

BEACH-CLEANING ROBOT DRIVES POLLUTION-FIGHTING INTO THE FUTURE

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ABSTRACT:

Beaches are one of the main tourist attractions in the coastal parts of India. They are also the most polluted. Most government neglected cleaning of beaches. The main reason being the difficult nature of cleaning it. It takes up lot of resources and time. The workers need to manually pick the waste. The waste when thrown in the sand gets covered with the sand by the heavy coastal winds. This makes the spotting of waste difficult. It is difficult for the workers to clean as they have to dig each cubic feet to collect the waste. The heat and humid climate of the beaches makes the working conditions worse. Many organisations and government bodies are taking several steps to get rid of the waste accumulated in beaches more effectively. India has a long stretch of coastline of about 7517 Km with nearly 170 famous beaches both on eastern and western coasts. Our aim of work is to design and fabricate the beach cleaning machine. We have created a simple economical design so that it will be easy for maintenance and use. The parts have been sourced locally so replacement parts will be easier to get. The machine is environment friendly and can run in any

conditions offered by the beach. We have designed and manufactured a beach cleaning machine which is both cheap and easy to use. It does not have a huge learning curve. The machine runs on human power or electric motor. The electric motor is powered by solar panels. This gives an advantage over the current models available in the market which runs in fuel motors. The entire machine is able to fit in the rear of a car.

INTRODUCTION:

Beaches are one of the main tourist attractions in the coastal parts of India. They are also the most polluted. Most government neglected cleaning of beaches. The main reason being the difficult nature of cleaning it. It takes up lot of resources and time. The workers need to manually pick the waste. The waste when thrown in the sand gets covered with the sand by the heavy coastal winds. This makes the spotting of waste difficult. It is difficult for the workers to clean as they have to dig each cubic feet to collect the waste. The heat and humid climate of the beaches makes the working conditions worse. Some governments have invested in beach cleaning machines. The main drawback

being they are quite expensive and there are not many who can operate it. Those machines get broken way too often and the spare parts need to be imported. This makes the government to abandon such machines. These machines while cleaning the beaches create pollution due to their heavy fuel based motors. Thus the whole point of reducing pollution is nullified. The pollution is being changed from one form to another. We have designed and manufactured a beach cleaning machine in a pragmatic way, which is both cheap and easy to use. It does not have a huge learning curve. As all the parts for the machine been sourced locally, there will not be much difficulty in obtaining spare parts. The machine runs on human power or electric motor. The electric motor is powered by solar panels. This gives an advantage over the current models available in the market which runs on fuel motors. Waves bring in a lot of waste from deep sea. These plastic wastes wash into the beaches and get mixed with the sand. This wet waste easily gets soiled with sand and will be difficult for human eyes to notice. The machine is capable of clearing such waste with utmost ease. Tides too play a major role in putting the waste from deep sea into the beaches. Many animals like tortoise get stuck in this waste when they come to lay eggs on the beach. This causes a lot of deaths, thus tipping the balance of the environment. One of the other problems faced by the shore areas is the advent of constant cyclones that affect the areas. These cyclones once settle, damage a lot of property thus creating a lot of waste. It takes a lot of time to remove such waste and to clear the sand

of it. If the waste left to rot on the beaches it gets into smaller pieces ultimately ending up getting eaten by aquatic animals [3]. The main aim of the study is to design and fabricate the beach cleaning machine with a simple economical design so that it will be easy for maintenance and use. The machine is environment friendly and can run in any conditions offered by the beach. The machine does not have a huge learning curve. As all the parts for the machine been sourced locally, there will not be much difficulty in obtaining spare parts. The machine runs on human power or electric motor. The electric motor is powered by solar panels. This gives an advantage over the current models available in the market which run on fuel motors. The entire machine is able to fit in the rear of a car.

The coastal area beaches are main attraction for tourism, so in attracting tourists the beach must be kept clean. For the purpose of cleaning the beach, some cleaning machine must be used so we have manufactured a cleaning machine which is helpful in cleaning the beaches. The motor is responsible for driving mechanism of conveyor. The strainer attached to the conveyor will collect the wastages from the surroundings and transferred to storage bucket through conveying belt. As today's era is moving towards being digitalized and automated with a great speed, the youth want everything very easily and smart. Not only the youth but the people of all generations are finding it very easy to be smart effort and more and more being healthy and are getting attracted or joined towards latest technology of being "smart work". Anywhere you go, you get this

technology available. So we thought of using this technology and adding more to it for our final year project. Nobody likes to suffer and wait for our long waiting hours just to get good surrounding or so. To avoid this and to save time of our management of waste we are creating a application called “Smart cleaning system”. For that we are using system by which beach cleaner can do his work smartly using communication through application. Smart Cleaning System proposed to overcome the real time problems. With the continued expansion of industries, the problem of sewage water must be urgently resolved due to the increasing sewage problems from industries of the surrounding environment. The wastes produced from the industries are very harmful to human beings and to the environment. Second Important thing is waste management system by which worker can maintain all his health and work good through application maintain that reporting worker don't need to wait and get in to drainage. One more very useful and important advantage of our system is that the worker to replace the manual work in beach cleaning by semi mechanical beach cleaner. And can access them very easily.

