



Wireless Multi-Purpose Floor Cleaning Machine

Jigar Patel¹, Bijal Rana², Swapnil N Sharma³
Assistant Professor³

Department of Electrical Engineering

Neotech Institute of Technology, Gujarat Technological University, Gujarat, India^{1,2}
Neotech Institute of Technology, Virod, Vadodara, India³

Abstract:

The main aim is that it combines operation of all three different device's operation. Main purpose of this project is design to make cleaning process easier than by using manual cleaning. Push or walk behind scrubbers can increase productivity over manual cleaning greatly. In particular, they help to reduce worker as cleaning can cover more space than old map and bucket method. This project is based on innovative project design, development and manufacturing of semi- automatic floor cleaning machine which will work on electricity. A semi-automatic floor cleaning machines developed by keeping basic consideration for less energy consumption, machine as well as operational cost reduction, reduce the human effort, environment friendly and easy to handle. It performs two operations Sweeping and Mopping. In our case a single vacuum pump is used instead of using two vacuum which saves power.

Key Words: Sweeping, Mopping, Vacuum, Designing, Fabrication.

1. INTRODUCTION

- Different type of floor cleaning machine are available today such as floor buffers, automatic floor scrubbers are working under different principle and maintenance cost is very high.
- **This machine is divided into three various mechanisms :**
 1. Dust cleaner
 2. Vacuum cleaner
 3. Floor cleaner

Good well-maintained entrance matting can dramatically reduce the need for cleaning. For public and office buildings about 80 to 90% of the dirt is tracked in from outside. Installing a total of approx. 15 feet of matting consisting of both indoor sections will remove about 80% of this. Thus about two-third of the dirt can be removed at the entrance.

Reasons for Cleaning Floors

The principle reasons for floor cleaning are:

- To prevent injuries due to tripping or slipping. Injuries due to slips and trips on level floors are a major cause of accidental inquiry or death. Bad practice in floor cleaning is itself a major cause of accidents.
- To beautify the floor.
- To remove stains, dirt, litter and obstructions.
- To remove allergens, in particular dust.
- To prevent wear to surface.
- To make the environment sanitary.
- To maintain an optimum traction.

How to operate a Floor Cleaner

Floor cleaners clean your floor better and leave it dryer than you can do yourself with a mop and bucket. They come in many sizes and styles and can thoroughly clean just about any kind of floor surface. The principle is the same for most models: a water and cleaner solution is separate onto the floor, scrubber in with a

vibration or rotating brush, then vacuumed up into an outflow tank. They are especially good for hard tiles like ceramic. For home use, you can buy or rent small models about the size of standard vacuum cleaner. This machine is not for home use. It is used in hospitals, houses, auditorium, shops, computer center etc which has open area.

