



# DEVELOPMENT OF ORBITAL WRAPPING MACHINE

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## ABSTRACT

*The aim of this paper is to study the Orbital Wrapping Machine and their various components and to develop a wrapping machine affordable for small scale industries or small start-ups. After taking analysis we got to know that most of the wrapping are too much costly which a small manufacturer cannot afford, so they use some old techniques to complete their process. So, we are going to build an affordable, easy to use, having basic functionalities for a small-scale manufacturer. In this machine only basic important functions are retained so that we can cut the cost in making. In this project we have done our best to design, fabricate a working model of Orbital Wrapping Machine.*

## 1. INTRODUCTION

Wrapping Machine are used in manufacturing units for covering the surface of the product so that the surface of the product remains protected for unnecessary moisture.

Unnecessary moisture leads to corrosion, therefore wrapping the product with good stretch film protects the surface from getting corrode. Most of the wrapping machines are expensive which a small manufacturer cannot afford. They have a lot of features such as automatic cutting of the stretch film feature which increases the cost of the machine. For a start-up level manufacturer, they need basic functionality to do their job.

So, after studying the facts we made a successful model of a wrapping machine with basic features considering the need.

## 2. METHODOLOGY

As per our study we have found that the orbital wrapping machine used in industries are not suitable for the small or intermediate size of product to be wrapped. Due to the light weight of the product, they might get uplift with the wrap material or stretch

