

# Fabrication Of Floor Scrubber Machine

Saravanan N, Sanjay S, Sreenithyanandan R S, Vimal Raj T

**Abstract:** The purpose of this project is to clean the floor in colleges, hospitals, auditoriums, malls and workshops. It is to design and develop floors for cleaning wet and dry surfaces. It is useful for cleaning wet as well as dry floors. In modern days interior cleaning is becoming important in our life, floor cleaning is important for our health and this floor cleaning machine reduces the effort required for cleaning. So this project is very useful in our day to day life. It is simple to manufacture and easy to operate, anyone can operate this machine easily. This floor cleaning machine consists of conveyor belt, swiping brush, wipers. The total cost of this machine is also affordable. Machines already available in the market are operating under different principles and the cost is very high. In recent years, floor cleaning machines are becoming more popular for cleaning large floor area in minimum time. However in India, which is a developing country, a large number of such machines are needed to meet the cleaning needs

**Index Terms:** clean, floor, machine, manufacturing, wet, dry, cost.

## 1. INTRODUCTION

Cleaning machines are very useful in cleaning around us such as roads, grounds, college premises and public spaces etc. In modern days interior as well as exterior cleanliness is becoming an important role in our life. Waste cleaning is very important for our health and reduces the need for manpower. Many road cleaning machines are available, but the project aims to make construction much simpler and easier. Anyone can operate this machine easily. Hence it is very useful in cleaning the playground, any large area. The time taken for cleaning is very less and the cost is also less. Maintenance costs are low. Many types of machines are widely used for this purpose. The project consists of a machine built with a small amount of electrical equipment to operate in a purely mechanical way. The floor cleaner is of simple construction and is easy to operate, one can operate it with safety without any prior training. Cleanliness is an essential requirement of this generation. Basically colleges have a road to clean dirt or dust regularly for cleaning different rotary speeds on the cricket field and floor. By the 1840s, England had become the first industrial city. Manchester was the first passenger rail service in the world and one of the largest textile industries of the time. As a result, the strong metropolis was said to be an unhealthy place to live in England. In response to this uncertain environment, Joseph Whitworth invented mechanical street and floor scrubbers. Scrubbers were designed with primary objectives to remove dirt, dust, and dust from roads and floors to maintain aesthetic goals and safety

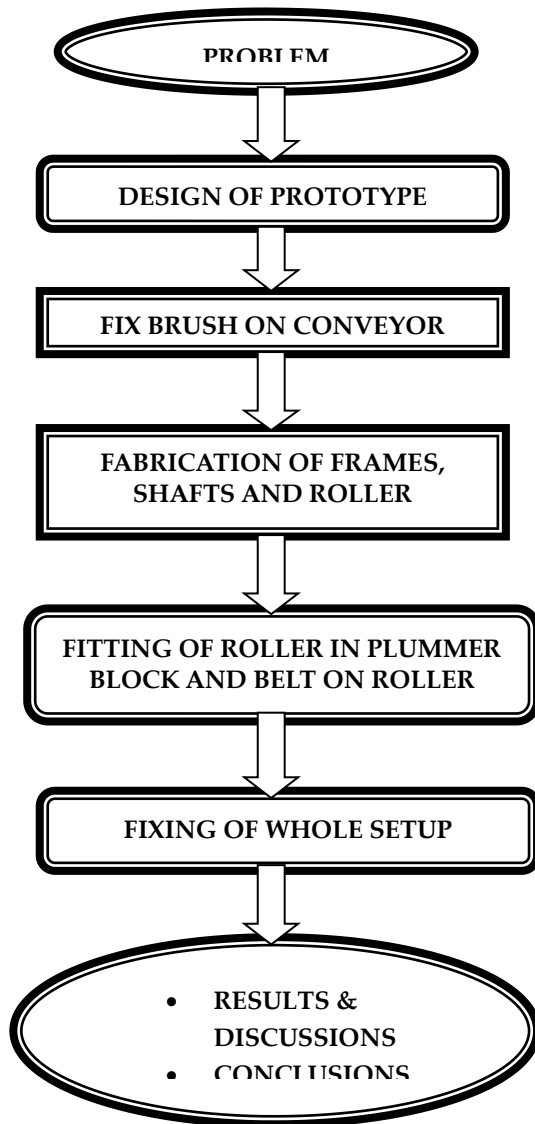
## LITERATURE REVIEW

Prathamesh Joshi, Akshay Malaviya, Priya Soni (2013) This paper is based on a "manual operated platform cleaning machine", which provides the basic requirement of cleaning very large floor areas such as railway platforms, hospitals, malls and many investments. this. In recent times, Indian Railways has purchased platform rider scrubbers and platform cleaning machines from various companies to ensure cleanliness. Due to the absence of electricity at bus stands, railway platforms and

