (and thus the time period of the controlling voltage) while the "ON" and "OFF" duty ratio remain constant. times are kept constant. This type of control is called **Pulse Frequency Modulation** or PFM.

The motor voltage is controlled by pulses of variable frequency, for example, at a low frequency or with very few pulses, the average voltage applied to the motor is low, and thus the motor speed is slow.

The average motor terminal voltage increases as the frequency or number of pulses increases, as does the motor speed.

Then, transistors can be used to control the amount of power applied to a DC motor, with the mode of operation being "Linear" (variation of motor voltage), "Pulse Width Modulation" (variation of pulse width), or "Pulse Frequency Modulation" (varying the frequency of the pulse).

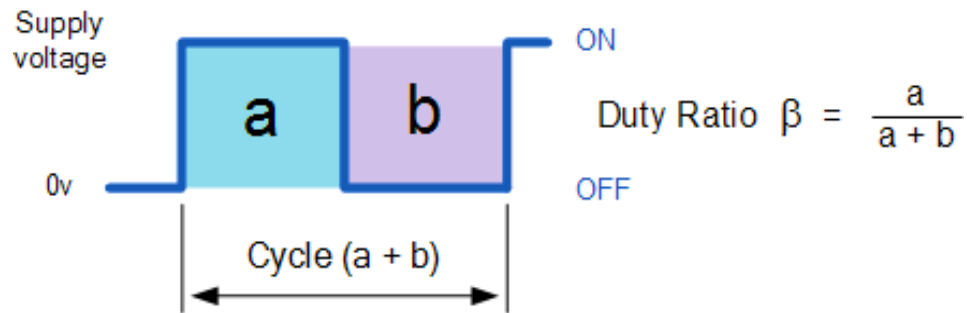


Fig 4.1.3 Pulse Width Speed Control

4.1.4 12V wiper motor

The windshield wiper motor, which provides power to the wipers, is the mechanism behind wipers. The rotational output of the windshield wiper motor is converted into the back-and-forth motion of the wipers by a linkage.

The force can be controlled by the worm gear by slowing down the speed of the electric motor, which delivers to the drive arm. The wipers are held in place by pivots mounted on brackets at both ends of a connecting link.

The pressure exerted by the motor on the driver's side of the connecting link causes the other windshield wiper to move. Near the windshield wiper motor, the connecting link is connected to the drive link. An electronic control circuit settles the wiper if it is set to intermittent and also provides consistent power to the wiper; a spring linkage connects the pivot to the drive link to return the wiper to its original position and keep the wipers close to the windshield.

The electronic circuit inside the windshield motor maintains power until the windshield wiper is in the down position and then cuts power to the wiper motor.

Wipers have small arms that distribute wiper pressure along the rubber blade. These pressure points hold the rubber blade against the windshield glass, allowing it to clean it properly.

An electromagnetic field aligned with the centre of a wire coil generated by a current flowing through it. The direction and magnitude of the magnetic field produced by the coil can be altered by varying the current flowing through it.

A simple direct current motor consists of a stator with a stationary set of magnets and an armature with one or more windings of insulated wire wrapped around a soft iron core that concentrates the magnetic field.

The windings typically have multiple turns around the core, and in large motors, several parallel current paths can exist.

The wire winding's ends are connected to a commutator. The commutator energises each armature coil in turn and connects the rotating coils to the external power supply via brushes. (Brushless DC motors lack brushes and use electronics to switch the DC current to each coil on and off.) The strength of the electromagnetic field created is determined by the total amount of current sent to the coil, the size of the coil, and what it is wrapped around.

The sequence of turning on and off a specific coil determines the direction of the effective electromagnetic fields. A rotating magnetic field can be created by sequentially turning on and off coils.

These rotating magnetic fields interact with the magnetic fields of the magnets (permanent or electromagnets) in the motor's stationary part (stator) to produce a torque on the armature, causing it to rotate. In some DC motor designs, the stator fields generate magnetic fields using electromagnets, allowing for greater control over the motor. Forced air is almost always used to cool DC motors at high power levels. The number of stator and armature fields, as well as how they are connected, determine the inherent speed and torque regulation characteristics. The voltage applied to the armature of a DC motor can be changed to control its speed.

Speed can be controlled by varying the resistance in the armature or field circuit. Modern direct current motors are frequently controlled by power electronics systems that adjust the voltage by "chopping" the DC current into on and off cycles with a lower effective voltage.



Fig 4.1.4 12v Wiper Motor

4.5. 12V adaptor

An adapter is a device that allows one type of hardware to communicate with another that would otherwise be incompatible. Adapters include things like electrical adapters, video adapters, audio adapters, and network adapters.

For example, an electrical adapter may convert the incoming voltage from 120V to 12V, making it suitable for a radio or other small electronic device. The incoming electrical surge could literally fry the device's internal components if voltage is not regulated via an adapter.

Adapters are typically attached to the plug at the end of an electrical cord in most consumer electronics. It is most likely an electrical adapter when you see a plug surrounded by a large box.

The input and output voltages are usually printed directly on the adapter. A voltage adapter is typically built into a device that does not have an adapter on the end of its electrical cable. Desktop computers, for example, typically have the adapter built into the internal power supply.

Switched-mode power supplies (SMPSSs) became almost ubiquitous for this purpose early in the twenty-first century due to their small size and light weight in comparison to their power output capability.

The mains voltage is rectified to produce a high direct voltage, which drives a switching circuit containing a high-frequency transformer that produces direct current at the desired voltage. High-frequency ripple is less difficult to remove than mains-frequency ripple.

Because of the high frequency, the transformer can be small, reducing losses, and the switching regulator can be much more efficient than a linear regulator. As a result, the device is much more efficient, smaller, and lighter. As with the older linear circuit, safety is ensured by the presence of a transformer, which still provides galvanic isolation.