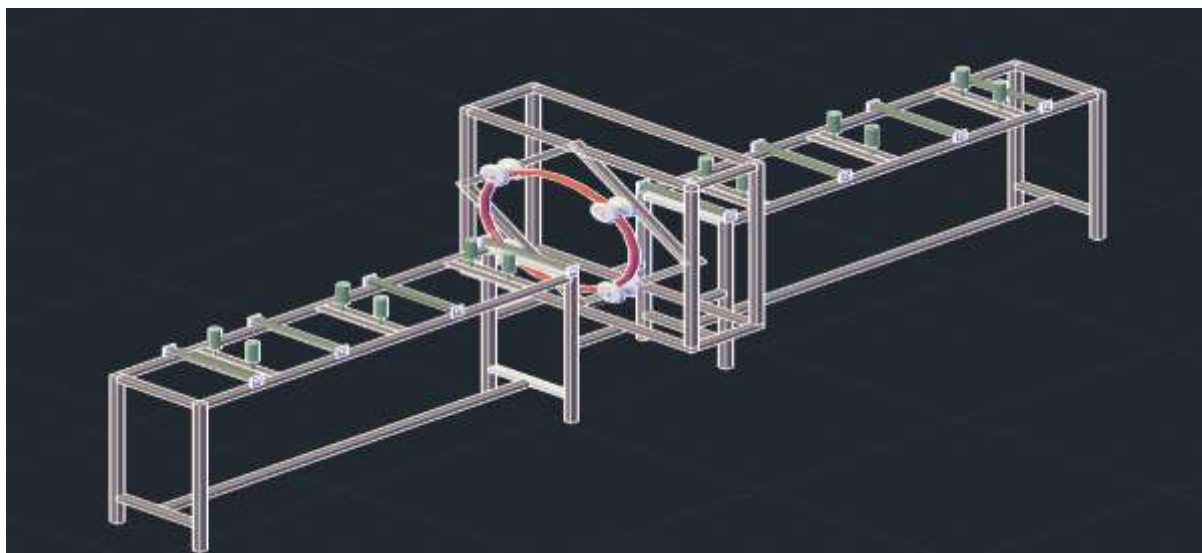
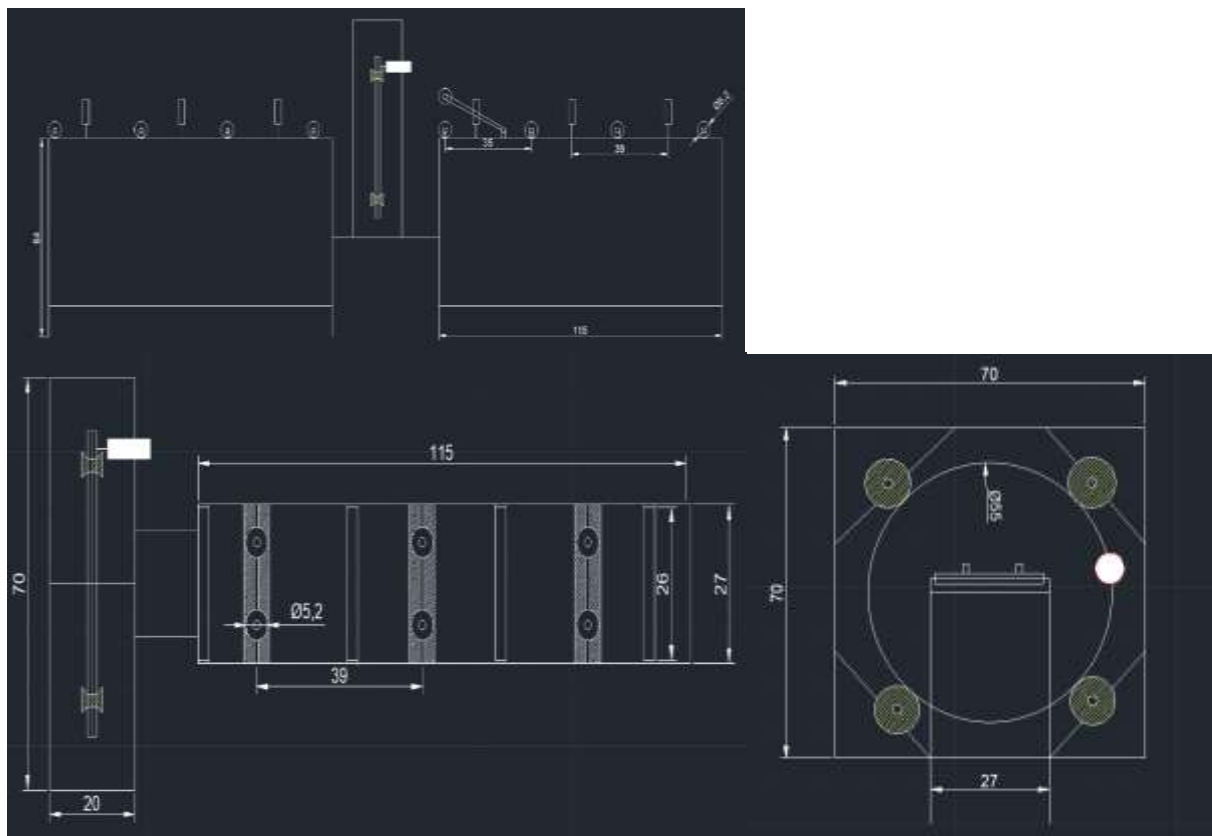
film. To overcome this situation, we make changes in traditional wrapping machine by providing supporting roller and clamp which will hold the product during wrapping.

### 2.1 PROBLEM IDENTIFICATION

The number of Orbital wrapping machine are used in large scale industries to wrap the Pallets and other products are very expensive which might not be affordable for small scale industries. The other problem which are generally observed in wrapping machine are. Tearing of stretch film, Shrinkage of wrap materials, Wrapping on Bar too loose or too tight, Uneven wrapping on the Bars, Loose wrapping cause the materials to get rust or other damages seen on bars, Lag in feeding movement of the materials to be wrapped by conveyors.

### 2.2 Design

The designing consist of selection of material and power source, synthesis of the mechanism, force analysis, determining the dimensions. This has been done and explained below in the part list.



