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DESIGN OF ROAD AND FLOOR CLEANER MACHINE

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Abstract -

Cleaning is necessary or basic need of all humans and animals. We design and develop new fully manual operated manual operated road and floor cleaning machine which has simple mechanism and structure , light in weight which easily carrying anywhere. The road cleaner and floor cleaner machine which has wide range of applications. The working principle of machine is dependent on mechanical design. The intention of the project to develop manual process for cleaning road with brush. In railway station, fuel pump, airport, footpath, stadium, cinema hall , etc. In our project we use easily available material at less cost it no need of any fuel and pollution free machine it can be used in our daily life.

Key words : Mechanism and structure , pollution free , manual operated , mechanical design , road cleaner , etc.

1. INTRODUCTION:

Cleaning and sanitizing road and ground, places. Is important factor of maintaining healthy, safe and beautiful nature. However old cleaning method can be labor intensive, costly, and it's dangerous to environment. To consider these challenges, we have developed a manually operated road and floor cleaner Machine that offers an less cost, efficient solution for cleaning road, highway, footpath, street, and public places. The new and innovative project is powered by human power; it's no need of any fuel and electricity. Modern industrial and agricultural settings, they are efficient removal of residues, dust, and particals from various a surfaces is essential to maintaining productivity and the product quality. The Road Cleaner Machine is be innovative solution designed to automate and enhance the cleaning process and manual operated. It is less complex new design makes it simple to use and maintain when it's adjustable brushes and small size allow for cleaning sufficient storage.

With its more benefits and uses, our manually operated road cleaner Machine clean our road and public place.

1.1 Objective of Road and Floor Cleaner

- Cost -Effectiveness
- Efficient waste collection and management
- Health and safety improvement
- Pollution free
- Easy to operate

1.2 Components Used in Road Cleaner

1) Pedestal bearing
2) Shaft
3) Frame and structure
4) Brush
5) Chain and sprocket
6) Cycle wheel
7) Small wheel

2. Scope of the project

Existing road cleaner methods are two types 1) manually operated. The scope of a road cleaner machine extends across various domains, including urban maintenance, industrial cleaning, automation, environmental sustainability, and public health. The increasing demand for efficient, eco-friendly, and smart cleaning solutions has broadened the scope for innovation and development in this field.

3. Methodology

- Design and development
- Market analysis
- Fabrication
- Road Testing and performance
- Result and Discussion

3.1 parameters consider developing low cost

drives are a means of transmitting power like gears, shafts and belt drives. Chain drive is a way of transmitting mechanical power from one place to another. It is often used

to convey power to the wheels of a vehicle, particularly bicycle and motorcycle .It is also used in a wide variety of machines be sides vehicles .Drive belts can slip unless they have teeth, which means that the output side may not rotate at a precise speed, and some work gets lost to the friction of the belt as it bend surrounds the pulleys .Wear on rubber or plastic belts and their teeth is often easier to observe, and chains wear out faster than belts if not properly lubricated

MANUALLY OPERAED SWEEPING MACHINE

- **Shaft(Axle):**Axle is used form outing sprocket and wheels .We use three axle first axle is used for transmission power ,second axle is used for mounting sweeper brush ,and third axle is used for mounting supporting wheels.

Mild steel material is selected for an axle due to mild steel has a resistance to breakage. Mild steel, as opposed to higher carbon steels, is quite malleable, even when cold this means it has high tensile and impact

strength higher carbon steels 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. Even when the suspension is not independent, split axles permit the use of a differential ,allowing the left and right drive wheels to be driven at different speeds as the automobile turns, improving traction and extending tire life.

- **Chain Drive:** A chain drive consists of one endless chain running around two sprocket wheel the chain drive has a feature which a recommend both the gear drives and belt drives. Chain drives are a means of transmitting power like gears, shafts and belt drives. Chain drive is a way of transmitting mechanical power from one place to another. It is often used to convey power to the wheels of a vehicle, particularly bicycle and motor cycle. It is also used in a wide variety of machines be side vehicles .Drive belts can slip unless they have teeth, which means that the output side may not rotate at a precise speed ,and some work gets lost to the friction of the belt as it bends around the pulleys. Wear on rubber or plastic belts and their teeth is often easier to observe, and chains wear out faster than belts if not properly lubricated.

components and material of road and floor cleaner

Components	Material
Cycle wheel	steel ring
Small wheel	plastic rubber
Roller brush	plastic
Chain, sprocket	Steel
Sheet for bin	sheet
L- pipe	Mild steel
Circular Rod	Mild steel
Pedestal bearing	Cast iron
Ferial	Steel

Fig.3.1 Designofeco-friendly road Cleaner machine

Eco friendly road cleaning machine is an advanced type of machine used for the roads or street. The machine is run by a human effort or man power. The system is fixed with pair of wheel which are connected with the help of shaft. The shaft makes the wheel connected to one other. The wheel are moved for a desired position with a help of manual force which can handle to move. A chain drive is connected to the wheels and gear at one side. The chain is moved according to the wheel and gear. The brush moving opposite direction of the wheels move and the brush brooms the waste present on the road also it dumps the waste into the waste collecting box. The waste collecting box is removed to dump the waste into desired place.