2. MATERIALS AND METHODOLOGY

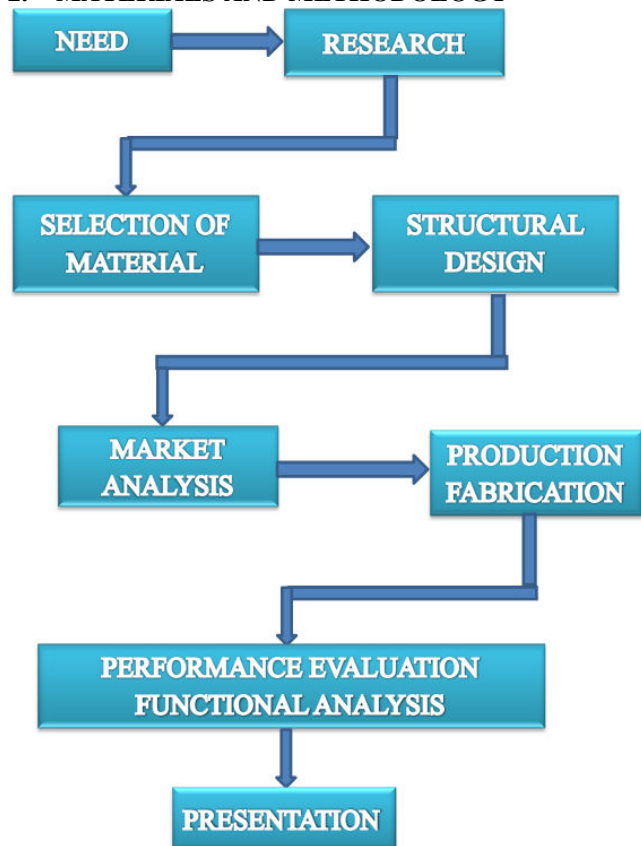


Figure .1. Methodology

3. BODY PARTS

1. DC Gear Motor:

- It is an Electrical machine that utilizes electric power resulting in mechanical power output.
- Normally the motor output is a rotational motion of the shaft.
- A Gear Motor is a specific type of electrical motor that is designed to produce high torque while maintaining a low horsepower, or low speed, motor output. Gear motors can be found in many different applications, and are probably used in many devices in your home.
- Gear motors are commonly used in devices such as can openers, garage door openers, washing machine time control knobs and even electric alarm clocks. Common commercial applications of a gear motor include hospital beds, commercial jacks, cranes and many other applications that are too many to list.
- The gear assembly helps in increasing the torque and reducing the speed. Using the correct combination of gears in a gears motor, its speed can be reduced to any desirable figure.

2. Lead Acid Battery:

- The storage battery or secondary battery is such a battery where electrical energy can be stored as chemical energy and this chemical energy is then converted to electrical energy as and when required.
- Main power supply is 12 V, 7 A.

3. Switch Board:

- It is fixed onto the handle. It is used to start and stop the machine as per requirement.

4. Water Tank:

- It stores water in it. While doing wet cleaning it provides

water as per the requirement.

5. Wheels:

- Here 4" fiber wheels are used. Rubber is wound on their periphery for avoiding slippage.

6. Frame:

- It is a main part of machine which holds all other parts on it. It is made up of metal pipe because it satisfies all conditions required.

7. Shaft:

- Shaft is a mechanical component for transmitting torque and rotation, usually used to connect other components of a drive machine that cannot be connected directly because of distance or the need to allow for relative movement between them.

8. Submersible Motor:

- Submersible pump is centrifugal type of pump which pumps out water from the plastic container.
- The pump remains dipped in water due to which there will not be any suction trouble.
- Micro DC 3-6 V micro Submersible Pump is a low cost, small size submersible pump motor which can be operated from a 2.5-6 V power supply. It can take up to 120 liters/hour with very low current consumption of 220 mA.

9. Motor Clamp:

- It is used for motor fitting & motor supporting purpose.
- Its thickness is 2mm and motor mounting hole diameter is 10mm.
- It is made up of mild steel.

