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DESIGN AND FACBRICATION OF ECO-FRIENDLY ROAD CLEANING MACHINE

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ABSTRACT

All humans now consider cleaning to be a basic requirement, and it is an inevitable daily ritual. The most common locations for the traditional road cleaning machine are bus stands, airports, train stations, and hospitals. These locations also require electricity to run the equipment. It is neither environmentally friendly nor user-friendly. There is a power outage during the summer, and as a result, most road cleaning equipment is not used efficiently. We are employing inexpensive, readily available materials for our project. It is a superior substitute for a traditional machine.

Key Words: Design and Fabrication, Eco-Friendly cleaner, Road safety and hygiene

1.INTRODUCTION

The goal of this project is to create a manually driven floor cleaning machine that can take the place of more traditional floor cleaning devices in the event of a power outage. The development of a manually operated floor cleaning machine has three main goals in mind: first, to accomplish both dry and wet cleaning simultaneously in a single run; second, to make the equipment economical; and third, to minimize the machine's maintenance costs. The environment is the place where living things—plants, animals, and humans—exist. things is our duty to keep things orderly and clean. Our environment needs to be kept clean because it provides us with clean air, lowers pollution, etc.

A dirty environment causes several problems, including the emergence of two diseases and poor social conditions. As the importance of cleanliness for the advancement of the country has grown in recent years,

we have developed a design, worked on a study, and built a semiautomatic road cleaning machine to help further this cause.

OBJECTIVES

1. **Reduce Pollution:** Compared to conventional road cleaning techniques like manual sweeping or the use of diesel-powered equipment, these machines are intended to reduce air and noise pollution.
2. **Energy Efficiency:** Using renewable energy sources like solar power or electric batteries, eco-friendly road cleaning equipment is made to be energy-efficient.
3. **Water Conservation:** To reduce the amount of water used for cleaning, certain machines use water recycling systems. This helps with water conservation initiatives.
4. **Sustainable Materials:** These machines' construction uses recyclable and sustainable materials, which helps to lessen their overall environmental impact.
5. **Effective Cleaning:** By minimizing the need for repeated cleaning cycles and conserving resources, these devices are made to clean roads more effectively.
6. **Cost-Effectiveness:** Eco-friendly road cleaning equipment can frequently result in long-term cost savings through lower energy and maintenance expenses, even though the initial investment may be costlier.
7. **Public Health and Safety:** By decreasing air and water pollution and eliminating risks and trash, cleaner roads promote both public health and safety.

SCOPE OF THE PROJECT

An eco-friendly road cleaning machine project's scope can change based on a number of variables, including the project's unique goals, available funds, and technological capabilities. Nonetheless, the following are some regular components that are usually present:

Research and Development: This stage entails investigating current materials, technology, and techniques for environmentally friendly road cleaning. It might also involve the creation of brand-new technology or advancements to already-existing ones.

Design and Engineering: After the study phase is over, the road cleaning machine needs to be designed. This entails figuring out the machine's dimensions, form, and parts in addition to choosing materials and technology that support the project's environmentally friendly goals.

Testing and Prototyping: Following the design stage, a road cleaning machine prototype is constructed and tested to make sure it satisfies the project's goals and operates as intended.

Production and Assembly: The road cleaning machine is produced and put together after the prototype has undergone successful testing. This could entail negotiating with suppliers and manufacturers as well as locating labor, supplies, and components.

Implementation and Deployment: The road cleaning machine is put into service following its fabrication and assembly. This could entail setting up maintenance procedures, educating personnel, and incorporating the equipment into already-running road cleaning projects.

CONSTRUCTION

An ecologically friendly road cleaning machine must be built using a number of crucial processes, including machine design, sustainable material selection, and technological integration. This is a broad synopsis of the building procedure: Specify the needs and goals of the road cleaning equipment, including cleaning effectiveness, energy economy, and environmental effect. Design the machine's general framework and individual parts while taking usefulness, weight, and size into account. Choose environmentally friendly and sustainable materials, such steel, aluminum, or recyclable plastics.

Select components that are good for the environment, like control systems, batteries, and electric motors. Think about powering the device using alternative energy sources like solar panels. Utilize environmentally friendly manufacturing techniques to assemble the machine's parts.

Sweeping Mechanism:

Debris and dirt are removed from the road surface using a sweeping mechanism, which can be a brush

Collection System:

To dispose of the swept material, a collection system gathers it and stores it. This can be a bag or container that is fastened to the device.

Propulsion System:

The road cleaning machine is moved along the road by means of its propulsion system. This could be run manually (by pushing or pulling the machine, for example) or with the help of a renewable energy source, such as solar energy.