A linear circuit must be designed for a specific, narrow range of input voltages (e.g., 220–240 VAC) and must use a transformer suitable for the frequency (usually 50 or 60 Hz), whereas a switched-mode supply can operate efficiently over a very wide range of voltages and frequencies; a single 100–240 VAC unit can handle almost any mains supply in the world.

However, due to complex circuitry and the use of semiconductors, switching adapters are more likely to fail than older types unless very carefully designed and using suitable components. Unless properly designed, these adapters can be easily damaged by overloads, even transient ones, such as those caused by lightning, brief mains overvoltage (sometimes caused by a failing incandescent light on the same power circuit), component degradation, and so on.

The use of electrolytic capacitors, whose equivalent series resistance (ESR) increases with age, is a very common mode of failure; switching regulators are extremely sensitive to high ESR (the older linear circuit also used electrolytic capacitors, but the effect of degradation is much less dramatic). Well-designed circuits consider capacitor ESR, ripple current rating, pulse operation, and temperature rating.

Many low-cost switched-mode AC adapters do not include adequate electromagnetic interference filtering and/or shielding. Because of the nature of these high-speed, high-energy switching designs, relatively high energy harmonics can be generated and radiated

well into the radio portion of the spectrum if these preventative measures are not implemented.

In a modern household or business environment, there may be multiple AC adapters in use; in such a case, unplug them all, then plug them back in one by one until the culprit or culprits is found.



Fig 4.1.5 12V Adaptor

4.1.6 Switch mode power supply (SMPS)

The full form of SMPS is switch-mode power supply or switch mode power source; from the full form, we can get a good idea about SMPS, which is a special type of power supply network used in electronic devices.

The switch-mode power supply is one of the most common power supply types used in most advanced circuits. When we compare switch mode power supply to linear mode power supply, we can see significant differences, such as both power supplies are used to provide regulated DC signal.

The linear power supply is built with a transformer and other heavy components, but SMPS completely ignores transformers and heavy components, opening up many possibilities for SMPS.



Fig 4.1.6 Switch-Mode Power Supply

4.1.6.1 Parts at SMPS

When we compare SMPS to linear mode power supply, the only difference we can see is in the switching process; the parts of the SMPS begin with a rectifier and a filter section, just like a normal power supply.

However, fast switch components such as MOSFET or IGBT are followed by a control unit consisting of a PWM oscillator, feedback unit, and output sensor, then a tiny transformer the size of an inductor, and finally a rectifier and filter section.

4.1.6.2 SMPS works

When we connect unregulated DC to the high-frequency unit, they operate at 15-50 Hz using the control unit to generate a high-frequency signal, which is then passed over to the tiny step-down transformer.

We get a low voltage signal after the transformer section, then we pass the signal through the rectifier and filter to get a stabilised DC output.

4.1.6.3 TYPES OF SMPS

- **Buck converter**

Buck SMPS, also known as a step-down voltage converter, is used in charger applications.

- **Boost converter**

Boost SMPS are step-up voltage converters that are used in high power applications.

- **Buck-Boost converter**

It is a buck and boost SMPS converter combination that can use both low voltage and high voltage properties on a single board.

4.1.6.4 Merits of SMPS

- Their circuit boards are lighter than those of other power supplies.
- SMPS only consumes a small amount of power.
- SMPS have an operational efficiency of 75% to 80%.
- SMPS is a highly dependable power supply system.
- SMPS can easily adapt to changes in load.
- SMPS circuit components produce little noise.
- SMPS can change the circuit resistance in response to the output voltage.
- When operating, SMPS generates very little heat.
- SMPS are more interchangeable.
- SMPS power supplies are less expensive than traditional power supplies.
- SMPS are less sensitive to changes in input voltage.

4.1.6.5 DEMERITS OF SMPS

- SMPS generate a lot of heat;
- they have a lot of electromagnetic interference; and
- they have complicated circuitry.

- SMPS also contribute to harmonic distortion.
- SMPS have significant output ripples.
- SMPS are not permitted to use frequency-sensitive devices.

4.2. MACHINES USED

4.2.1 *Portable metal cutter*

It is a grinding machine. It is employed in the cutting of the square tube. Many manual cutting tasks necessitate the use of a hand-held grinder with a cutting wheel. One of the most common applications for cutting wheels is metal fabrication. Examples include cutting sheet metal, sizing metal stock for welding, cutting a weld to re-weld it, and cutting and notching steel pipe. Other common tools used with cutting discs include die grinders and chop saws. Smaller projects and more precise cuts may necessitate the use of a die grinder with a cutting wheel. These cutting wheels or discs are extremely thin and frequently have a diameter of less than 2 inches.

They are commonly made of metal and have a diamond-coated edge as the abrasive because they are so thin. This disc cutter is ideal for cutting sheet metal and lightweight or thin materials. A larger disc cutter is required for thicker or heavier materials. A standard Circular Saw with a 7 1/4 inch cutting wheel is used for long straight cuts on sheet metal or for light cut-off work. These cutting discs, like the smaller wheels of an angle grinder, are made of resin-bonded abrasive material or metal with a diamond-coated edge. Cordwood saws were once common in rural America. In an era when hand saws were the only option, they were used to cut smaller wood into firewood. Logs that were too large for a cordwood saw had to be cut by hand. Chainsaws have largely replaced cordwood saws in the preparation of firewood today. Nonetheless, some commercial firewood processors and others use cordwood saws to reduce chainsaw wear and tear. Cordwood saws are widely regarded as dangerous and obsolete technology.

A cutoff saw is used to cut larger items such as heavy metal stock, metal studs, and large metal pipe. This tool's cutting discs are typically 10 or 12 inches in diameter, with a composition similar to the smaller wheels mentioned above. To avoid overheating when cutting heavy materials, the cutting discs may require lubrication or coolant. The cutoff saw is used to make clean, straight 90-degree cuts in the material. Many manual cutting tasks necessitate the use of a hand-held grinder with a cutting wheel. One of the most common

applications for cutting wheels is metal fabrication. Cordwood saws, also known as buzz saws in some areas, use sawmill-sized blades. A sawmill rips (cuts with the grain) a log.

