

# Enhancement in Productivity of Insulation Paper Winding Machine

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**Abstract** - Paper winding machine is one of the simplest machines which wind the paper in needed amount. The conventional paper winding machine has complex mechanism and bulk size. Some modifications is done to the conventional machine and eliminating its defects, through careful analysis of current machines, use of alternative cheaper material and use of more energy efficient drive mechanism, it is possible to come up with cost efficient solution. The implementation of this design has major positive benefits to the development of economy. The main peculiarity of machine is its simplicity, reduced size, weight and also reduced floor space. This project can directly implement to paper winding machines in paper mills. By applying these modifications to the conventional machine reduced maintenance and servicing cost, it is well suited for small scale industry.

**Key Words:** Paper Winding Machine, Arm Plate, Main Shaft, Crepe Paper, AC Motor.

## 1. INTRODUCTION

This paper winding machine is applicable in many paper industries. Present work is based on insulation paper winding machine, Conventional paper winding machine was handle operated hence that machine can't give the accuracy and proper production.

By modifying that machine design making it motor operated for increasing production and accuracy, they used motor in existing machine in which the center shaft is operate by motor and on rectangular plate there is one arm which is fixed at one corner of the plate.

The one end of the arm plate is fixed on the plate by using nuts and bolts and on other end of arm plate shaft is fixed for holding the big roller of insulation paper but as per todays need this machine not able to give production hence by modifying the design of existing paper winding machine we design new paper winding machine, the existing paper



Fig.-1: paper winding machine.

winding machine is as shown in above fig.1 and new design of insulation paper winding machine is as shown in fig.2.

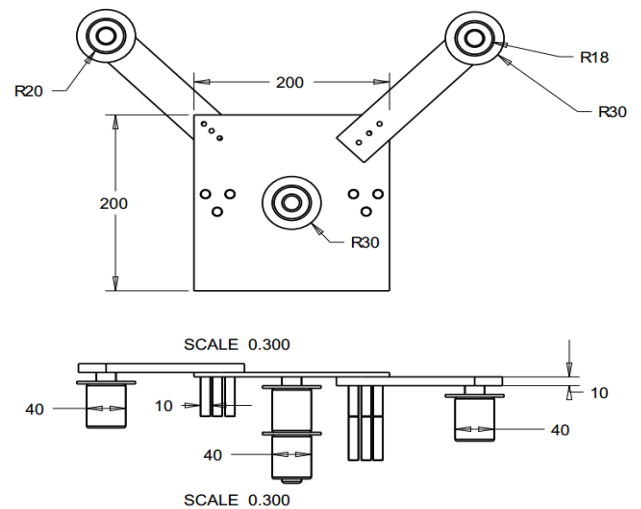


Fig.-2: Design of insulation paper winding machine

## 2. OVERVIEW

There are many industries where the paper winding machines is used. Similarly the winding mechanism is used for different purpose such as winding the coils, winding the silk in textile industries .In Conventional winding machine handle was used which is fixed at one side and other side bobbin is fixed for winding the paper, it takes more time and the accuracy of the production was very less i.e. Packing of the paper on the bobbin is not proper.



Fig-3: conventional paper winding machine.

The effective analysis is used for a side research of this project. The application can be seen by solving the problem facing by the operator while doing their job in a machine. The worker is facing body ache because of conducting a process manually that is cutting the paper, loading and unloading the paper roller and bobbin assembly for a long period. By doing a survey on the operator and used the survey for effective analysis, an automatic product was suggested to solve the problem that is paper winding machine. The conventional paper winding machine is as shown in fig.3

The project starts with review on the existing paper winding machines and understanding effective analysis in surrounding work. It continues with creating suitable design and material for the product (machine). The fabrications steps then held and the machine was make sure function correctly. An experiment was held to ensure the machine performance. All problems and related issues were explained clearly in this paper so for clarifying the all issue some modification was done in that machine and in place of handle they used motor in existing machine in that machine the center shaft is operate by motor and on rectangular plate there are one arm which is fixed at one corner of plate, the one end of the arm plate is fixed on the plate by using nuts and bolts and on other end of arm plate shaft is fixed for holding the big roller of insulation paper. But still required production was not achieved and does not fulfil the demand with this existing machine .hence for increasing the production and we design the new machine.

**3. TYPE OF COMPONENT**

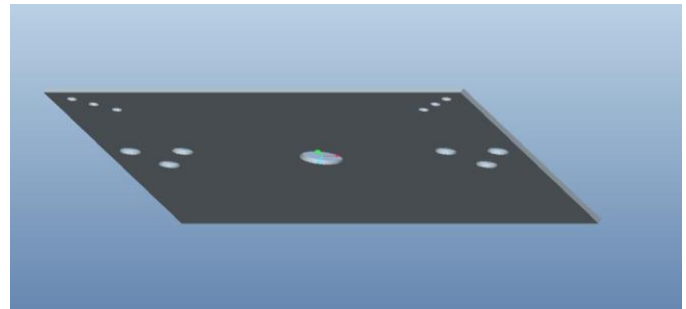
**TABLE -1:** Various Components Used in Machine

Sr no	Component name	Material	Dimensions (mm)	No of pieces
1	Side Plate	Mild steel	450x500x12	2
2	Shaft	Mild steel	φ25x500 φ30x450	2 1
3	Nut and bolts	Mild steel	M10x1	10
4	Motor	-	0.75HP	1
5	Base plate	Mild steel	785x480	1
6	Bush	Mild steel	Φ60x53	16

**4. MANUFACTURING PROCESSES**

**4.1 Drilling the Main Plate:**

The drilling operation is perform on drilling machine on which for supporting and holding the work piece fixture is used on that the M. S. plate is fixed for drilling .Total thirteen number of holes are drilled on plate as in following dimension .