4. HARDWARE DESIGN

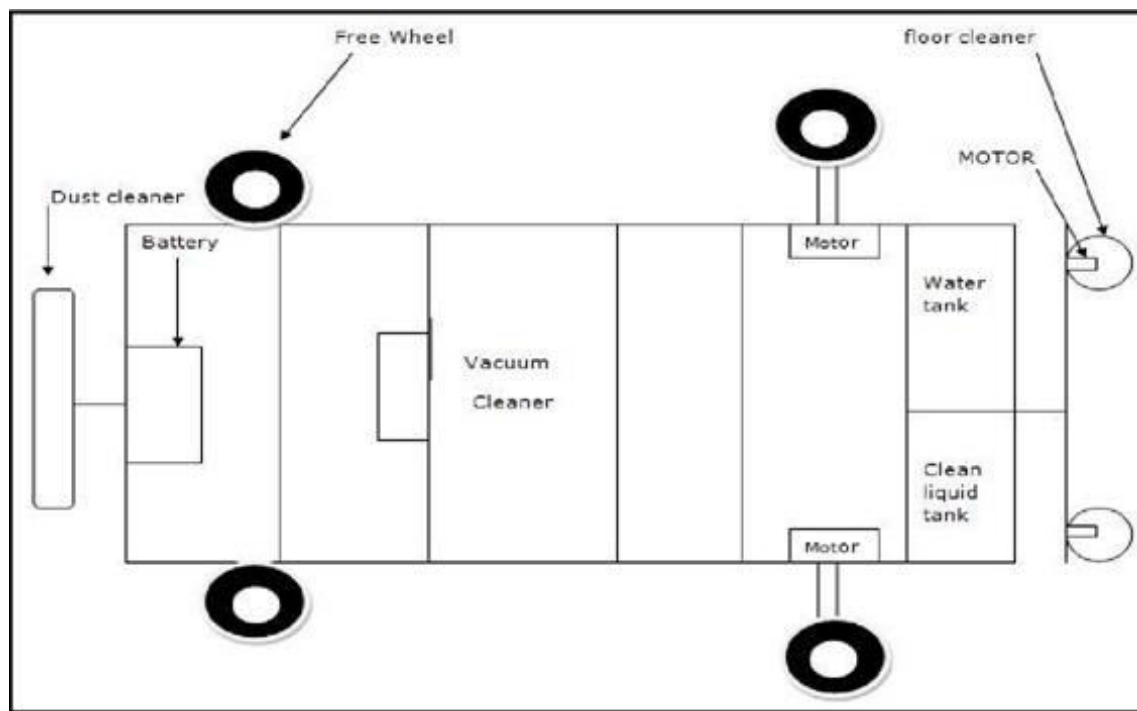


Figure .2. Hardware Design

5. CHASSIS DESIGN:

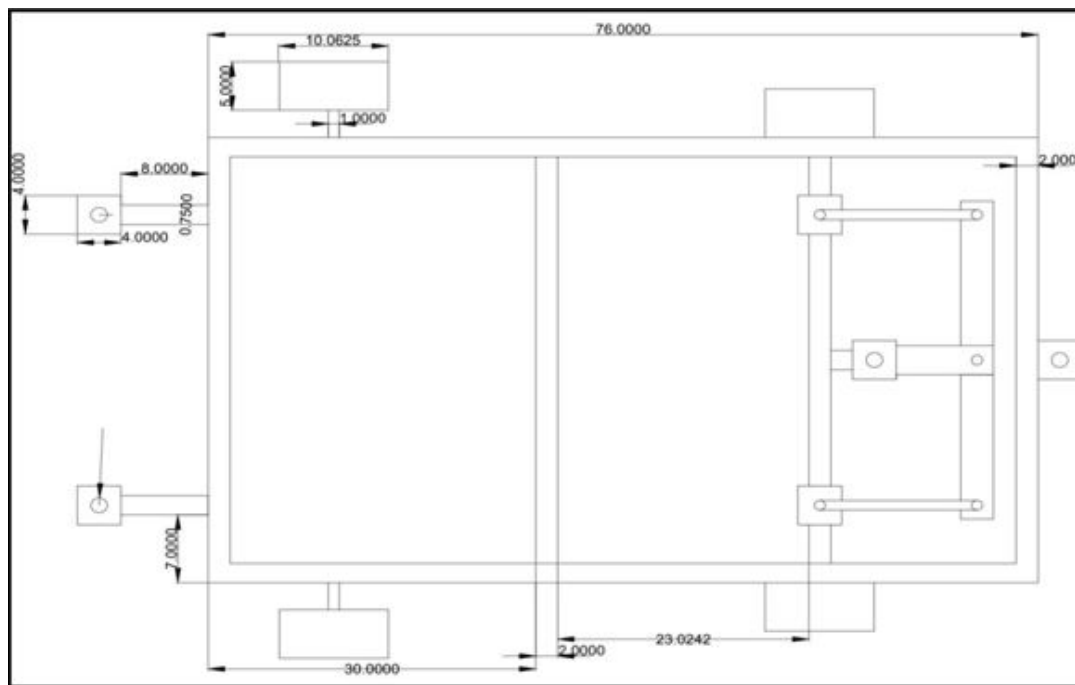


Figure.3. Chassis Design

4. SPECIFICATION OF PARTS

Table .1. Specification of Parts

Sr. No.	Components	Nos.	Ratings
1.	DC Gear Motor	1	12 V, 1 A,3.5 RPM
2.	Lead Acid Battery	1	12 V, 7 A
3.	Shaft	1	6mm
4.	PVC Sheet	1	5mm(thickness)
5.	Nut Bolt	1 Packet	8mm x 2inch
6.	Wheels	4	5cm (Radius)
7.	Wire	5m	7m
8.	FW/RW Switch	1	24 V, 7 A
9.	ON/OFF Switch	4	24 V, 7 A
10.	Metal Pipe	20ft	20ft
11.	DC Motor	5	12 V, 1 A,200 RPM
12.	Dust Cleaner	1	--
13.	Motor Clamp	5	2mm thickness, hole 10mm
14.	Free Wheel Knob	2	--
15.	Wooden Sheet	1	1200 x 2400mm
16.	Floor Cleaner Mop	2	--
17.	Vacuum	1	60 W
18.	Submersible Water Pump	2	3-6 V DC
19.	Plastic Container	1	--

