

A
PROJECT REPORT
ON
MANUAL PAPER PLATE MAKING MACHINE
Submitted in partial fulfillment of the requirement for the award of the
degree of
BACHELOR OF TECHNOLOGY
IN
MECHANICAL ENGINEERING
Dr. APJ Abdul kalam technical university, Lucknow



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Affiliated to

Dr. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW



SR INSTITUTE OF MANAGEMENT & TECHNOLOGY

CERTIFICATE

This is Certified that the project entitled as "**MANUAL PAPER PLATE MAKING MACHINE**" is submitted by-

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In the partial fulfillment of the requirement for the award of degree of bachelor of technology of Dr. A.P.J. Abdul Kalam Technical University, Lucknow is a record of student own work carried out by student and the content do not forms the basis for the award of any other degree to the candidate or to anybody else.

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We hereby declare that the project report entitled "**MANUAL PAPER PLATE MAKING MACHINE**" submitted by us in partial fulfillment of the requirements for the award of the degree of bachelor of technology (mechanical engineering) of Dr. A.P.J. Abdul Kalam Technical University is record of our own work carried under supervision and guidance of **Mr. Anurag Srivastava**, Head of department of Mechanical department **and Mr. Rohit Srivastava , Deputy** Head of department of Mechanical department.

To the best of our knowledge this project has not been submitted to Dr. A.P.J. Abdul kalam Technical University for any Degree.

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We are also thankful to our family members, friends, seniors and classmates for their unconditional support and motivation.

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ABSTRACT

Disposable food service products were initially developed to enhance public health by improving practices in the food service industry. This requirement when combined with the environmental threat faced by us at the turn of the 20th Century and need of strong efforts in order to conserve the environment gave birth to the concept of PAPER PLATES. There are several inherent advantages in using Paper Plates as compared to cups of other materials. These Paper Plates are gaining popularity all across the globe as a beautiful and stylish way of minimizing exposure to food borne infections. Paper plates have numerous advantages like; they are manufactured in a very simple process using Food Grade Raw Materials with least waste and are easiest to recycle. They are ideal for individual servings at all kinds of parties, functions, picnic occasions, marriages, chat, tea & food joints, etc. Non-toxic in nature, the shapes and surface designs on these paper plates are attractive and present an inviting look. These paper plates can also be custom printed with an outlet's logo, brand punch line or advertising message.

TABLE OF CONTENTS

Content	Page No.
Certificate	2
Declaration	3
Acknowledgement	4
Abstract	5
Table of Contents	6
List of Figure	8
CHAPTER 1: INTRODUCTION	9
1.1 THEORY	10
1.2 HISTORY	11
1.3 TYPES OF PAPER PLATE MAKING MACHINE	12
A Manual Paper Plate Making Machine	12
B Semi-Automatic Paper Plate Making Machine	13
C Fully Automatic Paper Plate Making Machine	14
1.4 NEED	15
CHAPTER 2: LITERATURE SURVEY	16
2.1 Literature survey of the Manual Paper Plate Making machine	17
2.2: Project Objective	19
CHAPTER3: DESIGN & CONSTRUCTION OF MANUAL PAPER PLATE MAKING MACHINE	20
3.1 Components and Their Technical Features	21
3.1.1: DIE	21
3.1.2: HANDLE	23
3.1.3: GUIDE PILLARS	25
3.1.4: BUSHES	26
3.1.5: ASSEMBLY	28
3.1.6: BASE	29

3.1.8: MACHINE FRAME

3.2 FABRICATION PROCESS USED IN THE PROJECT

3.2.1 WELDING

CHAPTER:4 WORKING OF MANUAL PAPER PLATE

MAKING MACHINE

32 35

CHAPTER:5 COST ANALYSIS

CHAPTER:6 MARKET POTENTIAL & STRATEGY

36

CHAPTER:7 APPLICATIONS

CHAPTER:8 RAW MATERIAL AND ITS OUTPUT

38 40

CHAPTER:9 FUTURE SCOPE

42

CHAPTER:10 CONCLUSION

44

CHAPTER:11 REFERENCES

47

50

LIST OF FIGURES

Figure No.	Figure Name	Page No.
Fig.1.3(a)	Manual Paper Plate Making Machine	12
Fig.1.3(b)	Semi-automatic Paper Plate Making Machine	13
Fig.1.3(c)	Fully Automatic Paper Plate Making Machine	14
Fig:3.1.1	Die	21
Fig:3.1.2	Handle	23
Fig: 3.1.3	Guide Pillars	25
Fig:3.1.4	Bushes	27
Fig:3.1.5	Assembly	28
Fig:3.1.6	Base	29
Fig:3.1.7	Heaters	30
Fig:3.1.8	Machine Frame	32
Fig:3.2	Welding	35
Fig: (A)	Basic Paper Plate (Paperboard paper plate)	45
Fig : (B)	Laminated Paper Plate	45

CHAPTER:1

INTRODUCTION

INTRODUCTION

1.1: THEORY:

Paper plate is a convenient and disposable option for serving food. Manual paper plate making machine offer a small-scale, cost-effective way to produce paper plates. Items made from recycled paper, cardboard and post-consumer plastics provide another viable alternative to single-use tableware. These products help reduce waste by utilizing materials that have already served a purpose, thereby conserving resources and reducing the amount of waste in landfills. A manual paper plate making machine is a cost-effective option for small businesses or individuals looking to produce paper plates on a limited scale.