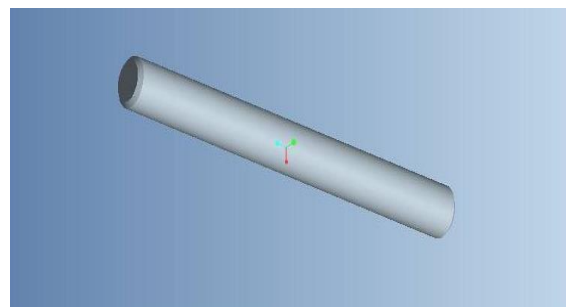
**Fig-4:** main plate

- 6 holes of φ10 mm at corner of plate at an angle 45°, 3 holes at each corner.
- 6 holes of φ25 mm a middle part of the plate 3 holes on each side.
- 1 hole of φ33 mm at a center of the plate.

**4.2 Cutting the Shaft:**

There are two types of the shaft one is guide shaft and other is center shaft of mild steel is cut on cutting machine as in following dimension

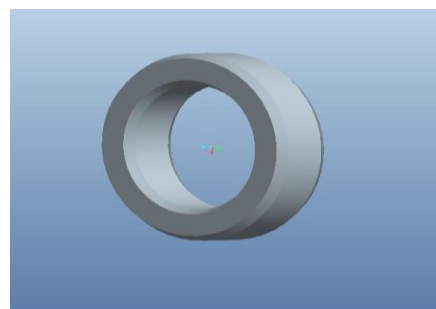
- 3 guide shafts of φ25mm x 120mm
- 3 guide shafts of φ25mm x 200mm
- 1 center shaft of φ30mm x 450mm



**Fig-5:** Center Shaft

**4.3 Cutting the Washer and Finishing**

The washer is used for guide the paper which is come from paper roller, the washer is fixed on guide shaft and it cut on cutting machine and give finishing on the lathe machine the operation performed on the lathe is as follows



**Fig-6:** Washer

- Turning
- Facing
- Drilling
- Boring
- Chamfering

The material selected for the washer is mild steel and it cut in dimension of  $\phi 35 \times 5\text{mm}$

#### 4.4 Cutting and Finishing Of Bush

The bush of mild steel is as shown in figure it cut on cutting machine and by performing the different lathe operations give finishing such as

- Turning
- Facing
- Drilling
- Boring
- Chamfering

The bush having dimension  $\phi 60\text{mm} \times 53\text{mm}$

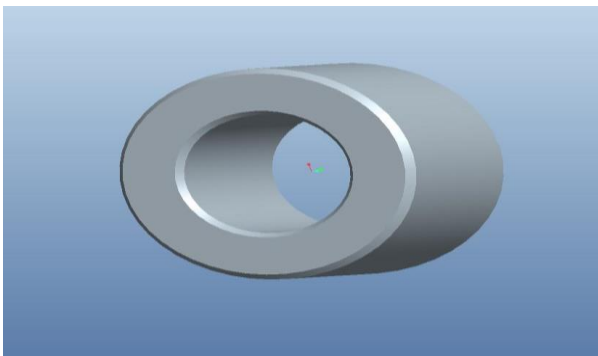


Fig-7: Bush

#### 4.5 Drilling The Arm Plate

The arm plate of mild steel is drilled on drilling machine there are three holes which is drilled on plate of  $\phi 10\text{mm}$  for fixing on main plate at an angle of  $45^\circ$ .

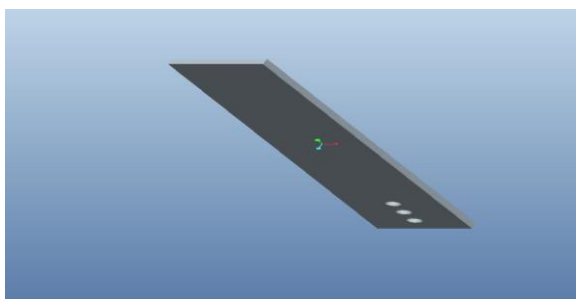


Fig-8: Arm plate

### 5. CONCLUSIONS

By implementing the new paper winding machine It reduce the inventory cost, and it increase the production of the

industry and save the time i.e. in same time it doubled the production. Precision winding is obtained in this machine. The cost and other parameter are required very less. So the machine will be beneficial for the small industries and the paper mills. The most interesting modification is in place of one arm we used two arms for holding the paper rollers.

Manual winding is quite tedious job to do and it depends completely on the skills of worker .But the machine can be used by any other person without much knowledge of the winding techniques.

We can do automation on than machine by using sensors, robotics so due to this we zero the manpower and we save more time this effect we increase the production as well as increase the accuracy of the products.

### ACKNOWLEDGEMENT

I am very glad to represent the paper on “Enhancement in Productivity of Insulation Paper Winding Machine”. I have try my best to focus upon each and every parameter.in concern with this topic details ,necessary figure, definition ,tabular analysis has been enumerated in very easy, simple, compact and lucid manner.

I have been able to achieve this task by the dynamic guidance of honorable prof. S. J. Chede; because of his reference and guidance we able to fabricate as a machine.

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## BIOGRAPHIES



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