Cordwood saws can have blade diameters ranging from 20 inches (510 mm) to more than 36 inches (910 mm) depending on the power source and intended use. Logs and slabs (sawmill waste) are cut into firewood using cordwood saws. The cubic metre and the cord (unit) are common measurements for standing timber or rough logs. "Cordwood" refers to 4 foot (1.2 m) long unsplit logs. Farmers would supply cordwood to townhouses in the nineteenth and early twentieth centuries, which was then re-sawn and split to a length and circumference suitable for woodburning heaters and ranges. Almost all of these devices were designed to accept 16-inch (410 mm) sticks, which are conveniently cut into three equal lengths of cordwood. After re-sawing a piece of cordwood into three 16-inch pieces, it could be easily split to stovewood size with an axe.

The majority of cordwood saws are made up of a frame, blade, mandrel, cradle, and power source. The cradle is a tilting or sliding guide that holds logs while they are being cut. Certain cordwood saws are powered by a belt connected to a farm tractor power takeoff pulley. Others connect to the rear power takeoff shaft via a three-point hitch on a tractor. Self-powered models are powered by small gasoline engines or even large electric motors. The mandrel is a shaft with bearings that supports and transmits power to the blade. The frame is a structure that holds the cradle and blade in place at a comfortable working height.



Fig 4.2.1(b) Portable Metal Cutter

4.2.2 Angle cutter

An angle grinder, also known as a side grinder or disc grinder, is a portable power tool used for grinding and polishing. Angle grinders can be powered by electricity, gasoline, or compressed air. The motor drives a right-angle geared head with an abrasive disc or a thinner cut-off disc mounted on it that can be replaced when worn. Angle grinders are typically equipped with an adjustable guard and a side handle for two-handed operation. Certain angle grinders can be used as sanders, depending on their speed range, by using a sanding disc with a backing pad or disc. Depending on the amount of flexibility desired, the backing system is typically made of hard plastic, phenol resin, or medium-hard rubber.

Angle grinders can be used to remove excess material from a piece of metal. Cut-off discs (diamond blade), abrasive grinding discs, grinding stones, sanding discs, wire brush wheels, and polishing pads are examples of discs used for various materials and tasks. Unlike a power drill, an angle grinder has large bearings to counteract side forces generated during cutting.

Angle grinders are commonly used in metalworking and construction, as well as in rescue operations and bicycle theft. They're common in workshops, service garages, and auto body shops. When it comes to finding the right angle grinder for the job, there is a large selection to choose from. The disc size and motor power are the most important considerations when selecting the right grinder. Other considerations include the power source (pneumatic or electric), the rpm, and the arbour size.

In general, disc size and power increase in tandem. The size of a disc is usually measured in inches or millimetres. Angle grinder disc sizes in the United States include 4, 4.5, 5, 6, 7, 9, and 12 inches, whereas in Europe, the most common sizes for angle grinder discs are 115 and 125 millimetres. Discs for pneumatic grinders are also available in much smaller sizes. Pneumatic grinders are typically used for lighter-duty jobs that require greater precision. This is most likely due to the fact that pneumatic grinders can be small and light while remaining powerful due to the absence of heavy copper motor windings, whereas it is more difficult for an electric grinder to maintain adequate power with smaller size. Electric grinders are typically used for larger, more demanding jobs. There are, however, exceptions.



Fig 4.2.2 Angle cutter

4.2.3 Drilling machine

The hole in the component is created using a drilling machine. Drilling machines come in a variety of styles. We're using radial drilling machines here. Two cam plates provide the hammer action of a hammer drill by rapidly pulsing the chuck forward and backward as the drill spins on its axis. This hammering (pulsing) action is measured in Blows Per Minute (BPM), with 10,000 BPMs being common. Because the combined mass of the chuck and bit is comparable to that of the drill's body, energy transfer is inefficient, making it difficult for larger bits to penetrate harder materials such as poured concrete.

A standard hammer drill accepts drill bits measuring 6 mm (1/4 inch) and 13 mm (1/2 inch). The operator is subjected to significant vibration, and the cams are typically made of hardened steel to prevent premature wear. In practise, drills are limited to standard masonry bits with a diameter of 13 mm (1/2 inch). A hammer drill is commonly used to install electrical boxes, conduit straps, or shelves in concrete.

The first vibration drilling studies began in the 1950s. The basic idea is to generate axial vibrations or oscillations in addition to the drill's feed movement so that the chips break up and are easily removed from the cutting zone.

There are two types of vibration drilling technologies: self-maintained vibration systems and forced vibration systems. The majority of vibration drilling technologies are still in the research stage. The eigenfrequency of the tool is used in self-maintained vibration drilling to make it naturally vibrate while cutting; vibrations are self-maintained by a mass-spring system included in the tool holder. Other works generate and control vibrations using a piezoelectric system.

These systems enable high vibration frequencies (up to 2 kHz) for small magnitude (a few micrometres); they are ideal for drilling small holes. Finally, mechanical systems can generate vibrations: the frequency is determined by the combination of the rotation speed and the number of oscillations per rotation (a few).

This final technology is fully industrial (example: SineHoling technology of MITIS). In situations such as deep hole drilling, multi-material stack drilling (aeronautics), and dry drilling, vibration drilling is the preferred method (without lubrication). In general, it improves reliability and gives you more control over the drilling process.



Fig 4.2.3 Drilling Machine

4.2.4 Radial drilling machine

A radial arm drill press is a large geared-head drill press in which the head can be moved along an arm that radiates from the machine's column. As it is possible to swing the arm relative to the machine's base, a radial arm drill press is able to operate over a large area without having to reposition the workpiece. This feature saves considerable time because it is much faster to reposition the machine's head than it is to unclamp, move, and then re-clamp the workpiece to the table.