Disposable food service products were initially developed to enhance public health by improving practices in the food service industry. This requirement when combined with the environmental threat faced by us at the turn of the 20th Century and need of strong efforts in order to conserve the environment gave birth to the concept of PAPER PLATE. There are several inherent advantages in using Paper products as compared to plates of other materials. These Paper plates are gaining popularity all across the globe as a beautiful and stylish way of minimizing exposure to food borne infections. Paper plates have numerous advantages like; they are manufactured in a very simple process using Food Grade Raw Materials with least waste and are easiest to recycle. They are ideal for individual servings at all kinds of parties, functions, picnic occasions, marriages, chat, tea & food joints, etc. Non-toxic in nature, the shapes and surface designs on these paper plates are attractive and present an inviting look. These paper plates can also be custom printed with an outlet's logo, brand punch line or advertising message. Available in a wide variety of designs, textures, colors and sizes, disposable paper plates are gorgeous, stylish and eloquent. Adding premium aura wherever used, these plates are made with utmost care to detail and are a unique addition to any table setting. Hence, the future of the proposed unit for manufacturing paper plates is very vibrant and will be a gesture towards supporting the usage of Eco-friendly products.

1.2: HISTORY

The history of the paper plate making machine can be traced back to the early 20th century when plates. The first paper plate making machine was invented in the United States in 1904 by Martin paper plates first gained popularity as a convenient and disposable alternative to traditional ceramic L. Keyes.

Credit of inventing the paper plate goes to Martin Keyes. He reportedly witnessed workers using leftover wood veneer scraps for disposable plates.

Inspired by the veneer workers Keyes envisioned a machine that could form plates from paper pulp. With patent secured, Keyes formed the Keyes Fiber Company. This company began commercial production of paper plates in 1904, marking the birth of the paper plate industry.

Keyes' invention was a manual machine that used a die to cut the paper into the desired shape and a press to shape the paper into a plate. The machine was operated by hand and could produce a limited number of plates at a time. Over the years, several improvements were made to the paper plate making machine, making it more efficient and capable of producing a larger number of plates. In the 1920s, electric-powered machines were introduced, which were faster and more efficient than the manual machines. In the 1950s, with the increasing demand for disposable plates, several companies began to manufacture paper plate making machines on a large scale. The machines were designed to be more versatile and could produce plates of various sizes and shapes.

1.3: TYPES OF PAPER PLATE MAKING MACHINE

There are basically three types of paper plate machines used in modern era –

- A. Manual Paper Plate Making Machine
- B. Semi-Automatic Paper Plate Making Machine
- C. Fully Automatic Paper Plate Making Machine

A. Manual Paper Plate Making Machine:

These machines are much simpler and less expensive than fully automatic paper plate machines. They are a good option for small businesses or individuals who want to produce paper plates on a limited scale.

A manual paper plate machine, also sometimes called a hand press machine, is a machine that forms paper plates by applying pressure and heat to cut and shape circular pieces of paper.

Plates are formed by rotating the mold, offering higher production capacities compared to other manual machines. Each type has its own advantages and production capacities, so the choice depends on factors like budget, production volume, and desired level of automation.

Hand Press Paper Plate Making Machine



Fig: 1.3(a) Manual Paper Plate Making Machine

B. Semi-automatic Paper Plate Making machine:

A semi-automatic paper plate making machine is a machine that forms paper plates from rolls of paper. It is less automated than a fully automatic machine, but it can still produce a large number of plates per hour.

A semi-automatic paper plate making machine is a piece of equipment used to produce paper plates on a small to medium scale. It typically involves manual loading of paper sheets and unloading of finished plates, with some automated processes like cutting and shaping. These machines are often used in small businesses or for occasional production needs.

It combines manual and automatic processes, requiring less manual effort while still being operated primarily by hand.



Fig: 1.3(b) Semi-automatic Paper Plate Making Machine

C. Fully Automatic Paper Plate Making Machine:

A fully automatic paper plate making machine is an industrial machine that can produce paper plates at a high speed with little human intervention.

These machines are typically used by businesses that produce large quantities of paper plates such as for use in restaurants, cafeterias and food trucks.

Fully automatic paper plate making machines can produce a wide variety of paper plate sizes and shapes. They can also be equipped with features such as automatic stacking and counting.



Fig: 1.3(e) Fully Automatic Paper Plate Making Machine

1.4: NEED

Paper plate making machines are in demand due to several reasons :-

Eco-friendly Alternatives: With increasing awareness about environmental conservation, there's a growing demand for eco-friendly alternatives to plastic plates. Paper plates are biodegradable and compostable, making them a preferred choice for many consumers and businesses.

Cost-effectiveness: Paper plates are relatively inexpensive compared to other types of disposable plates. Investing in a paper plate making machine allows businesses to produce plates in-house, reducing production costs and increasing profit margins.

Hygiene and Convenience: Paper plates offer convenience in terms of disposal and hygiene. They are often used in outdoor events, picnics, parties, and fast-food restaurants where washing dishes may not be feasible.

Market Demand: The market for disposable tableware, including paper plates, is consistently growing due to the rise in food service industries, events, and the overall trend towards convenience.

Government Regulations: Some regions have implemented regulations or bans on single-use plastic products, which has further fueled the demand for alternatives like paper plates.

CHAPTER:2

LITERATURE SURVEY

LITERATURE SURVEY

2.1 Literature survey of the Manual Paper Plate Making machine

Disposable food service products were initially developed to enhance public health by improving practices in the food service industry. This requirement when combined with the environmental threat faced by us at the turn of the 20th Century and need of strong efforts in order to conserve the environment gave birth to the concept of PAPER PLATES.

