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Automatic Road Cleaner

Devendra Dorkar[1], Raj Nair[2], Siddhesh Neman[3], Aakash Chauhan[4]
[1](Department of Mechanical Engineering, VIVA Institute of Technology, University of Mumbai, India)
[2](Department of Mechanical Engineering, VIVA Institute of Technology, University of Mumbai, India)
[3](Department of Mechanical Engineering, VIVA Institute of Technology, University of Mumbai, India)
[4](Department of Mechanical Engineering, VIVA Institute of Technology, University of Mumbai, India)

Abstract : *In This Project, We Discuss on Automatic Road Cleaner Machine, In our Country various types of manually operated as well as Electrically Operated Road Cleaner Machine is available in the market but the cost of this equipment are very high. So these machine are not used in small spaces, like in College Area, Industrial Area, and Hospital Area. In This Project an efforts has been made to develop a mechanically operated Road Cleaning Machine, so that it can be used for small space cleaning without pollution. On the other Hand in rural area the road cleaning is done by manual operated which can be hazards to health like asthma, bronchitis etc. to the worker. The cost of mechanically operated Automatic Road Cleaning Machine, is less as compare to electric operated Road Cleaning Machining and machine is economical and comfortable for operating in rural area as well as urban area, and it is suitable on small spaces, and it is eco friendly to user. Basically It is Applicable for BMC workers, as they daily clean roads, Hospital area, School Area,.This machine is useful for them, because of its design it is very efficient for the workers. they can easily store the machine anywhere, and at a time one worker can clean whole area in minimum time.*

Keywords - *manually, mechanically, asthma, bronchitis, Road Cleaner, Human Operated, Roller Brush, Dust Collector etc.*

I. INTRODUCTION

Cleaning has become a basic needs for all human beings and its unavoidable daily routine process. Effective cleaning and sanitizing helps and protect the health of human beings directly and indirectly. The road cleaner is used to keep our surrounding clean. So that we can feel fresh while walking on the streets. In recent years, The Conventional road Cleaning Machine is most broadly utilized in Railway Stations, Airports, Hospitals, Malls, Bus Stands, etc. and in many commercial places, as cleaning is one of the important parameters for the sanitation and government regulations. For maintaining such places, cleaning the ground is the major task which is very necessary.

Generally in the era of modern technology, different device such as electric motors, and robots are being used to clean the floor But such processes create abundant pollution, Also this machine needs electricity for its operation It isn't user friendly as well as eco-friendly. In summer seasons there is power crisis and most of the roads cleaning machines are not used effectively due to this problem particularly. In our Project we are using easily available materials with low cost. It is the better alternative for Conventional Machine.

The main Reason Behind Choosing the Automatic Road Cleaner Machine is to provide machine that will be affordable to people who cannot afford the Expensive Road Cleaning Machine that will give them an opportunity to work on there project at low cost. Due to the small size of machine, it will easily carried out anywhere of cleaning operation as well as it can easily store in small spaces without any difficulties. Basically This machine is mainly manufactured for BMC workers who cleans all Roads, and areas with broom, If they use this machine they can easily complete their work in minimum time.

Automatic Road Cleaner Machine will be much more cheaper than Electrically operated Road Cleaning Machine, also it is operated by human power so that it is not consume electricity, This machine is more compact

compared to any Road Cleaning Vehicles or Machine so it can store easily at any places. Also because of walking with machine, it will helps us for walking exercise. The Collector bin collects all dust so that no dust flows in atmosphere due to this machine.

Because of all this we select this as our mini Project.

II. PROBLEM DEFINITION

The major problem which India faces is cleanliness. The problem we came across was Cleanliness on roads, pathways, lanes, highways, railway stations airports etc. The Dust and Dirt on the Road as well as metal and other pieces on the road are a problem for humans. It is dangerous for humans as well as the vehicles running on the road. Dust and Dirt causes asthma and other breathing issues. On the other hand metal particles and other abrasive particles are harmful for tires of vehicles.

The main feature would be cost efficiency as the cost of make the machine is very less as compared to other cleaners available in market. The running cost of machine is low and initial cost of machine is protected via way of means of saving of workers time.

OBJECTIVES

- To lessen Human Effort.
- To provide the alternative method for road cleaning.
- To save the time.
- To reduce the cost.