### 2.3 Components

Sr. no	Components	Dimension
1.	Conveyor frame	Length = 120 cm, Width =27cm, height= 64cm
2.	Ring frame	Length= 71.5cm, Width =20.5cm, Height 68.5cm
3.	Centre ring	Diameter = 55 cm
4.	Conveyor motor	12 volt Speed= 30 RPM Torque= 5 kg.cm
5.	Ring motor	12 volt, 200 rpm, Torque =10 kg.cm
6.	Roller bearing	Bearing no. Z809 ,outer diameter=22 mm, inner



7.	Horizontal roller	Length =26 cm, Diameter = 26 mm, shaft length =
8.	Supporting roller (vertical	Shaft Length =12.5 cm , Diameter= 26mm, shaft
9.	Distance between 1 <sup>st</sup> and 2 <sup>nd</sup>	Length =35 cm
10.	Distance between 2 <sup>nd</sup> and 3 <sup>rd</sup>	Length =35 cm
11.	Distance between 3 <sup>rd</sup> and 4 <sup>th</sup>	Length = 35 cm
12.	Supporting roller distance	Length = 39 cm

Sr. no	Component	Unit
1.	Central ring	1
2.	Conveyor	2
3.	Dc motor	2
4.	Horizontal Rollers	7
5.	Vertical rollers	8
6.	Fabrication Frame	1
7.	Wrapping wheel holding rollers	4
8.	SMPS	1
9.	Regulator	1

**Central Ring: -**

Central ring is the main part of the wrapping machine. Which consist of wrapping tape. when the ring rotates with the help of dc induction gear motor. when rod is feed to words ring it efficiently wrap the rod and give the tight wrap and equal distance wrapping in minimum time. Material of the ring is mild steel and wrapping material is plastic is also called stretch film.

**Conveyor:** - conveyor is the main part of wrapping machine. the function of the conveyor in the wrapping machine is to feed the rod with the constant speed. there are two type conveyors are present in the wrapping machine are as follows:

1. **Feeding conveyor:** - feeding conveyor give the feed towards the central part of the wrapping machine is called as ring. only feeding conveyor consist of the moving rollers. the rollers can rotate with the constant speed.

2. **Receiving conveyor:** - the function of the receiving conveyor is to receive the wrapping pipes. This conveyor is also called free conveyor because there are no moving rollers are present to receive.

**Dc gear motor:** - Dc motor plays an important role in the wrapping machine. dc motor gives the constant revolution speed to the ring and the conveyor .in the ring we use the dc motor of 12 volts, 200 rpm and torque of 10 kg.cm and the dc motor used in conveyor is 12 volts ,30 rpm and torque of 5 kg.cm.

**Horizontal rollers:** - In the wrapping machine horizontal rollers is also called as followers. Horizontal rollers consist of the bearing and the shaft. the specification of bearing is bearing no is Z809, outer diameter is 22mm and internal diameter is 8 mm. the specification of the shaft is length is 29 cm,

diameter is 8mm. and the dimension of roller is length of 26 cm and diameter is 26mm.

**Vertical rollers:** - vertical roller is also called supporting rollers. which is used to support or guide the pipe towards ring without misguide the pipe. this roller are movable rollers and adjust as per the size of the pipe we want to feed. The specification of the vertical rollers are as follows: the length of the shaft is 12.5 cm and diameter of shaft is 8 mm and the roller length is 8cm and diameter is 26 mm

**Fabrication frame:** - the fabricated frame is the main component where the whole assembly will take place. the fabricated frame is made of mild steel hollow square pipes. fabricated frame is consisting of conveyor frame and ring frame. conveyor is the table like structure, specification of the conveyor is as follows that is length if 115 cm and width of 27 cm and height of 64 cm the specification of the ring frame are as follows that the length is 70cm, breadth of 70 and width of 20 cm

**Wrapping wheel holding rollers:** - Holding rollers are used to hold the ring and wrapping wheel and wrapping material (stretch film). the wrapping rollers are made up of nylon material gives the suitable friction and help to rotate the ring the wrapping rollers are free to move.