There are several inherent advantages in using Paper Plates as compared to plates of other materials.

A paper plate is a plate made out of paper and often lined with plastic to prevent liquid from leaking out or soaking through the paper. The base paper for paper plates is called Kraft. This Kraft is coated with the thin layer of silver film. This paper is then pass through successive stages of rolling, and then gets wounded on a roller. Then it is cut for required dimensions (here 14x28 in). After then this paper of required dimensions is pass to the press machine for giving required shape of plate. The operations from taking out the roller of coated paper, cutting it for required dimensions and then transferring it to the press machine are carried out manually. This project work deals with automating the above mentioned operation of the manually operated paper plate making machine available at “S.M. manufacturing and trading” company at

Bhandara (M.S)

Disposable plates are used for serving food because of their easy handling and disposal. Traditionally, disposable plates made of leaves were used in India. Different types of plant leaves have been used for plate making in different states. The present market of disposable plates, however, largely comprises of paper and expanded polystyrene (foam) plates. The three types of leaf plates studied are Areca (*Areca catechu*), Siali (*Bauhinia vahlii*) and Sal (*Shorea robusta*). More than half of the production cost of leaf plates is attributed to procurement of raw material and labour wages. This indicates that leaf plate making is a labour intensive business creating employment in rural areas. Areca plates (Rs 7/ plate) have the highest market price while paper plates (Rs 0.5/ plate) have the lowest. It was found that the energy consumption of making Sal and Siali plates is comparable to that of making the paper plates; while the energy consumption of making Areca leaf plates is the highest. Nowadays, Sal and Siali plates have an embedded polythene sheet. Thus, looking at the currently available

designs in the market, non-coated paper plates and Areca leaf plates were found to be the only completely biodegradable disposable plates.

A paper plate is a plate made out of paper and often lined with plastic to prevent liquid from leaking out or soaking through the paper. The base paper for paper plates is called Kraft. This Kraft is coated with the thin layer of silver film. This paper is then pass through successive stages of rolling, and then gets wounded on a roller. Then it is cut for required dimensions (here 14x28 in). After then this paper of required dimensions is pass to the press machine for giving required shape of plate. The operations from taking out the roller of coated paper, cutting it for required dimensions and then transferring it to the press machine.

Established in the year 1972, “Excellent Paper Plate Engineering Company” is engaged in manufacturing, exporting and supplying Paper Plate Making Machine & Dies. In this line, project offering Paper Plate Machine, Paper Plate making Machine, Paper Plate Making Machinery, Paper Plate Making Raw Material, Paper Thali Making Dies and Core Thali, etc.

2.2: Project Objective:

The title of this project work is “Manual Paper Plate Making Machine”. The objective of the present work are :

- ❖ The project objectives of a manual paper plate making machine could include efficiency in production, cost-effectiveness, ease of operation, durability, and the ability to produce high-quality paper plates.
- ❖ Additionally, factors like environmental sustainability, safety standards compliance, and scalability might also be considered depending on the specific requirements of the project.

CHAPTER:3

**DESIGN & CONSTRUCTION OF MANUAL
PAPER PLATE MAKING MACHINE**

DESIGN & CONSTRUCTION OF MANUAL PAPER PLATE MAKING MACHINE

3.1 Components and Their Technical Features

3.1.1: DIE

A paper plate making machine, a die is used to cut the paper into the desired shape of the plate. The die is typically made of metal and is customized to the specific size and shape required for the plates being produced. It's an essential component of the manufacturing process, ensuring uniformity and precision in the final product.



Fig:3.1.1:Die

One of the most important aspects of the process is the paper plate die. It is a part of the plate making machine that shapes the wood pulp into plates as we know them. These dies are made up of various materials but metallic dies are the most common and are widely used. These are heavy-duty and durable parts that require almost zero maintenance. You can also replace these dies easily which enables you to manufacture different kinds of paper plates using a single machine. There is no doubt that these are one of the most beneficial parts of the paper plate manufacturing process.

these dies easily which enables you to manufacture different kinds of paper plates using a single machine. There is no doubt that these are one of the most beneficial parts of the paper plate manufacturing process.

Following types of materials are used for dies in paper plate making machine:

Cast Iron: The most common material for dies due to its durability and affordability. Used for basic, everyday plates .

Mild Steel: Another cost-effective option, sometimes used for simpler designs .

High-Carbon Steel: Offers better wear resistance for high-volume production runs.

Diamond-coated: For intricate designs or those requiring a smoother finish.

Size: Dies come in various sizes to match the desired plate diameter. The upper die is called “Male die” and lower die is called “female die”. The diameter of male die is 50mm and internal diameter and external diameter of female die are 65mm and 85mm respectively.

3.1.2: HANDLE

A manual paper plate making machine handle is a component of a manual press used to apply force in operations such as punching, stamping and pressing.

Here are some key points about manual paper plate making machine handle:

Functionality: The handle is used to manually apply leverage, which translates to mechanical force on the paper. The user operates the handle to exert pressure through the machine's mechanism.

Design: Manual paper plate making machine handles are typically designed for ergonomic use, ensuring that the operator can comfortably apply the necessary force without undue strain. They are often made from materials that provide a good grip and are durable under repetitive use. Its length is 530mm.



Fig:3.1.2: Handle

Types : Depending on the type of hand press machine, handles can vary in design:

Straight Handles : Simple and direct, providing straightforward leverage.

Rotary Handles : Allow for more controlled application of force, often seen in screw presses.