The arm can swing out of the way of the table, allowing an overhead crane or derrick to place a bulky workpiece on the table or base, increasing the size of work that can be handled. With a radial arm drill press, a vise may be used, but the workpiece is usually secured directly to the table or base, or held in a fixture. These machines almost always have power spindle feed, and coolant systems are common. Larger machines frequently include power feed motors for elevating or moving the arm.

The biggest radial arm drill presses are able to drill holes as large as four inches (101.6 millimeters) diameter in solid steel or cast iron. Radial arm drill presses are specified by the diameter of the column and the length of the arm. The length of the arm is usually the same as the maximum throat distance. The radial arm drill press pictured to the right has a 9 inch diameter and a 3 foot long arm. The maximum throat distance of this machine would be approximately 36", giving a maximum swing of 72" (6 feet or 1.83 meters).

A cross arm drill, also known as a radial drilling machine. The headstock can be moved left and right on the rocker arm, as well as rotated by 180°. To accommodate workpieces of varying heights, the rocker arm can be raised and lowered along the outer column. Smaller workpieces can be mounted on the workbench, while larger workpieces can be mounted directly on the machine base or the floor. In single and small batch production, radial drilling machines are commonly used to process the holes of larger and heavier workpieces. For drilling large workpieces, radial drilling machines come in a variety of screw holes, threaded bottom holes, and oil holes. The sliding seat type and the universal type are the two main types of radial drilling machines. The sliding type radial drilling machine is created by converting the basic rocker drilling machine's base into a sliding seat, which can be moved along the bed rail to expand the processing range, and is suitable for boilers, bridges, rolling stock and shipbuilding, and machining industries. In addition to vertical and rotary motion, the

universal radial drilling machine's rocker arm can be moved horizontally. The spindle head on the rocker arm can be tilted to accommodate machining of various parts of the workpiece.



Fig 4.2.4 Radial Drilling Machine

4.2.5 Arc welding

Arc welding is a method of joining metals by using electricity to generate enough heat to melt the metals, and the melted metals, when cool, result in a binding of the metals. It is a type of welding in which an electric arc is created between an electrode and the base material to melt the metals at the welding point using a welding power supply. They can use either direct current (DC) or alternating current (AC), as well as consumable or nonconsumable electrodes. The welding area is usually shielded by a shielding gas, vapour, or slag. Manual, semi-automatic, or fully automated arc welding processes are available. Arc welding, which was invented in the late 1800s, became commercially important in shipbuilding.

A variety of power supplies can be used to provide the electrical energy required for arc welding processes. Constant current power supplies and constant voltage power supplies are the most common types. In arc welding, the voltage is proportional to the length of the arc, while the current is proportional to the amount of heat input. Because they maintain a relatively constant current even as the voltage varies, constant current power supplies are

most commonly used for manual welding processes such as gas tungsten arc welding and shielded metal arc welding.

This is significant because it can be difficult to hold the electrode perfectly steady during manual welding, causing the arc length and thus voltage to fluctuate. Constant voltage power supplies maintain a constant voltage while varying the current, and are thus commonly used for automated welding processes such as gas metal arc welding, flux cored arc welding, and submerged arc welding. The arc length is kept constant in these processes because any variation in the distance between the wire and the base material is quickly rectified by a large change in current. For example, if the wire and the base material become too close, the current will rapidly increase, causing the heat to rise and the voltage to fall.

The direction of the current used in arc welding is also important in welding. Consumable electrode processes, such as shielded metal arc welding and gas metal arc welding, use direct current in general, but the electrode can be charged positively or negatively. The positively charged anode will have a higher heat concentration in general (around 60 percent). It should be noted that the most common polarity for stick welding is DC+. It yields a good bead profile with greater penetration. DC- polarity causes less penetration and a higher rate of electrode melt-off. It is sometimes used on thin sheet metal, for example, to prevent burn-through. Electrode-positive (reversed polarity) results in deeper penetration with few exceptions.

Electrode-negative (straight polarity) electrodes melt faster, resulting in a faster deposition rate. Non-consumable electrode processes, such as gas tungsten arc welding, can employ both direct current (DC) and alternating current (AC) (AC). However, because the electrode only creates the arc and does not provide filler material, a positively charged electrode produces shallow welds and a negatively charged electrode produces deeper welds with direct current. Alternating current quickly switches between these two, producing medium-penetration welds. One disadvantage of alternating current is that the arc must be re-ignited after each zero crossing. This has been addressed by the development of special power units that produce a square wave pattern rather than the normal sine wave, thus eliminating low-voltage time after the zero crossing.