5. WORKING PRINCIPLE

Speed and torque are inversely proportional to each other. That means if the speed get reduced then torque get increased so as to

get same power outcome as three various operations:

1. **Dust Cleaner-** To Clean the Dust
2. **Vacuum Cleaner-** To Suck up the Dust
3. **Floor Cleaner-** To Clean the Surface

8. MANUFACTURED MODEL:

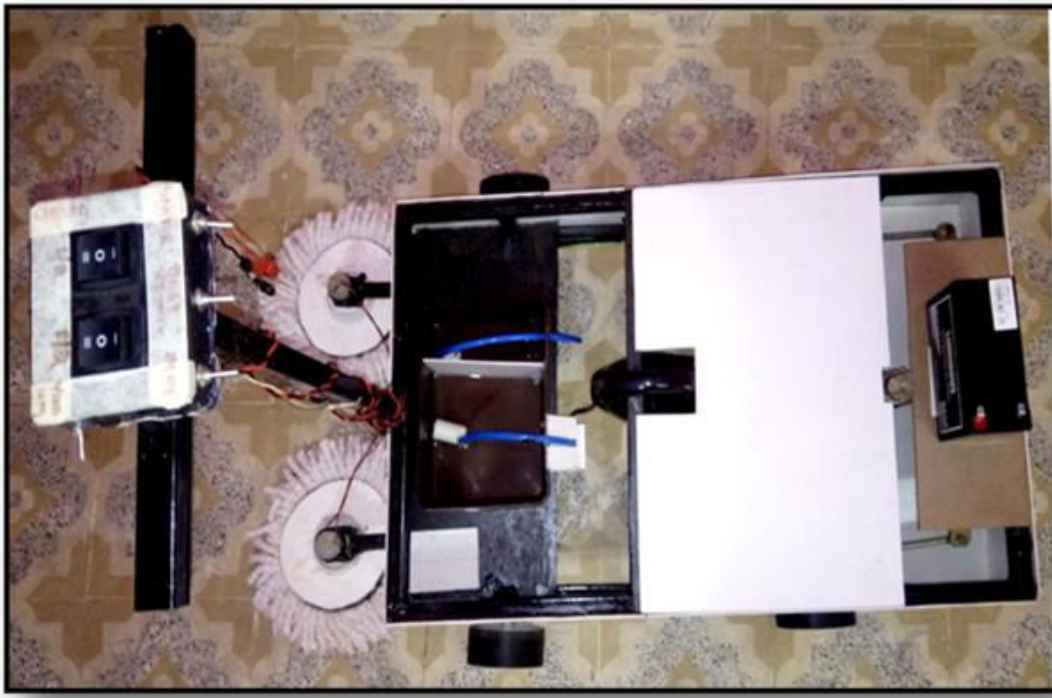


Figure.4. Manufactured Model

9. WHY OUR IDEA IS INNOVATIVE?

- └ Existing machines are not wireless.
- └ There are two different product available for doing dust cleaning and floor cleaning there are two machines vacuum cleaner and floor scrubber.
- └ **But our floor cleaning machine will become wireless.**
- └ **It performs multiple operation at a time for e.g. sweeping and mopping.**
- └ **Easy to operate, time taken for cleaning is very less and maintenance cost is also less as compared to existing system.**

10. ADVANTAGE:

- Number of cleaning tasks can be done with less cost.
- Less maintenance.
- Cleaning and drying can be done at same time.
- Manual effort is reduced.
- Operating time is less.
- Design is very simple.
- Every part is bolted, Hence it has more flexibility.

11. CONCLUSION:

- Thus in our project we have designed the automatic floor cleaning machine with the help of DC motor. This machine is designed in order to enable easy operation and to reduce the effort of human being. The ultimate need of this project is satisfied and with the help of this machine we can clean the floor easily.
- After the whole design was completed, it was put to test see if it performs the designed specifics such as cleaning, mopping and sweeping. In the model, a vacuum cleaner,

water pump and scrubber are attached to the machine will always be moving continuously and will stop only when there is an obstacle. Further modifications are being done so as to mollify the model.

- In our case a single vacuum pump is used instead of using two vacuum which saves power.
- Overall the project is completely successfully and will define the next start up until the best one.

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