other commercial locations, the automatic cleaning machine is not suitable at all costs. The author built a four-wheel cart with the help of accessories such as belts, pedal axles, scrubber brushes; The U-clamp cleaning process is executed. Sandeep J. Meshram, Proc. GD (2016) This paper describes the design and manufacture of a three-wheeled road cleaning machine that some foreign automatic machines are used according to the road conditions in our country. The author aims to propose a semi-automatic machine to reduce human effort and time in rural and urban areas. Through this article, suggested solutions are being made for the current state of the art. The technology of this unique machine runs with the power of ten humans. Ritwik Ghosh, HR Vinay Kumar, Dattatreya, Pawan Kumar b. Hiremath, Proc. Pradeepab (2014) Kumar Pedal Driven Floor Mapping Machines are operated at low speed with the help of mechanical power using foot pedals. This mechanism is close to the spinning mop, also known as the "magic mop". Bevel gear with right gear specification has been used for speed gear. And for better ergonomics the machine is operated on three wheels using paddles with the help of a mechanical drive train. In order to provide efficient and effective cleaning without missing any spots, an attempt has been made to make the turning radius of the machines as small as possible. 5 An additional mechanism is provided to drain the dirty water by which the mop can be cleaned and fresh water is supplied to offer continuous floor cleaning. M. Ranjit Kumar, N. Kapilan (2015) This paper elaborates a manually used floor cleaning machine that is different from traditional floor cleaning machines that rely on electricity for use. This machine is modelled and analyzed using available software called ANSYS, the stress levels in the machine were found to be within safe limits after finite element analysis. This cleaning machine is uniquely designed to clean floors that are smooth and plain such as tiles, mosaics and smooth surfaces. Manual cleaning machine is a better option than automatic cleaning machine in times of power crisis. The pedal operated body is used concurrently to achieve dry and wet cleaning.

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## METHODOLOGY



## FABRICATION PROCEDURE

At first the frame of floor scrubber is manufactured as per the designed load by square tubes. Trolley wheels are attached to that. The two rollers are placed on the frame by means of shaft and pedestal bearings (Plumber block). Two rollers are connecting with conveyor belt and in the rollers by which the belt drive is used to transmit the rotary motion. The transmission shaft is supported by using bearings with frame.

## WELDING

The base made of mild steel square frame is done by using welded joint. Arc welding is chosen and the current is adjusted to 1Amps. Then fixed arm assembly with the shaft is also done by using welded joints.

## SHEETMETAL CUTTING

Sheet metal is used to make a collector box. First the required shape is drawn on the sheet metal and cut using cutter plier. The required shape of collector box is made. Sheet of 0.25mm is selected.

## ASSEMBLY

Finally the movable arm is assemble is the fixed plate which is already welded in the shaft. It is inserted by drilling on a fixed plate. Then, the shaft is mounted in the base frame through the bearing. The wheel base assembly is done by using the bearing which is fixed on the base by using fasteners

## DESIGN MODEL

A design is a plan or specification for the creation of an object or system or for the implementation of an activity or process, or a prototype, product or process as a result of that plan or specification. This 3D model has been created using the CREO PARAMETRIC version 5.0 software package.



3D model

## DESIGN CALCULATION

Conveyor calculation

$$\begin{aligned} \text{Length of the belt } (L) &= ((D+d))/2\pi + 2C \\ L &= ((0.08+0.08))/2\pi + 2 \times 0.414 \\ L &= 1.079 \text{ m} \end{aligned}$$

Belt load (P)

$$\begin{aligned} \text{Belt Load } (P) &= G_1 \times C \times W \\ &= 1 \times 0.414 \times 2 \\ (P) &= 0.828 \text{ Kg/m} \end{aligned}$$

Belt Tension (Tb<sub>1</sub>)

$$\begin{aligned} &= 1.37 \times \mu \times C \times g \times (2 \times m_i + (2 \times m_b + m_m) \times \cos\theta + (h \times g \times m_m)) \\ &= 1.37(0.3) \times (0.414) \times 9.81 \times (2 \times 6 + (2 \times 5 + 4) \times \cos 45 + (0.35 \times 9.81 \times 4) \\ & \quad (2 \times 6 + (2 \times 5 + 4) \times \cos 45 + (0.35 \times 9.81 \times 4) \\ [(Tb)_1] &= 59.47 \text{ N} \end{aligned}$$

