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A Study on Design and Construction of a Beach Dust Collection System Machine

Srishti Sharma[1], Parul Saxena[2]
Student[1], Professor[2]
Department of Mechanical Engineering
Axis Institute of Technology and Management, Kanpur
Corresponding Author's Email: *ss325412@gmail.com[1]*

Abstract

A beach dust collector is a machine that collects waste items from beach sand so that it may be cleaned. These devices are tracked or wheeled manual vehicles that are hauled by a quad bike or tractor. Beach cleaning devices are employed by seaside communities to combat pollution at the beach. One of the most significant things that should be focused on for future cleaning is dust cleaning on beaches. As a result of the effort, a gadget that collects dust from the beach was developed, and it has a basic design. Cleaning of beach sand is done here with the use of mechanical machinery such as a chain conveyor and gears, which produce superior results.

Keywords: *Dust Collector, Waste, Machine, Conveyor, Gears*

INTRODUCTION

Generally, waste is obtained in solid, liquid, or gaseous form, and each of these wastes has its own method of removal. This garbage, as well as any other wastes gathered from other sources. Trash management is being created in order to limit the harmful impacts of waste on the human health system, as well as environmental changes. The Indian government has just initiated a programme called as the "Clean India Mission." They are raising awareness of waste management, its procedures, and solutions to problems through this initiative. They've created several trash-collecting machines. These machines are used to gather trash and debris from a variety of locations. These manually operated machines will contribute significantly to the cleaning and

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sanitization of the streets. The device parameters are quite difficult to determine. Then, in order to retain the cleaning, its usage should be more simple and cost-effective for the consumers.

LITERATURE SURVEY

Akshaya Mancy et.al, "Design & Fabrication of amphibious seaboard trimmer", International Research Journal of Engineering and Technology, Volume: 5, Issue: 4, April- 2018

This work is a dust collector that is used to gather dust on beaches. Beach cleaning equipment is created and manufactured in a cost-effective manner to address issues in the operation. It is made up of a conveyor that is utilised to collect waste. When the garbage is collected, the sand will be liberated from the waste. This garbage can be appropriately utilised. This gadget may gather contaminants in the flow of water.

Vivek Dhole et.al, "Design and fabrication of beach collecting machine", International Research Journal of Engineering and Technology, Volume:6, Issue:4, April- 2019

There is a need to build equipment that is capable of not only collecting garbage but also disposing of it. The equipment is essentially comprised of an engine that runs on fossil fuels and is responsible for the entire process.

Brijesh K J et.al, "Design and fabrication of waste collecting machine", Volume: 6, Issue: 5, May- 2019

This work focuses mostly on garbage disposal safety and other issues. Because of the rise of the economy, industry, and technology, today's society has a waste problem.

The current waste collection and disposal systems are ineffective, and the globe is seeking for new solutions to these issues. For better performance, a new equipment called a semi-automatic dust collector was used. The machine has a metal base and is powered by a battery. The apparatus is controlled by a mechanical mechanism or a remote.

Arun. A, et.al, "Design and fabrication of garbage collector on the beach using solar power", Internal Journal Research of Engineering aad Technology, Volume:7, Issue:3, 2018

There is a requirement for equipment to tackle connected challenges in an automated manner. The rate of technological advancement has accelerated significantly in recent years. There is an opportunity to design new machines that

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are better than prior machines as a result of this.

Beach sand is cleaned using mechanical equipment such as gears, chain drives, and conveyors, which provide excellent performance and results. This gadget can run on solar power. For improved results, a 50 Watt monocrystalline solar panel is employed. The electricity from the panel is stored in a Lithium-Ion battery with a voltage of 24 volts and 14 amps, which is then transferred to the motor, which drives the conveyor and machine.

METHODOLOGY

We designed a machine that may be utilised in both water and on the shoreline since pollution is the most serious problem on both land and water. The equipment gathers floating garbage both in the water and on the beach.