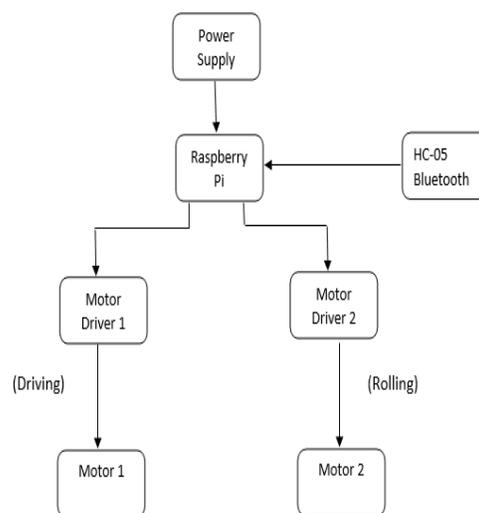
METHODOLOGY:

The essential objective of the beach cleaning machine is to clean the beaches at a depth as fast and efficient. To reduce the cost of machine and to be able to transport it to most remote beaches. To procure spare parts locally and should be able to fix by any person who knows basic mechanics.

When the machine is pushed in forward direction the motion of the machine helps

the conveyor to move. This is because the shaft which is connected to the wheel has a sprocket in it. This sprocket is then connected to the shaft of the conveyor with the help of a chain drive. It has a special projection on the chain on which the plates were bolted. This was made so that the motion of the chain is not obstruction and is not affected by the movement of plates and spokes. The rotational motion at the top of the conveyor system disposes the waste into the waste box situated behind. The waste can then be removed by the worker when its full. The bin act as a waste disposal site. If needed the segregation of the waste can be done at the waste bin. The whole model was designed in the SolidWorks and the analysis was carried out using the same software. Components were made individually and at the end the entire components were assembled accordingly.

BLOCK DIAGRAM



WORKING:

The Beach garbage cleaning robot consists of 2 Motor drivers and 2 DC Motors. Each DC Motor is connected to the respective

Motor Driver. Motor driver 1 is used for driving of wheels in order to move the robot in the direction we required. Another Motor driver is used for the rollers so that the garbage or the waste material which is present on the surface of the beach will be cleaned.

APPLICATIONS

a. Municipalities - Beach cleaners make keeping large beaches clean a manageable endeavor. Large, state-run beaches need to be clean and safe for beach-goers. High-volume beach traffic often results in excessive man-made litter, which presents safety and liability threats. Beach cleaners remove glass, cans, cigarette butts, syringes, and other potential hazards. They also make the beaches visually pleasing and increase tourism. Cleaning by hand often proves too costly and takes too much time to ensure quality beach conditions during peak seasons.

b. Contractors - Beach cleaning can be a lucrative business for contractors. Due to its unique niche market, contracting with a beach cleaner often fetches prices well-worth the effort. Beach cleaner machines minimize manual labor while maximizing effectiveness. Additionally, beach cleaner can also be used for other common landscaping applications, like stone picking, litter picking, seed-bed prep, and de-thatching. This makes a beach cleaner a multi-season investment for landscapers and other contractors.

c. Resorts - Beach cleaners are a necessity for resort owners that thrive on beach-goers. Especially when paying premiums for their

stay, visitors demand pristine beaches and amenities. A mechanical beach cleaner ensures that visitors will get the best use out of the beach during their stay and return for more.

d. Individuals - Individuals who own private beaches, gardens or sandy areas can greatly benefit from a beach cleaner too. Self-propelled vehicle is easy to run, require little maintenance, and can ensure your sandy area is spotless with minimal effort.

CONCLUSION:

This project has created the robot for garbage collection at the beach. Wireless communication (Bluetooth HC-05) module is used in the project for remote controlling. Raspberry Pi was used for processing all commands. The robot can progress on the sand as per the user's command by wireless communication medium and collect the garbage. This robot is expected to overcome the excessive garbage spread on the beach which might harm the natural environment . However, the robot can still be improved to operate automatically and control from even larger distance. Design of prototype model and waste cleaning robot is proposed which is used at beaches to cleaned it and maintain the surrounding environment clean and hygiene. It is very easy to handle and also its operation is easy. Our proposed robot is also used at different places like gardens, different campuses, sports grounds etc. For maintaining its hygiene and for cleaning purpose. At present, we are working on fabrication and mechanical parts development of this project. Progress which is so far is successful and good

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