III. METHODOLOGY

During the survey, we came across the points that all road cleaning machines which are available in current market that cannot be clean floor and compact roads effectively, like in colleges, companies, hospitals, and household purposes. Thus for this an alternative method is essential. To overcome this disadvantages a simple design is made. This machine is very much feasible to use for household purposes and compact spaces.

3.1 Proposed Methodology

- First of all, We do the market analysis to identify problems and requirements for the project.
- Then we select suitable fabrication materials, After then we purchased the fabrication materials, Then we start fabrication work.
- Here first we take aluminium bars for fabricating base frame and supporting frame, for that we done welding operation to join the all bracket and make a one single frame.
- Then at the one end we attach mechanism, for mounting of wheels we attached two rods.
- On the first rod we attach small wheels and on second rod we attach big wheels.
- Cleaning Brush is connect on the gear pair to rotary motion.
- Then we attach collector bin opposite side of brush broom for collecting dirt and dust of roads, college areas etc.
- At last we attached handle on supporting frame with welding operation.

3.2 Part List and Components:-

Table 3.2.1 Parts to be Purchased

Sr. No.	Parts	Materials	Objective	Quantity
1.	Wheels	-	**To Move machine anywhere**	4
2.	Chain	Alloy steel	**Transmit the motion**	1
3.	Sprocket	Stainless steel	**Transmit the Motion**	2

4.	Shaft (Axle)	Mild steel	**To Connect wheels and brush**	3
5.	Cleaning Brush	Plastic	**For cleaning Purpose**	1

Table 3.2.2 Parts to be Manufactured

Sr. No.	Parts	Materials	Objective	Quantity
1.	Frame	Aluminium	**To hold all assembly**	2
2.	Collector Bin	Aluminium	**To Collect all dust and dirt**	1

3.3 Description of Parts and Components

We will use no. of components while making the project are as follows: Wheels, Shaft, Collector Bin, Chain and Sprocket, Cleaning Brush etc.

3.3.1 Wheels

A wheel is a circular block of a hard and durable material at whose center has been bored a circular hole through which is placed a bearing about which the wheel rotates when a moment is applied by gravity or torque to the wheel about its axis, thereby making together one of the six simple machines. When placed vertically under a load-bearing platform or case, the wheel turning on the horizontal axle makes it possible to transport heavy loads; when placed horizontally, the wheel turning on its vertical axle makes it possible to control the spinning motion used to shape materials. There are total 4 wheels are attached, 2 small wheels to front side of frame, and 2 big wheels to back side of frame.

Fig 3.3.1 Wheels

3.3.2 Chain & Sprockets

A chain and sprocket drive is a type of power transmission in which a roller chain engages with two or more toothed wheels or sprockets, used in engines as a drive from crankshaft to camshaft. Chain and sprocket drives are the most common final drive system in motorcycles, a small front and larger rear toothed wheel linked by a roller chain. A chain and sprocket drive is one way of conveying power to the wheels of a vehicle. Chain and sprocket are mounted on frames, which transmit rotary motion.

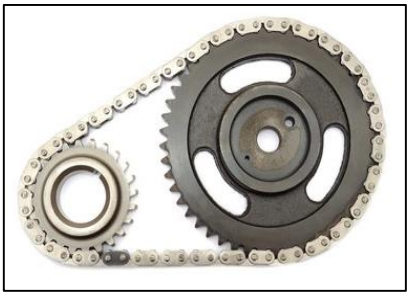

Fig 3.3.2 Chain & Sprockets

3.3.3 Shaft

Shaft (Axle) is used for mounting sprockets and wheels. We use three axle, first axle is used for Transmitting Power, Second axle is used for mounting Cleaning Brush, and Third axle is used for supporting wheels. Mild Steel is selected as material for an axle due to this it has resistance to breakage. Mild Steel is quite malleable , even when cold this means it has high tensile and impact strength higher than carbon steel usually shatter or crack under stress, while mild steel bends or deforms. In some designs, this allows independent suspension of the left and right wheels, and therefore a smoother ride. Wheels are placed on these shaft. It can also use as handle of machine.

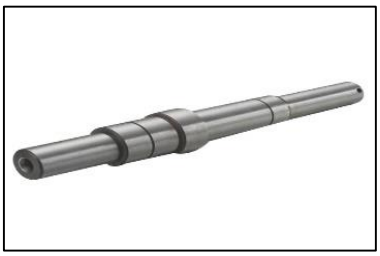

Fig 3.3.3 Shaft

3.3.4 Cleaning Brush

The cleaning brush is located at base frame of the machine and it is mounted on the shaft which is rotated with the help of chain and sprocket unit. When Chain Sprocket starts rotating because of it collects with sprockets It also starts rotating. The plastic is selected for Cleaning Brush. The main purpose of the cleaning brush is to dump the waste into Collector Bin.