In this work components used as given below

- **Cycle wheel:**
  A cycle wheel use for movement of our machine. Use two wheels each wheel having diameter of609.6mm.

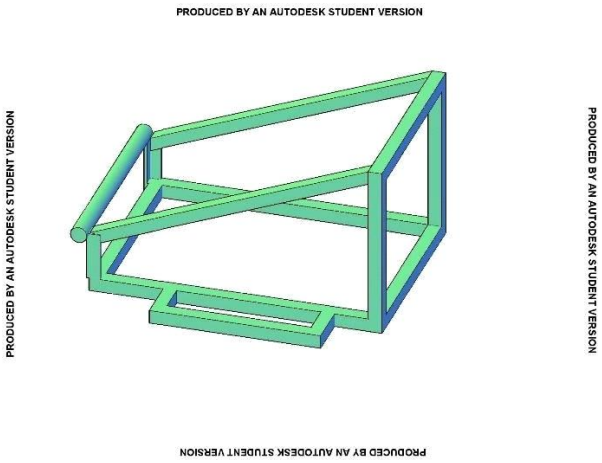

Fig.3.1(h) frame

Frame is the body part on which all the other components are assemble

- Cycle wheel
- Small wheel
- Pedestal bearing
- Spur gear
- Industrial brush
- Bin

- **Chain**

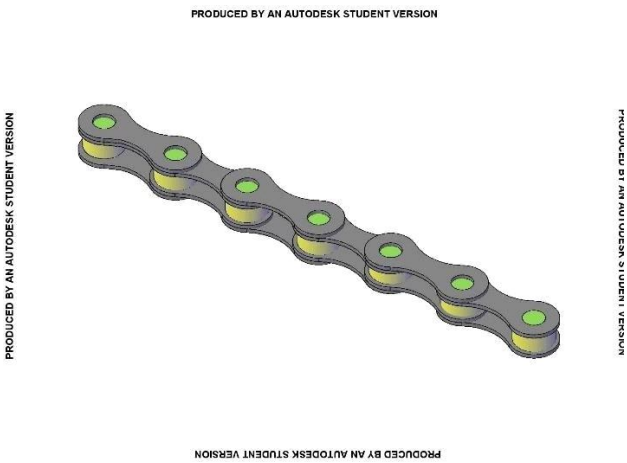

Fig.3.1(I) chain

Roller chain is most used to transmit the power.

Result :

1. Efficiency & Performance

Studies show that modern road cleaning machines equipped with advanced suction and water spraying mechanisms improve dust and debris collection by up to 90%.

Automated and AI-integrated road sweepers enhance cleaning speed while reducing labor costs.

2.Environmental Impact

Use of electric or hybrid road sweepers significantly reduces carbon emissions compared to traditional diesel-powered machines.

Water-efficient systems help minimize water wastage while controlling airborne dust.

Conclusion :

Environmental Benefits: The study emphasizes the environmental benefits of modern road cleaning machines, especially those powered by electricity or hybrid systems. These machines help reduce carbon emissions, noise pollution, and water consumption, making them more sustainable.

Technological Advancements: The research concludes that advancements in automation, AI, and sensor-based technologies have significantly improved the efficiency and precision of road cleaning machines. These innovations contribute to cleaner roads with reduced manual intervention.

References :

1].Design and Development of Road Cleaner Machine: This study focuses on creating a manually operated, eco-friendly road cleaner that is cost-effective and easy to maintain. The machine is designed to be user-friendly, utilizing readily available materials to ensure affordability and ease of fabrication

2].Design and Fabrication of Eco-Friendly Road Cleaner Machine: This research aims to develop a manually operated road cleaning machine that is both eco-friendly and cost-

3].. Design and Fabrication of Eco-Friendly Road Cleaner Machine This study discusses the creation of an eco-

4].Design of a Multi-Purpose Road Cleaning Machine This research focuses

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effective. The machine is designed to work efficiently in terms of coverage area, time, and cost, making it a viable alternative to existing machinery.

5].Design and Development of Eco-Friendly Floor/Road Cleaner Machine: This paper discusses the creation of a manually operated, pollution-free road cleaner intended to keep environments clean. The machine is designed to be simple in construction, easy to operate, and portable, making it suitable for various applications

6].friendly and low-cost road cleaning machine that reduces environmental impact while improving road maintenanc

on a multi-purpose road cleaning machine capable of performing various functions, such as dust collection, sweeping, and waste disposal