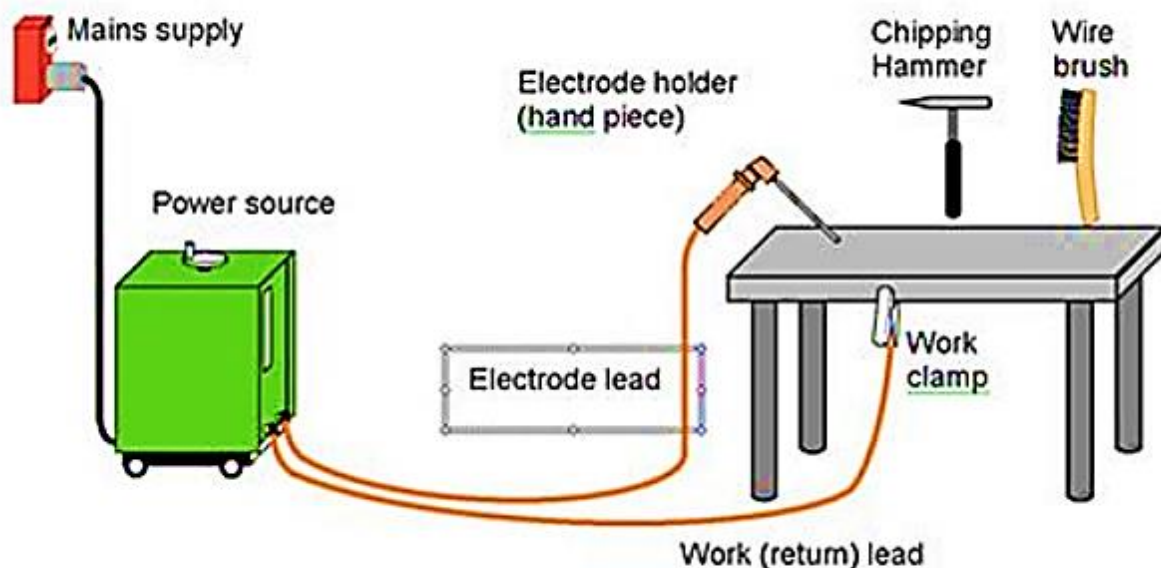


Fig 4.2.5(b) Arc welding

4.2.6 Gas welding

The basic technique of GMAW is simple, and most people can achieve reasonable proficiency in a few weeks with proper training and practise. Because so much of the process is automated, GMAW relieves the welder's (operator's) burden of maintaining a precise arc length as well as feeding filler metal into the weld puddle, coordinated operations that are required in other manual welding processes such as shielded metal arc.

The only requirement for GMAW is that the welder guide the gun with proper position and orientation along the area being welded, as well as clean the gun's gas nozzle on a regular basis to remove spatter buildup. Knowing how to adjust the welder so that the voltage, wire feed rate, and gas flow rate are appropriate for the materials being welded and the wire size used is another skill. It is critical to maintain a relatively constant contact tip-to-work distance (the stick-out distance).

The only requirement for GMAW is that the welder guide the gun in the proper position and orientation along the area being welded, and that the gun's gas nozzle be cleaned on a regular basis to remove spatter buildup. Another skill is knowing how to adjust the welder so that the voltage, wire feed rate, and gas flow rate are appropriate for the materials being

welded as well as the wire size used. It is critical to keep the contact tip-to-work distance relatively constant (the stick-out distance).

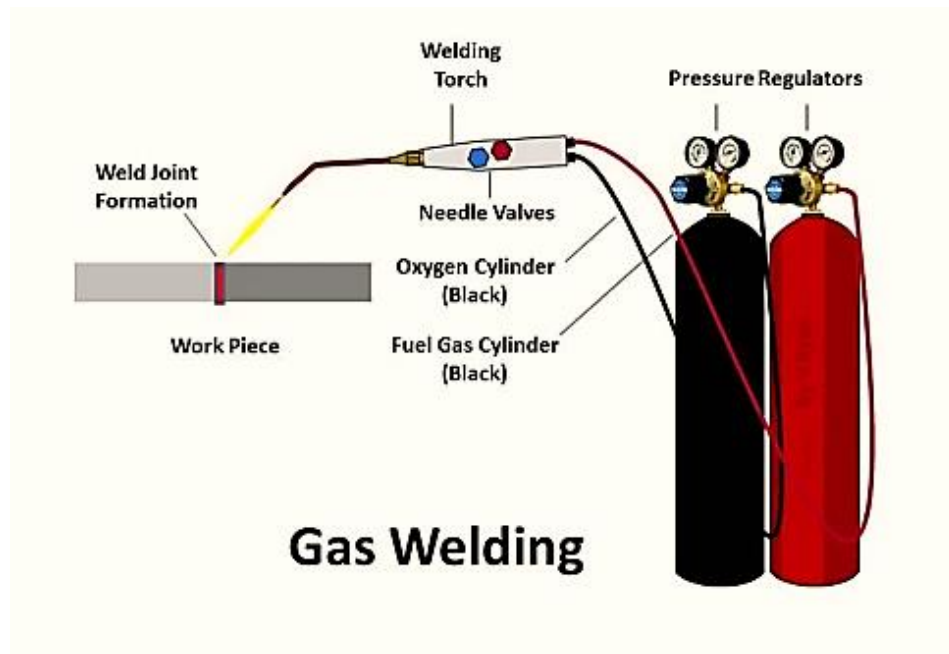


Fig 4.2.6 Gas Welding

4.3 METHODOLOGY

4.3.1 Scotch yoke mechanism

The Scotch Yoke Mechanism is a type of reciprocating mechanism that converts rotational motion to reciprocating motion and vice versa. It is also referred to as the slotted link mechanism. This mechanism is a double slider crankshaft inversion.

It can be used to convert either the linear motion of a slider to the rotational motion of a crank or the rotational motion of a crank to the linear motion of a slider.

This mechanism is commonly used in high-pressure gas and oil pipeline control valve actuators.

4.3.1.1 Advantages of Scotch yoke mechanism

- Increased torque output with a smaller cylinder size.
- Fewer moving parts, resulting in a smoother operation.

- A greater proportion of time spent at the top dead centre improves engine efficiency.
- It can be used for a variety of tasks such as cutting, slotting, and so on.
- The process is automatable.
- Conversion of rotary motion to reciprocating motion.

4.3.1.2 Disadvantages of Scotch Yoke mechanism

- Rapid wear of the yoke slot caused by sliding friction and high contact pressures.
- Lower percentage of time spent at bottom dead centre, reducing blow-down time for two-stroke engines.
- Guideways are necessary for proper reciprocating of arms.

CHAPTER 5

SIMULATION AND ANALYSIS

5.1 CONSTRUCTION

Scotch Yoke Mechanism's main components are the Crank, Sliding Pin, Sliding Yoke with Slot, Fixed Link, Connecting Rod, or Piston, which receives the output reciprocating motion of the Scotch Yoke Mechanism.

A sliding yoke connects the piston or reciprocating part.

This sliding yoke has a slot that engages a sliding pin that slides inside the yoke and is a non-fixed slider of a double slider crankshaft.

This sliding pin is also attached to a crank, which has a fixed link of a double slider crankshaft on the other side. This crank revolves around the fixed link, which serves as its centre, and the sliding pin, which serves as its endpoint.

The sliding pin slides into the slot of the fixed link as the crank rotates around it.

5.1.1 Working

The rotary motion of the crank is converted into linear motion of the reciprocating part by the Scotch Yoke Mechanism. Power is supplied by the DC motor shaft, and the crank attached to the shaft begins to rotate.