Dust Suppression System:

During the cleaning process, a dust suppression system assists to lower dust emissions. This can entail dousing the road surface with water or a dust suppressor.

Fig.2.1. Design of Road Cleaning machine

Components	**Material**
Cyclewheel	Steel
Smallwheel	Plastic
Rollerbrush	Plastic
Chain,sprocket	Steel
Brushratio	1:15
Gear ratio	1:3.77
Sheetforbin	GIsheet
Squarepipe	Mildsteel
Rod	Mildsteel
Pedestal bearing	Castiron
Spurgear	Steel

Table.1: Components and Their Materials

WORKING PRINCIPLE

It is necessary to join or connect the hopper before we can utilize this environmentally friendly road cleaner.

The cleaner's wheels, chain drive, and chain sprocket all begin to rotate in tandem with the user's push of the cleaner.

As a result, the brush rotates wh1. It is necessary to join or connect the hopper before we can utilize this environmentally friendly road cleaner.

The cleaner's wheels, chain drive, and chain sprocket all begin to rotate in tandem with the user's push of the cleaner.

As a result, the brush that is attached to it rotates.It has ch connected to it.

The brush will rotate in the opposite direction from the wheels.

As a result, all of the dirt will move in the hopper chamber.

As a result, we may effortlessly remove the hopper from the assembly and dampen the dust and debris that has accumulated. This cleanser should be stored in a clean area after use.

Cleaning and removing and storage of this machine is very simple and tidy

RESULTS AND DISCUSSION

For superior industrial/professional cleaning and sweeping needs, use a mechanical sweeper. The dust and debris are propelled to a great extent by the brooms' motion. hefty machinery. Machine with High Pressure. Cleaning machines come in quite handy when it comes to cleaning floors and outdoor areas in public spaces such as bus stops, stores, auditoriums, and hospitals. Although there are several floor cleaning machines on the market, the one we designed is really straightforward to assemble and use. Anyone may easily run this equipment. For this reason, it is highly helpful in hospitals and other vast spaces. Both the time and the cost of cleaning are extremely low. There are lower maintenance costs.

We created a Cleaning machine in our project that runs entirely mechanically. The floor cleaner's structure is so basic and its operation so simple that anyone may use it, without having received any kind of safety training beforehand. A shaft is used to connect a pair of wheels that are fixed to the system. The wheels are connected to each other by the shaft.

Since hand cleaning takes time, we can save time by using a manually powered road cleaning machine.

A review of the literature revealed that cleaning is less successful in areas where the road appears to be severely damaged and uneven.

The equipment requires little maintenance and is simple to operate and clean.

You can utilize vacuums, brushes, vipers, mobs, scrubbers, and other items to make the design traditional and affordable.

Sensors and electrical circuits can be used to automate additional vehicle modifications.

The car can be altered to fit the needs of its intended function and the circumstances of Indian roads.

Because hand cleaning takes time, we can save time by using a manually operated road cleaning machine.

A review of the literature revealed that cleaning is less successful in areas where the road appears to be severely damaged and uneven.

The equipment requires little maintenance and is simple to operate and clean.

Vacuum, brushes, vipers, mobs, scrubbers, and other items can be utilized to create a conventional and cost-effective design.

Electrical circuits and sensors can be used to automate more modifications to the car.

The car can be altered to suit the needs and the circumstances of Indian roads.

APPLICATIONS

Municipal Corporations

Ports

Airports

Cements Factories

Steel Factories

Food Industries

Engineering Industries

Highways

CONCLUSION

After conducting the project, we have determined that our machine is safe, environmentally friendly, and saves money and time compared to dusting by hand. The most effective substitute technique for clearing roadside dust is this one. The dust separated on the road divider is scrubbed by the scrubber brush in our cleaning machine when the motor starts, and the dust is collected by the cyclone vacuum collector and placed in the collector tank. The machine just needs one operator, and cleaning takes relatively little human labor. Utilizing this Modified Technology Simplified Road Cleaning Machine, Fit for Indian Conditions, due to its disposable nature and dependability. Because the system is very inexpensive overall and requires only a one- time investment, labor costs can be reduced. The use of this method contributes to road cleaning because of these advantages.

In India may get the opportunity to use this machine in the future in all the sectors. The goal of a mechanical setup is to generate cost-effective cleanup for both the floor and the road surfaces by utilizing the synergies of mechanics and mechanical systems. This project uses an eco-friendly road cleaner that is controlled by hand to clean roads while saving money, time, and human labor. It's the most straightforward option for a machine-driven road cleaning device during an electrical outage. It has been discovered that the current

road cleaning equipment runs on diesel and gasoline. It will produce pollution, and the machine's vibration will also produce noise pollution. The device is cost-effective. Hand cleaning could result in shoulder pain because of ongoing

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