Toggle Handles : Provide significant mechanical advantage and are used for applications requiring more force.

Materials : Handles can be made from various materials, including metal, plastic, or composite materials, to balance strength, weight, and comfort.

3.1.3: GUIDE PILLARS

Guide pillars, also known as guide posts, are crucial components in manual paper plate making machine. These provide accurate alignment to the die set. One end of the pillar is given press fit in the base plate with H7/p6 tolerance. The other portion, which is sufficiently long, provides guide for top plate for easy sliding. It is 450 mm long and 30mm dia. They serve several key functions:

Alignment: Guide pillars ensure precise alignment between the upper and lower parts of the press. This is essential for maintaining the accuracy of the operations being performed, such as stamping, punching, or pressing.

Stability: By providing a stable guide for the moving parts, guide pillars help in maintaining the structural integrity of the machine. This stability is vital for consistent performance and durability of the machine.

Reduced Wear and Tear: With proper alignment and stability, guide pillars help in reducing wear and tear on other components of the machine. This prolongs the life of the machine and minimizes maintenance requirements.

Smooth Operation: Guide pillars enable smooth vertical movement of the press ram or punch. This ensures that the force applied is evenly distributed, resulting in cleaner and more precise operations.



Fig: 3.1.3: Guide Pillars

Types of Guide Pillars

Straight Guide Pillars: These are simple cylindrical rods that provide straightforward vertical alignment.

Shoulder Guide Pillars: These have a shoulder or flange, which provides additional support and stability, preventing the pillar from moving during operation.

Ball Bearing Guide Pillars: These incorporate ball bearings to further reduce friction and allow for smoother movement. They are used in applications requiring high precision and minimal wear.

Materials of Guide Pillars: Typically made from hardened steel or other durable materials to withstand the repetitive forces exerted during operation.

Maintenance Tips

Regular Lubrication: Ensure that guide pillars and bushings are regularly lubricated to reduce friction and wear.

Periodic Inspection: Regularly inspect guide pillars for any signs of wear, bending, or misalignment.

Cleanliness: Keep the guide pillars and surrounding areas clean to prevent debris from causing damage or misalignment. Guide pillars are essential for the efficient and accurate functioning of manual hand press machines, contributing significantly to their reliability and longevity.

3.1.4: BUSHES

In mechanical engineering, "bushes" or "bushings" are components used in shafts to provide support and reduce friction between the rotating shaft and the stationary support. It is often paired with guide pillars to reduce friction and wear. These are usually made from materials like bronze, brass, or composite materials. Its internal diameter 33mm and outer diameter is 38mm and it is 80mm long. Here are some key points about bushes used in shafts:

Function: Bushings act as a bearing, providing a smooth surface for the shaft to rotate against. They reduce wear and tear on the shaft and support structure.

Materials: They are typically made from materials with good wear resistance and low friction properties. Common materials include bronze, brass, steel, and various polymers like nylon or PTFE (Teflon).

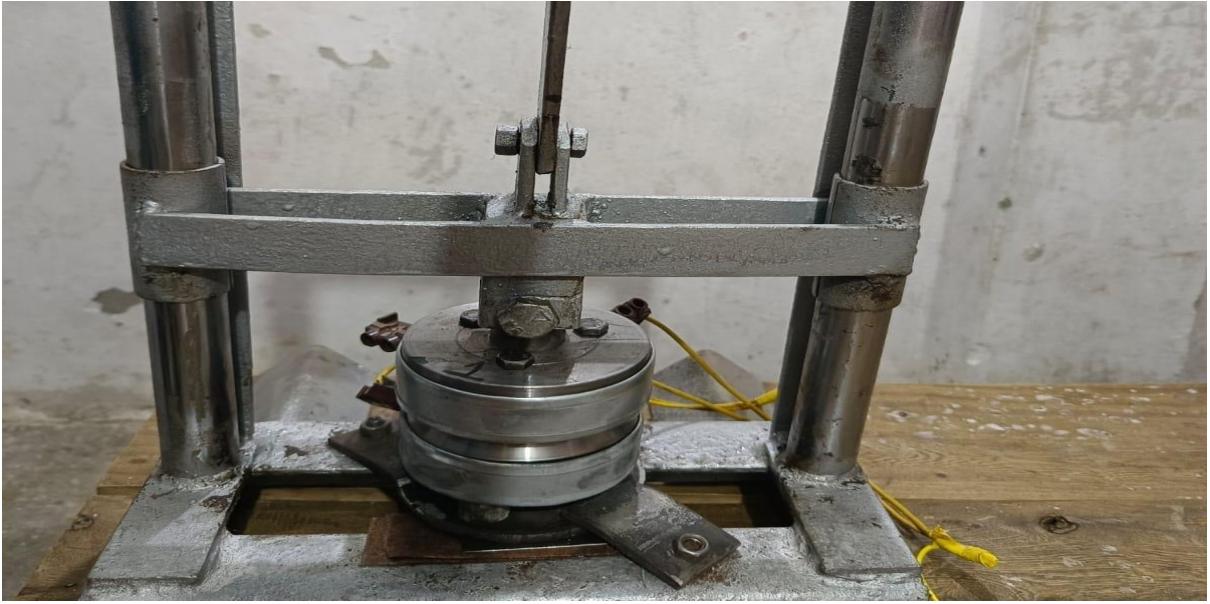


Fig:3.1.4: Bushes

Types:

Plain Bushings: Simple, cylindrical liners used for linear and rotational motion.

Flanged Bushings: Have an integral flange at one end to provide axial location and support.