As the crank rotates, the pin or slider connected to the crank begins to slide in the yoke, moving the yoke forward. When the crank's pin is at the top and the crank rotates clockwise, the yolk will be displaced forward.

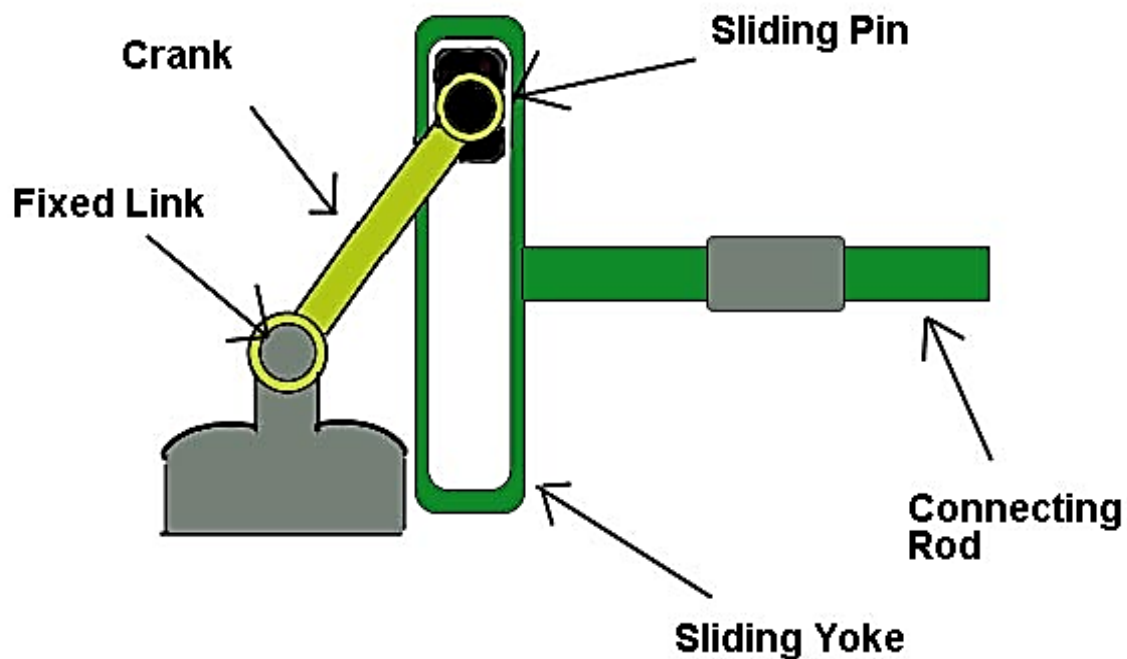


Fig 5.1.1 Construction of Scotch Yoke Mechanism

The yoke's maximum displacement will be equal to the crank's length. When the crank has completed one-fourth of its rotation, the yoke reverses its movement and begins moving backward until the crank reaches its leftmost position, at which point it begins moving forward again.

The rotational motion of the crank is thus converted to the reciprocating motion of the yolk. As needed, the yolk's reciprocating motion is transferred to the piston or connecting rod.

5.2 CALCULATION

To find the force of wiper motor

$$\text{Power(HP)} = \text{force(LBS)} * \text{speed (mph)} / 375$$

$$\text{Power} = 12v * 5 = 60 \text{ W}$$

$$\text{Power} = 0.0804 \text{ HP}$$

$$\text{Speed} = 3.14 * D * N / 60$$

$$\text{Speed} = 3.14 * 60.5 * 65 / 60$$

$$= 205.9 \text{ mm/s } 1\text{mm/s} = 0.0022369\text{mph}$$

$$= 0.46 \text{ mph}$$

CHAPTER 6

RESULTS AND DISCUSSIONS

6.1 RESULT OF PORTABLE AUTOMATIC STAMPING MACHINE

The above technologies and hardware combinations are used to design this system and are extensively used for automatic stamping technology and results showing higher accuracy and become a success. All hardware components are fitted in a wooden board with the support of metal rods and the connection wire of relay and sensor are larger the electronic components like SMPS, Motordriver, Relay, IR Sensor, DC motor.



Fig 6.1 Result of Portable Automatic Stamping Machine

So, the project looks massive with longer wires and more hardware components and the project is not expensive. Peoples can easily understand how the machine will work and output will give even uneducated peoples can also learn this system easily and quickly.

6.2 RESULT OF SCOTCH YOKE MECHANISM

The results of the Testing mode and the output of the mechanism displayed in the system are shown in the below figure (Figure. 6.