Belt Tension (Tb<sub>2</sub>)

$$\begin{aligned} [(Tb)_1] / [(Tb)_2] &= e^{\mu\theta} \\ 59.47 / (Tb)_2 &= e^{(0.3 \times 180)} \\ [(Tb)_2] &= 14.02 \text{ N} \end{aligned}$$

$$\begin{aligned} \text{Torque} &= (Tb_1 - Tb_2) \times (D+d)/2 \\ &= (59.47 - 14.02) \times 0.08 - \end{aligned}$$

$$14.02) \times 0.08$$

$$\text{Torque} = 3.63 \text{ Nm}$$

Motor calculation

$$\begin{aligned} \text{Power} &= 2\pi NT/60 \\ 745 &= (2\pi \times 1500 \times T)/60 \\ \text{Motor Torque } T &= 4.747 \text{ N.m} \end{aligned}$$

Pulley calculation

$$\begin{aligned} N_1/N_2 &= D/d \\ 1500/N_2 &= 70/35 \\ N_2 &= 750 \text{ RPM} \end{aligned}$$

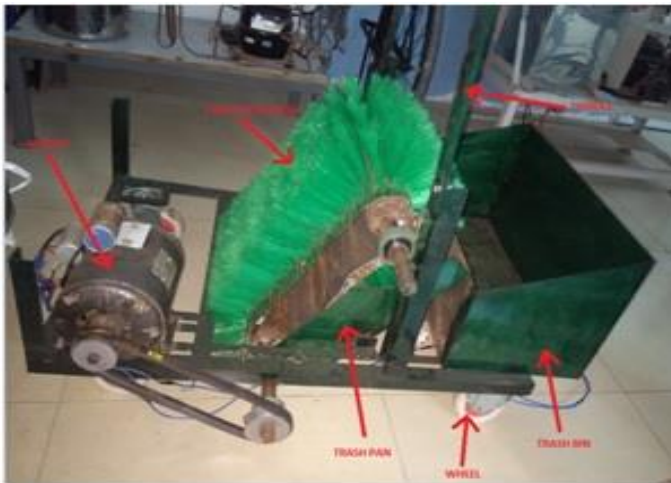
Trash bin capacity

$$\begin{aligned} \text{Volume} &= b \times h \times l \\ &= 0.25 \times 0.600 \times 0.15 \\ \text{Volume} &= 22.5 \text{ litres} \end{aligned}$$

very useful for the society and being cost effective and energy efficient can play an important role in India's sanitation.

## EXPERIMENTAL SETUP

The fabrication of each component is made according to the procedure. The brush attached throughout conveyor belt length and this belt fix on bottom conveyor belt and this belt connects the two rollers. This brush attached belt and rollers are arranged in inclined and the dustpan is arranged in same inclination to brush attached belt and roller setup. The bottom end of dustpan maintains small clearance to floor for waste and dust hold between the dustpan and brush and the top end of the dustpan is attached to trashcan. The trashcan mounted on back side of the chassis.



Fabricated model

## WORKING THE MACHINE

The floor scrubbing machine consists of various elements such as, AC motors, brush in the form of belt, belt roller, trash pan, trashcan, frame. The brush is attached throughout the belt length. Initially belt roller get's drive from the AC motor through belt drive. The brush belt connects the two rollers and brush belt was arranged in an inclined manner between the two rollers. The clockwise rotation of roller rotates the conveyor brush belt arrangement in clockwise direction. The bottom end of dustpan maintained at small clearance from the floor. The trashcan mounted on backside of the chassis. The machine moves forward on floor. The brush can easily pickup and trap the waste through dustpan will trap and carry the waste particles with help of dustpan, finally dust, dirt or waste drops in trashcan, and all collected waste are stored in trashcan. The whole setups were assembled on a frame

## CONCLUSION

The product thus developed is fully operational and gives the desired output. It is being tested in various types of floors resulting in successful results. It focuses on the cleanliness of roads, paths and other floors. Many applications provide a variety of functions in which we can clean a pipe, remove metal particles harmful to the road, remove dust and dirt from the road, provide a pick and place mechanism By which barriers can be removed. The project implements eco-friendly floor cleaning and reduces cost, human effort as well as time and does not cause any pollution to society. A low budget project is

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