**SMPS**

SMPS is the Switched Mode Power Supply circuit which is designed for obtaining the regulated DC output voltage from an unregulated DC or AC voltage. There are four main types of SMPS such as. DC to DC Converter. AC to DC Converter. We use ac to dc SMPS

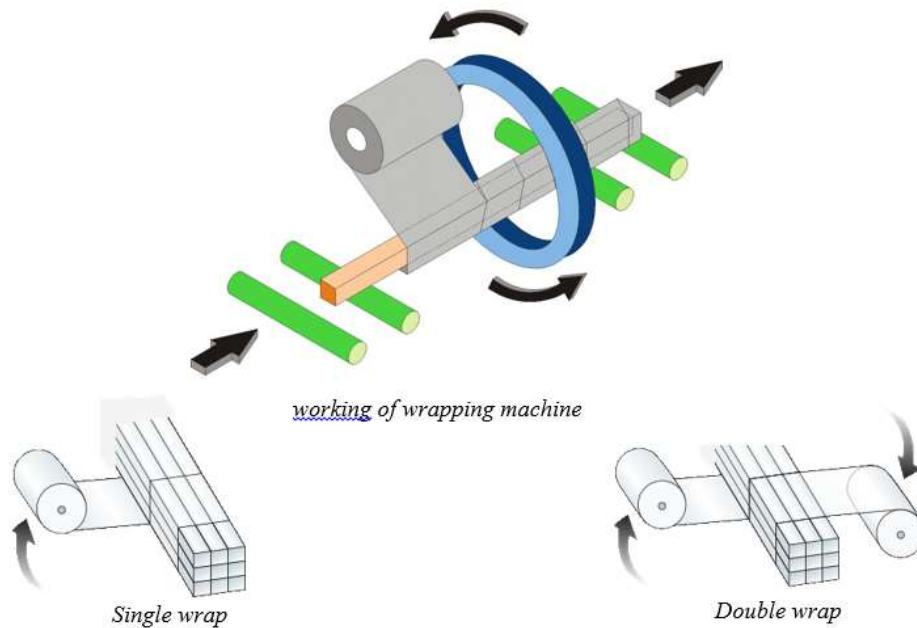


## Regulator

An electronic speed control (ESC) is an electronic circuit that controls and regulates the speed of an electric motor. It may also provide reversing of the motor and dynamic braking. Miniature electronic speed controls are used in electrically powered radio-controlled models

## 3. WORKING

It consists of an input and output table, between which a rotating crown (ERL) is located. Its operation is very intuitive: once the product to be packed is located in the center of the entrance table, the process starts automatically. The product advances to the crown, where it is wrapped by the stretch film. In this way, the package is closed and protected on all 4 sides.



The primary wrap is ideal where the material contrasts with the product, such as a package of loose letters. The secondary wrap refers to a situation in which the product is already wrapped using a different style in which this time you need to add a wrap on the top. Then, transit wrap, which is mainly used for the collection of loose products. Then, understanding these functions provides you with a basis for knowing how this particular stretch wrapping machine works. Speaking of how it works, the principle is that the product is pushed through a sheet of film that is cut from a single reel. What happens is that a longitudinal or base thermal seal is created where the film tends to overlap. Therefore, this equipment consists mainly of different mechanisms. It has a wrapping mechanism, a transport device that receives moves and also downloads the items. A semi-automatic stretch wrap machine also contains a roll of wrapping materials that have already prepared labels, a gluing device and, in some cases, a counting device.

## 4. BENEFITS

**Speed.** The orbital wrapping machine can achieve throughput rate significantly higher than manual wrapping machine.

**Scalability.** Because the wrapping machine is fast, it enables the smaller companies or manufacturers to more easily scale their operation or production as they grow.

**Uniformity.** Wrapping machines applies same amount of material in the same way to each package or product. This is important from the point of view of quality control and customer expectations.

**Quality.** Automatic wrapping results in more secure shipping and unitized loads, reducing any kind of damage to the package.

**Material cost reduction.** Machines apply significantly less material to the package or product than packaging applied manually. This can reduce the material usage by half or more. And less packaging material usage is good for the environment.

**Labor redeployment.** Rather than engaging personnel in time consuming, repetitive packaging tasks, staff can focus on more important and revenue generating activities.

## 5. CONCLUSION

In this development of project we are aiming to increase the productivity of the small industries or manufacturer and reduce the cost of machine so that the small manufacturer can afford it and improve the



quality of their product by effective wrapped packaging. Thus cost effective wrapping machine can serve his purpose to Small Scale Industried

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