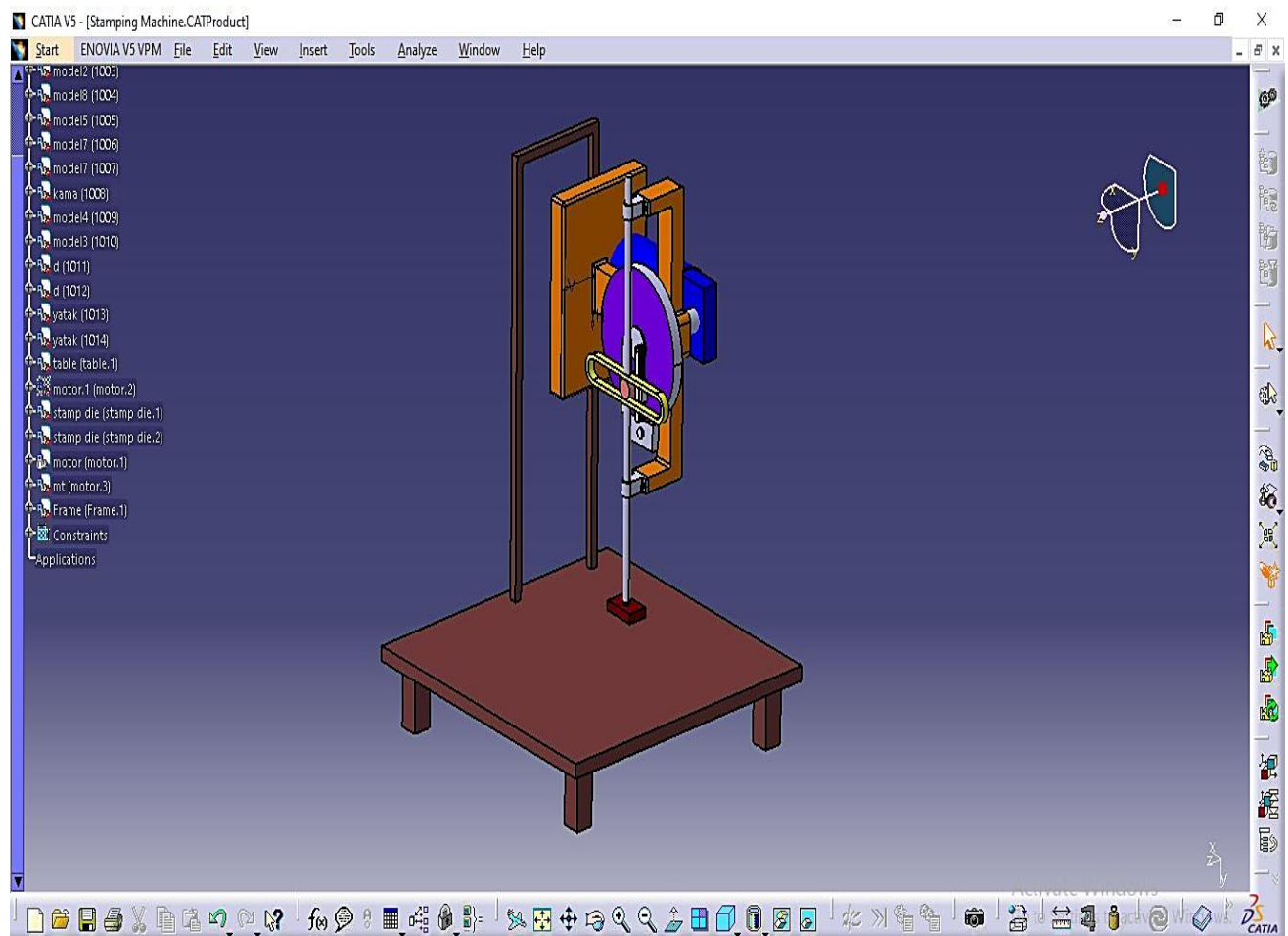


Fig 6.2 : Result of The Scotch Yoke Mechanism

CHAPTER 7

SUMMARY AND CONCLUSIONS

7.1 SUMMARY

An Automated Stamping Machine was designed, fabricated, tested, and operated using pneumatic systems that included an air compressor, directional control valves, and an air service unit. The pneumatic circuit was designed and simulated using Festo didactic's FluidSim software and the cascade method. During the fabrication process, materials and methods were chosen based on engineering properties and design parameters such as safety factor, force of rotation, stress analysis, bending moments, and speed of travel. Before beginning the stamping operation, the prepacked product is placed at the start of the belt travel, and the belt guide prevents the packed job from moving out of its travel due to any external constraints. The imprinted job was loaded into the stock hold plate on cylinder A. The compressor and the electric motor's start button were both turned on. The motor drives the roller, which in turn drives the conveyor belt. A compressor delivers compressed air to the system. The compressed air enters the system and is processed by the Filter-Regulator-Lubricator unit.

7.2 CONCLUSION

We conclude in this paper that "Automatic stamping machine" is a dependable printing mechanism that replaces traditional hand stamping on any object. The general purpose of the present invention, which will be described in greater detail later, is to provide a portable automatic pneumatic stamping machine with many advantages such as low power consumption, effective performance, and many system-specific features.

7.3 FUTURE ENHANCEMENT

- This design can be used in government offices, post offices, and colleges, among other places.
- It can then be manufactured at a high speed and with ease using various mechatronic structures.

REFERENCES

- [1]. Sheela. S, Shivaram. K. R , Meghashree. S, Monica. L, Prathima. A, Shriya. M .Kumar, "Low Cost Automation for Sorting of Objects on Conveyor Belt", Vol. 5, Special Issue 10, May 2016, pp.195-200.
- [2]. Amruta Pandit, Jyoti "Object counting using image processing technique"Vol. 3, Issue 4, April 2014, pp.8509- 8512.
- [3]. Avadhoot R. Telepatil, "Colour Object Counting and Sorting Mechanism Using Image Processing Approach" Volume 02, Issue 03, [March - 2015].
- [4]. Mr. Ravipothin "Automatic Pneumatic stamping machine" International Journal & Magazine of Engineering Technology & research Volume 2, Issue no 7, july2015 ISSN 2348-4845.
- [5]. A Gundawar "Pneumatic Stamping Machine", IJARIIIE, Vol-3 Issue-3 2017.
Mr.Arun S, Sree Rajendra and Vijayavithal Bongale "Automatic Punching Machine: A low cost approach" (2014).
- [6]. Mr. Raj Kumar Sharma, Rakesh Patwal, Rakesh Kumar Yadav, Vijay pratap , Kinematic Design & Development of Automatic Pa-per Stamping Machine by using CAM & FOLLOWER Mechanism[2015-16].
- [7]. "Hydraulic & pneumatics" by Shrinivasan. Publish in 2008.
www.fesco.com, provided information about the prices of the equipment's of the stamping machine.
- [8]. Joseph, E.S. (1989). Mechanical Engineering Design (Fifth edition). (Pp 333-345.) Library of Congress Cataloging in Publication Data, Singapore.
- [9]. Kalakarathi Achagam. (2005). PSG Design Book for Engineers (Second edition), pp.213-230,Cambridge University Press, New Delhi, Orileede, India.