Fig 3.3.4 Cleaning Brush

3.3.5 Collector Bin

Collector bin basically use to collect dirt and dust from roads, college areas, etc. When a brush start rotating through the Brush, Dirt and Dust can dump in Collector Bin. When A Collector Bin gets filled with Dirt then it easily get remove from frame and dump all collected dirt and dust into the Garbage box available in nearby.

3.4 CONSTRUCTION & WORKING

Construction

- First of all, we draw a rough diagram of our project, then with the help of solidworks software we generate CAD model of our project.
- The whole assembly is mounted on frame made up of aluminium bars. Wheels are connected to shaft.
- The manufacturing process include Road Cleaner Machine, are cutting, welding, grinding, and finishing processes.

Working

- First the dust cleaning machine system is fixed with a pair of wheels which are connected with the help of shaft.

- The Wheels are Moved to desired position with the help of manual force, which can handle is provided to move.
- A Chain drive is connected to the wheels and gear at each side. The chain is moved according to wheel and gear.
- The brush moving the alternative direction of the wheels move and the waste present on roads also it dumps into the waste collection box (collector bin).
- The waste Collection box is removed to dump the waste into desired place.

Advantages

- Easy to use.
- No battery and power needed.
- Compact in Design.
- Effortless dust cleaning.
- It is Pollution Less.

Disadvantages

- Needs a person to operate the machine.
- Cannot use the rainy season in muddy road.

Scope

- Cleaning of railway Station
- Cleaning of Bus stand
- Cleaning of College areas
- Cleaning of Road Surface
- It can be widely used in Industrial Sector.

IV. FIGURES AND TABLES

4.1 Cost Analysis:

Parts List	Cost (Rs.)
Wheels	300/-
Chain & Sprockets	350/-
Collector Bin	250/-
Cleaning Brush	300/-
Shaft	100/-
Nut & Bolts	50/-
Frames (L shaped Bracket)	400/-
Total	1750/-

Maximum budget of this project is 2000/-

4.2 3D CAD Model

This is a general CAD model of Automatic Road Cleaner. Which is generated by using solidworks software.

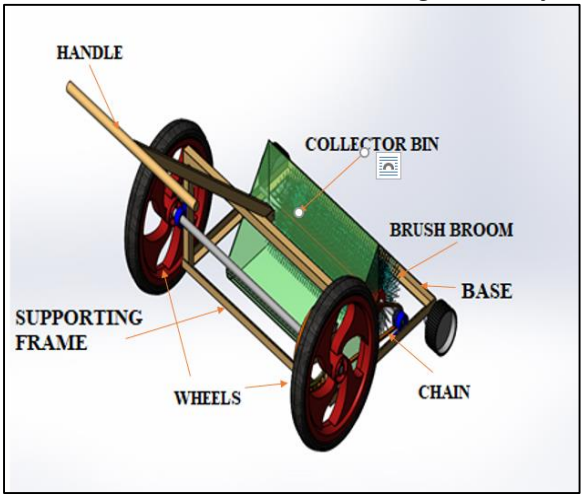

Fig 4.2 3D Model of Automatic Road Cleaner

V. CONCLUSION

This Design of automatic road cleaning system can be used to clean any kind of remote places. As the chain-sprocket mechanism selected can consume much less power so it will be the power saving as well, also there is a need of cleaning brush which operates automatically. As well as provides new add on of sanitization of roads, Successfully designed, analysed and fabricated.

This project works implements the manually operated automatic road cleaner for road cleaning that reducing the cost, human efforts as well as time. It is the best alternative for automated road cleaning machine during power crisis. It is found that the existing road cleaning machines uses petrol and diesel. It can cause pollution & also the vibration produced in the machine cause noise pollution. While manual cleaning may cause healthy problem as a person directly comes in contact with dust. Also the shoulder problem due to continuous sweeping occurs. A manually operated road cleaner is an alternative concept for avoiding such problems. The manually operated Road Cleaner can work very efficiently with respect to covering area, time and cost of road cleaning process compared with the exiting machineries. Also it is economical. It was seen while testing of machine, That the cleaning is less effective where the road seems to be very rough and damaged.

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