Sleeve Bushings: Cylindrical bushings without flanges, used for general purposes.

Split Bushings: Can be split into two or more pieces to facilitate easy installation and removal.

Applications: Bushings are used in a wide range of applications including automotive components, industrial machinery, household appliances, and aerospace engineering.

Benefits:

Reduced Friction: Helps in minimizing friction between moving parts.

Wear Resistance: Extends the life of both the shaft and the housing.

Noise Reduction: Helps in dampening noise and vibration.

Cost-Effective: Usually cheaper and simpler to replace compared to other types of bearings.

Installation and Maintenance: Proper lubrication is essential for the longevity of bushings. Some bushings are self-lubricating, which reduces the need for regular maintenance. Understanding the specific requirements of the application (load, speed, temperature, environment) is crucial in selecting the appropriate type of bushing for a shaft.

3.1.5: ASSEMBLY

Assembly is the act of putting together individual components to create a complete machine or device. It involves combining various parts, often manufactured separately, to achieve a specific function. Assembly lines in factories are a common example of this process.

In manual paper plate making machine we made a assembly of having two strips of 283 mm long and 30mm width and both end of these strips are fixed to the guide pillar bushes.

In this assembly a square iron rod is fixed in between the two strips and the upper die is fitted below the solid square iron rod and at upper portion the connecting strip is connected.



Fig.3.1.5: ASSEMBLY

3.1.6: BASE

The base of a manual hand press machine is the foundation that provides stability and support for the entire unit. It's typically made of cast iron for its sturdiness and vibration dampening properties.

The strong base for hold the total elements stable is made up by mild steel this controls the total assembly and it is situated on foundation. The base design can vary depending on the specific press. It is 440mm long and 300mm wide.



Fig:3.1.6: Base

Here's an overview of how to use it effectively:

Adjust the Seat: Adjust the seat height so that the handles are at chest level. Your feet should be flat on the floor.

Select the Weight: Set the desired weight by adjusting the pin in the weight stack.

Grip the Handles: Sit back against the seat, grip the handles with a firm grip, and ensure your elbows are at a 90-degree angle.

Press the Handles: Push the handles forward until your arms are fully extended, but do not lock your elbows.

Return to Start: Slowly bring the handles back to the starting position, keeping control of the movement.

Tips for Using a Chest Press Machine:

Keep your back pressed against the seat and your core engaged.

Avoid locking your elbows at the top of the movement to maintain tension on the muscles. Use a full range of motion to maximize the effectiveness of the exercise.

Start with a weight you can handle comfortably to focus on proper form before increasing the load.

3.1.7: HEATERS

Heaters used in paper plate making machines are typically designed to ensure the proper forming and sealing of the paper plates. These heaters come in various types and configurations depending on the specific requirements of the machine and the materials being used.



Fig:3.1.7: Heaters

Common types include:

Electric Heaters: These are the most commonly used heaters in paper plate making machines. They provide consistent and controlled heating, which is crucial for the proper molding of paper plates.

Infrared Heaters: Infrared heaters are used for their efficient and uniform heating capabilities. They heat the material directly without heating the surrounding air, which can be more energyefficient and faster.

Induction Heaters: Induction heating is another method used in some advanced paper plate making machines. It offers precise control and rapid heating, which can improve production efficiency.

Cartridge Heaters: These are tubular, high-density heating elements that are inserted into the molds or dies of the machine. They provide localized heating, which is ideal for specific parts of the forming process.

Band Heaters: These are typically used around cylindrical parts of the machine. They provide even heating around the circumference, which can be important for uniformity in the final product. **Key Considerations for Heaters in Paper Plate Making Machines Temperature Control:** Precise temperature control is essential to ensure the paper plates are properly formed and sealed. Overheating can cause burning or damage to the paper, while underheating can result in incomplete forming.

Durability: The heaters should be durable and capable of withstanding continuous use, as paper plate making is often a high-volume process.

Energy Efficiency: Efficient heaters can help reduce operational costs and environmental impact. Technologies that minimize heat loss and maximize heating efficiency are preferred.

Maintenance: Easy maintenance and replacement of heaters are important for minimizing downtime and maintaining productivity.

Application in the Machine In a paper plate making machine, the heaters are typically integrated into the molding dies. The paper (often coated with a thin layer of plastic or wax for waterproofing) is placed in the mold, and the heater ensures that the paper softens enough to

be shaped and sealed into a plate. The heat also helps to bond any coatings, ensuring the plate holds its shape and has a smooth, finished surface. Overall, the choice of heater and its specifications would depend on the specific type of paper plate being produced, the production volume, and the material properties.

3.1.8: MACHINE FRAME

The frame of a manual hand press machine is a crucial component, providing the structural support and stability needed for its various operations. It is 300mm long and 450 mm wide. Here's a detailed look at the frame:

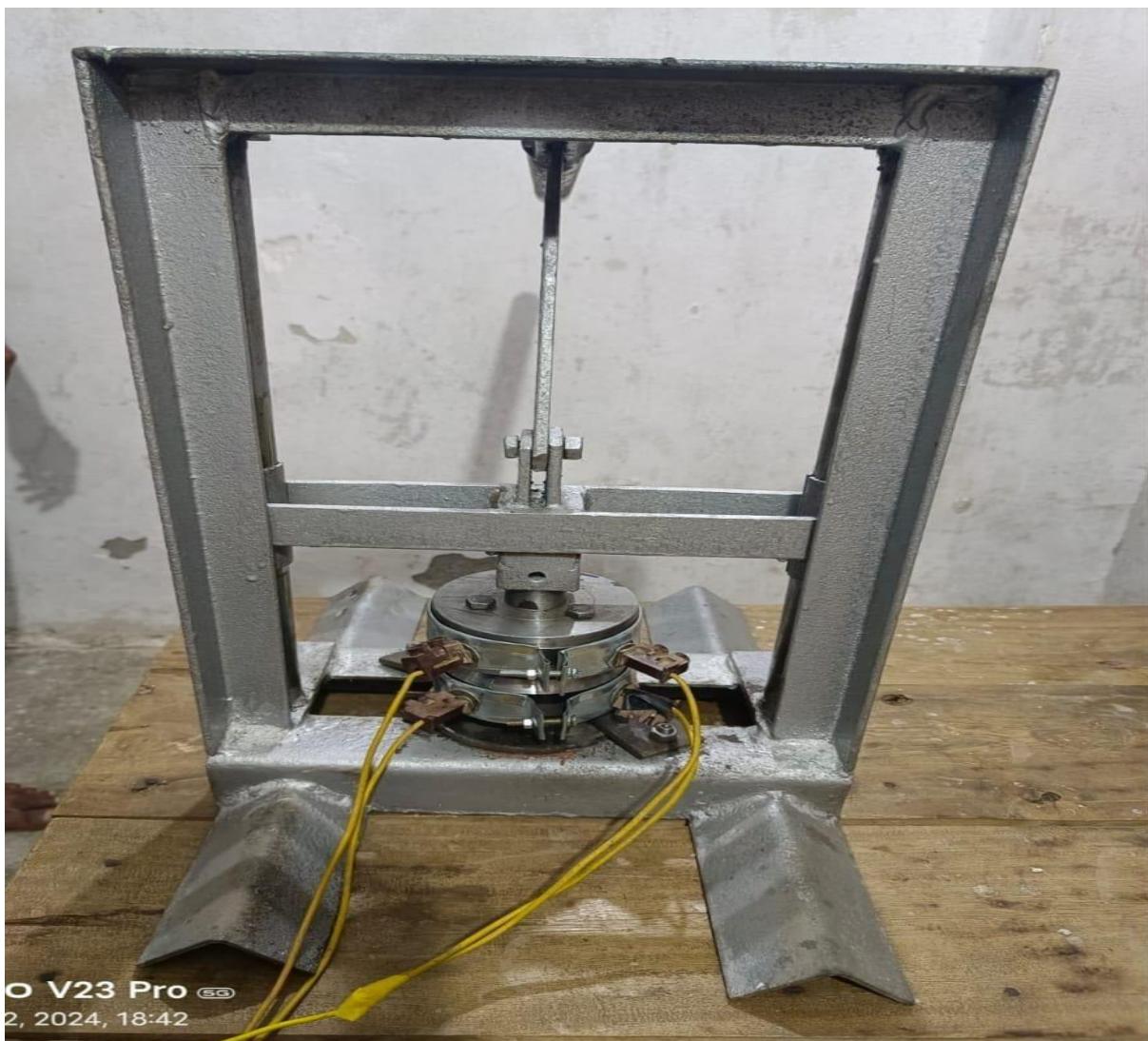


Fig:3.1.8: Machine Frame

Material:

Cast Iron: Commonly used for its durability and ability to withstand significant force without deforming.

Steel: Sometimes used for higher strength and rigidity.

Construction:

C-Frame (Open Frame): Shaped like a "C", allowing easy access to the workpiece from three sides. Ideal for operations requiring frequent loading and unloading.

H-Frame: Shaped like an "H", offering more rigidity and better resistance to deflection. Suitable for tasks requiring more force.

Column Frame: Includes one or more columns (pillars) supporting the ram, providing high precision and stability.

Components:

Base: The bottom part of the frame, providing a stable foundation. Often includes mounting holes for securing the press to a workbench or floor.

Support Arms/Columns: Vertical elements that connect the base to the top of the frame, bearing the load during pressing operations.

Top Crosshead: The horizontal part at the top of the frame, supporting the mechanism that moves the ram.

Functions and Features:

Stability: The frame must be stable to ensure accurate and consistent pressure application.

Rigidity: A rigid frame minimizes deflection and movement, which is essential for precision tasks.

Accessibility: Depending on the frame design, it can offer different levels of accessibility to the workpiece. C-frames allow better access, while H-frames provide more rigidity.

Mounting Options: Many frames come with holes or slots for securely mounting the press to a workbench or floor to enhance stability during operation.

Importance:

Safety: A robust frame ensures safe operation by preventing the machine from tipping over or collapsing under pressure.

Precision: A well-designed frame maintains alignment and accuracy, crucial for tasks requiring exact pressure and positioning.

Durability: The frame's material and construction quality determine the machine's lifespan and reliability.

Maintenance:

Regular Inspection: Check for cracks, deformations, or wear, especially in high-stress areas.

Tightening Bolts: Ensure all bolts and fastenings are secure to maintain the frame's integrity.

Cleaning: Keep the frame clean to prevent rust and accumulation of debris, which can affect performance and longevity. The frame is the backbone of a manual hand press machine, playing a vital role in its performance, safety, and durability. Choosing the right frame type and maintaining it properly ensures the machine operates effectively for a wide range of tasks.