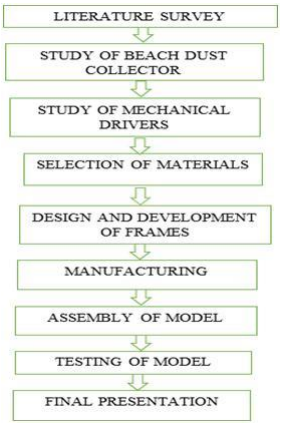


Fig.1. Procedure steps for beach dust collector

CONSTRUCTION

A body frame consisting of iron bars makes up the machine. The four wheels are secured to the frame's corners. A conveyor chain is connected to the frame, with one end positioned on two bearings attached to the frame's two welded pillars. The conveyor's bottom end is attached to the frame's foundation. On the front side of the conveyor, a spinning brush is attached and turned. To collect and store garbage, a storage box is positioned below the conveyor belt. The bucket carries the garbage upward, eventually depositing it in the storage box situated behind it.

WORKING PRINCIPLE



Fig.2. Beach dust collector vehicle

The device is placed across the beach to collect trash such as bottles, papers, and other items that people leave behind, and it is lifted by chain drives, gears, or other mechanisms. A chain is used to rotate the sprocket wheel, which is operated by a separate operator. With the aid of lifter

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teeth, the chain drive is used to raise the waste and store it in a box. When the waste box is full, it is removed from the container. At the bottom of the package, there is a 45- to 50-degree bend plate that is constructed. Its primary function is to level the beach's surface. The material we'll be using is M/S Mid-Grade, which is quite easy to work with. In comparison to others, it is less expensive on the market. The two rollers are separated from one another by a belt drive, on which perforated buckets are fastened through riveting joints. As the machine passes through the drainage, the buckets inside the drainage cause the roller to rotate, allowing the material to flow through. The waste material from the drainage area will be collected in the bucket. It contains a system that allows water to circulate while keeping trash contained in the bucket. Each end of the shaft is equipped with two sockets. Sockets spin the conveyor mechanism in a clockwise motion. On a sturdy iron rod, equidistant specifically crafted hooks and brushes are fastened. The chain is fastened to the iron bar. Depending on where the machine is utilised, the hook is employed to keep solid waste out of the sand or out of the water. The debris is swept away by the brush through a sieve placed beneath it. This aids in the sieve separation of solid waste and sand. The depth of ploughing action is determined by the hook size. Litter will be swept away and gathered on the garbage bin placed at the machine's back end when the chain conveyor moves.

COMPONENTS USED

1. Shaft
2. Bearings
3. Sprocket
4. Chain
5. Gears
6. Collecting Bin

ADVANTAGES

1. Easy to use. Machines designed on the people who use and manage tractors
2. Cleaning quality
3. Arts& Technology
4. Adapted
5. Resistant
6. Long life
7. Low cost.

CONCLUSION

This technique aids in the cleaning of beaches, keeping the sand clean and protecting marine life from pollution. This method does not require additional human labour for waste water cleanup, and it may eliminate human labor's direct contact with waste water, posing no risk to workers. Furthermore, because this process is automated, it takes less time to complete

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than the traditional way. Because the worker will not come into direct touch with rubbish as a result of this project, his health will be improved and he will be able to work for longer periods of time.

FUTURE SCOPE

To boost the machine efficiency, we have to expand the surface of the machine. At the place of permanent hooks, we can utilise mobile hooks. It may be controlled with camera to take long distant cleaning. The waste which is collected in the collector bin can be utilised for power production, we can add transmitter and receiver circuits can make machine automated. In future this waste collecting system has greater scope to remove enormous capacity of rubbish mechanically from beaches. It will decrease the direct human intervention and avoid the spread of infections. Also, can be employed for nuclear waste collecting where human presence is dangerous. This notion helps us to attain our aims as well as a better space management. The purpose of this study is to design a New Automatic operated Machine of Beach Cleaning. This notion helps us to attain our aim as well as improved space management. The new model takes into consideration all the real time conveyance system and gives remedy for their short coming.

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