[10]. Art Systems, (2006): FluidSim 4, HANDBUSH, (Third Edition) Festo Didactic, GmbH & Co KG, Germany Pneumatic Catalogue. (2001). Festo Controls (P) Limited Controls Ltd (Third edition), Germany.

[11]. S. Ilango, and V. Soundaranjan (2011): Introduction to Hydraulics and Pneumatics by PHI Learning Pvt. Ltd., India

[12]. Khurmi and Gupta (2007) "Theory of Machine" Third Edition pp. 106- 107, Eurasia Publishing house, New Delhi, DL 110055, India.

[13]. Tyler G. Hicks. 2006. Handbook of Mechanical Engineering Calculations: Shafts, Flywheels, Pulleys, and Belts for Power Transmission (Second Edition). (McGraw-Hill Professional Engineering, New Delhi DL, India.

[14]. V. B. Bhandari, (2006) "Design of machine Elements", Third Edition, Tata McGraw Hill Publishing Co. New Delhi., DL, India

[15]. Mr. D .S .Welkar, Lalit S.Saindane, Niraj S. Nerker, Harshal R.Baviskar, Vishal P. Sonawane, "AUTOMATIC STAMPING AND PAD PRINTING MACHINE", 7th International Conference on Science, Technology and Management , ISBN:978-93-86171-30-6, 2005.

[16]. Mr. S. M. Pimpalgaonkar, Mr. S. V. Kale, Mr. S. G. Ghugal, Mrs. S. V. Borkar, "Automatic Stamping Machine for Post Card to Over Come the Usage of Manual Repetitive Stamping Work", International Journal For Research In Emerging Science And Technology ,Special Issue,2007.

[17]. Mohd Jazirin Bin Shamsul , "Programmable logic control application for stamping operation",University Teknikal Maleshiya Melaka ,2008.

[18]. Mr. Ravipothina,B.Raju, G. Upendra Kumar, "Automatic pneumatic stamping machine", International Journal & Magazine Of Engineering,Technology,Management And Research,2008.

[19]. Yusha Patel, Prajakta Atale , Maitri Shah, R. S. Deshmukh, "Arduino controlled automatic paper stamping machine.", International Journal of Scientific & Engineering Research, Volume 8, Issue 2, ISSN 2229-5518 2009. 6. Akshay Gundawar¹, Yogesh Shahane², Aditya Kathar³,

[20]. Prof. S. A. Shimple⁴, "Pneumatic stamping machine", Vol-3 Issue-3, IJARIIIE-ISSN(O)-2395-4396, 2009,

[21]. Thivanka Kasun Gunawardena, P R Dadigamuwa and B G D A Madhusanka, "Low Cost Automated Machine for Paper Gathering and Folding.", European Journal of Advances in Engineering and Technology, Vol 2(2): 40-43, 2009.

[22]. Rakesh Sehgal^a & Ashim Sharma^b , "A graphical approach for.kinematic design and development of an automatic stamping machine. using four bar chain", Indian Journal of Engineering & Materials Sciences, Vol. 15, pp. 229-235, June-2009. 9.

[23]. Ekta Tripathi, PawanChaudhary, "Material sorting and stamping machine", International Journal of Current Trends in Engineering & Research (IJCTER), e-ISSN 2455-1392 Volume 3 Issue 5,. 163 – 169 Scientific Journal Impact Factor : 3.468,May 2011.

[24]. Pawan Koppa , Dr.N.Nagaraja, Amith.V, Sushilendra , Vyasaraaj T," "Development and Fabrication of Electro Pneumatic Automatic Stamping Machine.", International Journal of Innovative Research in Science, Engineering and Technology,Vol. 5, Issue 9, September 2012.

[25]. Arun S, Sree Rajendra and Vijayavithal Bongale. "Automatic Punching Machine: A Low Cost Approach", International Journal of Advanced Mechanical Engineering, Volume 4, Number 5, ISSN 2250-3234, 2012.

[26]. Andrea Dallan, "Comparison between stamping and punching machining.", LAMIERA, 2012.

[27]. Sara Victoria Pérez Vértiz, Daniel José Esponda Berrios, "Automation at a Stamping Industry", 7th WSEAS International Conference on Robotics, Control & Manufacturing Technology, Hangzhou, China, 2013.

[28]. Daniel R. Cooper, Kathleen E. Rossie, "An Environmental and Cost Analysis of Stamping Sheet Metal Parts", Journal of Manufacturing Science and Engineering 139.4 ISSN: 041012, 2013.

[29]. B.N. Nwankwojike, "Design and development of soap stamping and tableting machine", Nigerian Journal of Technology, Vol. 31, No. 2, 2014.

[30]. Ganesh B. Jangale, Prasad R. Malode, Prof. Amit. J. Somwanshi, "Design & Development of Automatic Stamping & Pad Printing Machine", International Journal of Science and Research (IJSR), (SJIF): 4.72, v-4, ISSN (P): 2348-6406, 2015.

[31]. A.K. Mrthy, Amith. V B.M. Satish, Nikhil. S, Nagaraj, "Mechanically Operated Paper Shearing Machine", (IJSR), Vol. 5, Issue 5, ISSN: 2319-8753, 2015.

[32]. Mr. Shinde Tushar B. Mr. Bhalrao Ganesh N., Ms. Anita V. Hase, "Mechanically Operated Automation System", IJSETR, Vol.- 4, Issue 5, 2016.

[33]. Vijay Kumar U, Ghanshyam Kumar, Dharesh Bansod, "Design and Analysis of Paper Cutting Machine works on Geneva Mechanism", IJSETR, vol.-5, 2016.

[34]. Rakesh Prajapati, Purvik Patel, Saurabh Modi, "Design and Development of Machine to Perform Stamping and Cutting Operation" , SJIf -4.72,ISSN : 2348-4470, 2016.

[35]. R. Syam Sudhakar Rao, A. Hari Tej, C. Siva Sai, " Design of Geneva wheel based auto-roll punching machine", International Journal of Science and Research (IJSR).