3.2 FABRICATION PROCESS USED IN THE PROJECT

3.2.1 WELDING

Cast iron can be welded perfectly well using a stick welder and nickel rod , or with preheat by a gas welder using cast iron rod. Welding cast iron is a precision task that requires high heat, and often expensive equipment. You should not attempt it on the strength of reading a brief internet article , no matter how informative. However, understanding the basics can help you prepare for a qualification course, or to make better decision for welding projects run by qualified personnel under your supervision. Tips

- Always preheat or precool cast iron using the same method throughout. Changing methods can cause stress and fractures in the cast iron. These may ruin your project, or be small enough to go unnoticed until the iron fails catastrophically during normal operation.

Cast iron is typically higher in carbon than steel. This makes the iron brittle, and more difficult to weld than other industrial metals.

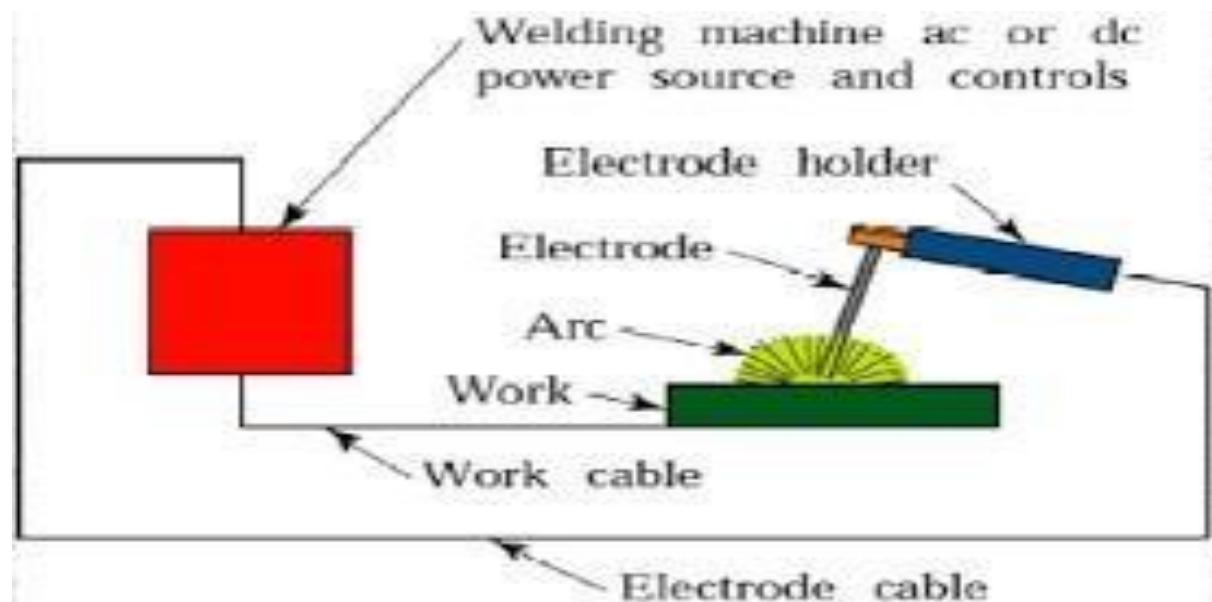


Fig:3.2: Welding

CHAPTER:4

**WORKING OF MANUAL PAPER PLATE
MAKING MACHINE**

WORKING OF MANUAL PAPER PLATE MAKING MACHINE:

A manual hand press machine operates based on simple mechanical principles to apply force for various tasks like punching, riveting, bending, or assembling parts.

Here is a brief explanation of its working principle:

Leverage Mechanism: The machine uses a lever mechanism to multiply the force applied by the operator. When the operator pulls or pushes the lever, it amplifies the force and transfers it to the working end of the machine.

Force Transmission: The lever is connected to a ram or a punch which moves vertically. The force applied by the operator is transmitted through the lever system to the ram, resulting in a downward force.

Pressing Action: The ram or punch exerts pressure on the workpiece placed on the base or anvil of the machine. This pressure can be used to punch holes, bend metal, set rivets, or press-fit components.

Adjustable Stroke: Many hand press machines allow adjustment of the stroke length or depth, enabling precise control over the amount of force and movement applied to the workpiece.

Return Mechanism: After the operation, a return mechanism, usually a spring, brings the lever and ram back to their initial positions, ready for the next cycle. This basic working principle allows manual hand press machines to be versatile and useful in various manufacturing and assembly processes where precise control over force is required.

CHAPTER:5

COST ANALYSIS

COST ANALYSIS

The cost estimation cannot be done 100% certainty because price of material used in the Manual Paper Plate Making Machine are highly fluctuating. In this work, a rough estimation of the cost is being reported on the basis of market survey. Approximate cost of different components are given in table 5.1:

S.NO.	NAME OF THE COMPONENT	QUANTITY	ESTIMATED COST
1.	Die	1 Set	1000
2.	Bushes	3 Piece	600
3.	Iron Angle & Stand	As per need	1500
4.	Iron Pipe		500
5.	Nut Bolts	10 Piece	100
6.	Shocker Rod	3 Piece	1800
7.	Iron Strips	As per need	250
8.	Welding Electrode		400

CHAPTER:6

MARKET POTENTIAL & STRATEGY

Market potential & Strategy

Market potential & Strategy

Paper crockery is finding extensive usage these days for serving parties and functions. Paper plates are the most commonly used disposable crockery in India. Paper plates, cups & saucers are made from millboard, greyboard, Kraft paper, greaseproof paper. Due to their disposable nature and attractive designs in which these are available, paper crockery like cups and plates have to a large extent replaced glass or porcelain crockery for some specific usage. The demand for paper plates is likely to grow substantially in the future both in urban as well as rural areas. Paper plates are produced from paper boards classed in the category of industrial paper. With growth potential envisaged as 9% as against 5% at present the availability of industrial paper for the manufacture of paper plates in the future is amply taken care of.

