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Automatic Beach Cleaning Machine

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ABSTRACT: Trash and litter left on beaches can endanger the life of coastal animals, like turtles and birds, and also damage tourism industries by diminishing the natural beauty of beaches. To solve this problem, most coastal areas employ manual labor, volunteer work, or large Zambonini-like machines to pick of trash. However, these operations are very expensive and time-consuming. In order to efficiently stop the increasingly negative impact of trash debris on coastal ecosystems, forms of mechanized, autonomous trash collection and disposal need to be utilized. Developing a robot that can transverse sandy terrain, pick up small trash debris, dispose of contained trash debris, and avoid large objects and the ocean all while functioning autonomously presents a variety of technical challenges. The invention is predicated upon the later developed concept of raking or combing the sand to a degree of continuity and thoroughness that will assure removal of not only larger sized debris, but also the bulk of smaller pieces such as broken glass, nails and the like, without necessitating or involving the removal or displacement with the debris, of any consequential quantities of the beach sand itself. This paper present the controlling and monitoring of the solar power device which is capable of picking up the miscellaneous litter which accumulates on the beach and collects all the litter after filltering the sand to a self attached trash box.

KEYWORDS: Cleaning, automatic, machine, trash

I. INTRODUCTION

Automation is defined as taking a system or process and making it automatic by eliminating human work as much as possible. Automation is one of successful field in today's world and it has become the backbone of control engineering. Automation plays an important role in the world economy and in daily experience. The goal is to provide plant operators and engineers the tools to monitor and control their plant more efficiently.

Mixing of liquids is a common process in the paint industry, medical industry, chemical industry, pharmaceutical industry etc. The most important step in mixing the liquid is defining the accurate proportion of constituent liquid element, which can be effectively and accurately performed with the help of machinery without manual intervention. This system is designed for automated level control, liquid mixing. The system is designed for mixture of two or more liquids in any proportion. The entire process is controlled and automated with the help of PLC. PLC are widely used in automation industry and process control systems due to its ability for being user programmable. Automated liquid mixer performs mixing of different liquid in predetermined proportions. The input to the control valve is given from the PLC. According to the ladder program the valve will works and controls it's flow.

II. PROBLEM STATEMENT

The coastal area beaches are main attraction for tourism, so in attracting tourists the beach must be kept clean .Indian beaches might not be exotic because they are littered many of the timesThis model is implemented to remove garbage, plastic bags, waste bottles and other debris from beaches and make them safe and visually pleasing for beach visitors.

III. METHODOLOGY

First, we have to design the entire project with appropriate drawing and the software. It is the main part of the project because we can change the project design with desired manner. This will have all the software simulation part. Designing play's important role in fabrication of any equipment. If the designing parameter are proper, then in later stage the other fabrication tasks becomes much easier. Here we have used solid edge software for designing the model. Secondly, Selecting the standard parts according to the project concept. The main criteria for picking the standard parts is low cost and high yield material and also rust free. Beside this other criterion also comes into play while selecting the parts such as light weight, durability, corrosion resistant, easily available. We should also select the place to buy the

parts like online or stores depending upon the prices. After that we have to build the actual model with the standard parts .we have to make sure the all parts should be good dimensional quality. Because machine will be in good condition and also reduce the errors coming from design. In construction phase, machining part must be done very carefully. If any of the machining operations like drilling is done in improper way, then it causes a lot of issues during fabrication like miss alignment of part. maintain the system.

IV. EXPERIMENTAL RESULTS



IV. COMPONENTS USED

1.DC Motor

A 24V DC motor is a type of electric motor that operates on a direct current (DC) power supply with a voltage rating of 24 volts. DC motors convert electrical energy into mechanical energy, which is used to rotate a shaft and perform mechanical work. In an automatic liquid mixer using a PLC, a DC motor can be used to drive the mixing blade or impeller in the mixing tank. The DC motor is connected to an output channel on the PLC and is powered by a 24V DC power supply. The mixing blade or impeller is attached to the shaft of the DC motor, which rotates it to agitate and mix the liquid in the tank.

2.Frame

The frame is the mechanical member which acts as a skeleton that holds the total structure of the vehicle. The frame is rigid and also withstands the static and dynamic forces, without undergoing deformation or distortion. Frames of all automobiles differ based on the load, speed, and torque and engine transmission. It may be reinforced with super materials as per the requirement. Frame in a beach cleaner provides support to the entire machine. The material used for making frame of beach cleaner is mild steel. Frame absorbs all the vibration which will be created while running the machine. We have L-shaped bar to construct the frame of beach cleaner. The length, breadth and height of frame is 2ft , 1.5ft , 2ft respectively.

3.Chain

The chain used here is specialized K2 chain. These chains are provided with attachments to which the claw plates can be bolted

4.Sprocket

A sprocket/sprocket-wheel is a profiled wheel with teeth that meshes with a chain, track or further perforated material. The sprockets used here are plain bored sprockets. Plain bores, often referred to as minimum plain bores or MPB, are simply untapered bores drilled through the center of a pulley, gear, sprocket, or sheave. Sometimes component part numbers use MPB to designate the plain bore style

5.Bearing

pillow block bearing is a platform used to offer help for a pivoting shaft with the assistance of good orientation and different accessories. Material for a pillow block bearing is commonly made of cast iron or cast steel. This will be used for wheel bearing for smooth movement of the machine with respective direction.

6. Shaft

Shaft is one of the major parts in beach cleaner which holds the sprocket and chain. Shafts also provide rotation to the chain. We have used two shaft to give the rotational motion to the beach cleaner. As we have plan to reduce the weight of the machine, so we are going to use aluminium shaft in our project. In order to make the modal light weight we have used the shaft of minimum diameter i.e 16 mm.

7. battery

A battery is a device consisting of one or more electrochemical cells with external connections provided to power electrical devices such as flashlights, smartphones, and electric cars. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode. The battery which we have used in beach cleaner is 12 volts , 7 ampere

VI. CONCLUSION

After all the testing project will be successful in representing the idea in practical way. The project will work with ease and in an efficient way. The waste material will be able to be fetched from the ground and will be collected it in the garbage collector container. Hence this project can be applied in public places like beaches and parks with effectiveness. Since beaches are linked with hygiene and in most of the beaches, pollution is major problem and this project can be implemented in those areas and can safeguard health of the people. The concept of this project is very useful in those seasons when the flow of tourists and visitors is maximum and the amount of solid wastes is also maximum because of heavy flow of visitors in public places like beaches and parks. This project can be incorporated with "SWACCH BHARAT ABHIYAAN" which is a revolution in present times. In India as most of the beaches are polluted, so this project or mechanism, can become very handy and use to clean them. In future this project is improved to type a lot of classes of waste. In this system we can use advance conveyor system and conveyor material for increasing the efficiency of collection of garbage. We can use the solar panel for providing power to the machine instead of battery operation. Apart from that, we can also make it fully automatic i.e. radio frequency controlled cleaning vehicle.

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