The paper plate manufacturer has good industrial potential in the future. Because the paper cup industry is in a boom, the requirement of drinking items like Tea, coffee, Cool Drinks for railways, Hotels, household appliances, domestic applications as well as for replacement of plastic cups, Glass items. There is a tremendous requirement of day-to-day life. On account of their lightweight, cost-effectiveness, biodegradability, and ability to provide air resistance, internal strength, and stiffness, paper cups and paper plates are extensively used in the food and beverage industry. Moreover, the rising influence of westernization and the increasing fast food consumption has been witnessed, particularly in the developing regions. Thus, the flourishing fast food sector which requires paper disposables for packing food and beverages is anticipated to propel the market growth during the forecast period. The prospects of paper cups depend on the value of customers who utilize them. But in our country paper cups are used by all the people as it is easy to use, hygienic and eco-friendly. Hence, per capita consumption has increased and the demand for it is recognized. While the demand for paper cups has shown good growth, the company will be successful in strategizing its market operations. Consumption has increased and the demand for it is recognized. While the demand for paper cups has shown good growth, the company will be successful in strategizing its market operations.

CHAPTER:7

APPLICATIONS

Applications:

Food industry: The paper plate making machine with motor and pulley is extensively used in the food industry for packaging and serving food items such as snacks, sweets, and fast food.

Catering industry: The machine is also used in the catering industry for events such as parties, weddings, and corporate events. It can produce a large quantity of paper plates in a short amount of time, which is essential for catering to large gatherings.

Retail industry: The machine is used in the retail industry for packaging and serving food items in super markets and convenience stores.

Hospitality industry: The machine is extensively used in hotels, restaurants, and cafes for serving food items.

Export industry: The machine is used for exporting paper plates to various countries, as it can produce a large quantity of plates in a short amount of time.

CHAPTER:8

RAW MATERIAL AND ITS OUTPUT

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The raw material used in a paper plate making machine is simply paper. But there can be some variations depending on the desired qualities of the finished paper plate. Here's a breakdown:

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Basic Paper Plate: Regular paperboard or paper stock is the most common raw material for disposable paper plates. This type of paper is usually inexpensive and comes in various thicknesses depending on the desired strength and rigidity of the plate.



Fig: (A) Basic Paper Plate (Paperboard paper plate)

Laminated Paper Plate: For added strength, moisture resistance, or a decorative look, laminated paper can be used. This involves bonding a thin layer of plastic film to the paper base. Laminated paper plates are often used for hot or greasy foods.



Fig : (B) Laminated Paper Plate

Specialty Paper Plates : Some paper plate manufacturers use recycled paper, tree-free fiber (like bamboo), or even Areca leaf plates, which is a more eco-friendly option made from naturally fallen Areca palm leaves.



CHAPTER:9

FUTURE SCOPE

FUTURE SCOPE

The future scope of paper plate making machines appears promising due to several driving factors:

Environmental Concerns: With increasing awareness about environmental sustainability and the detrimental effects of plastic waste, there is a growing demand for eco-friendly alternatives. Paper plates, being biodegradable, present a viable solution.

Government Regulations: Many governments are implementing stricter regulations against single-use plastics, creating a favorable market for paper-based products. Incentives and subsidies for sustainable manufacturing practices may further boost the adoption of paper plate making machines.

Technological Advancements: Ongoing improvements in technology can enhance the efficiency and productivity of paper plate making machines. Innovations such as automation, energy-efficient processes, and the use of recycled materials can make production more cost-effective and environmentally friendly.

Consumer Trends: There is a rising trend among consumers preferring eco-friendly products. This shift in consumer behavior towards sustainable living will likely increase the demand for paper plates, supporting the growth of the paper plate making industry.

Expansion of the Food Service Industry: The food service industry, including catering, fast food, and take-out services, is expanding globally. This sector's need for disposable tableware, particularly in regions with stringent hygiene standards, will drive the demand for paper plates.

Market Penetration in Developing Countries: In many developing countries, there is a significant opportunity for market penetration. As these economies grow and urbanize, the demand for disposable tableware will increase, providing a vast market for paper plate making machines.

Customization and Design Innovation: The ability to offer customizable and aesthetically appealing paper plates can attract a broader customer base. Innovations in design and printing technology can add value, making paper plates more attractive for various occasions and events.

Overall, the convergence of environmental priorities, regulatory support, technological progress, and market demand positions paper plate making machines for robust growth in the coming years.

CHAPTER:10

CONCLUSION

Conclusion:

In conclusion, our study has demonstrated the effectiveness of using a motor and pulley to generate multiple paper plates at a time. By driving multiple machines simultaneously, we were able to significantly increase the production rate and improve the consistency and quality of the plates. The use of a single motor to drive multiple machines also offers the potential for significant energy savings, making this approach an attractive option for businesses looking to increase their production capacity while reducing their operating costs. Our study highlights the importance of optimizing the diameter of the pulley for controlling the speed of the machines. By adjusting the pulley diameter, we were able to achieve a high production rate while maintaining a consistent quality of the plates. Overall, our study suggests that the use of a motor and pulley to generate multiple paper plates at a time is a highly efficient and effective approach to paper plate manufacturing. Future studies could focus on further optimizing the design and operation of the machine to further increase efficiency and productivity, as well as evaluating the economic feasibility of implementing this technology in a commercial setting.

CHAPTER:11

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