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Fabrication of Semi-Automatic Water Cleaning System

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Abstract -The design and manufacture of the waste water cleaning system are important aspects of this project. "Fabrication of semi-automatic water cleaning system for rivers and lakes" is a system that removes debris and waste particles from the water surfaces and carefully arranges the waste for disposal into a water body. This research work examined the current position of our nation's waterways, which was dumping tones of sewage waste and filled with toxic pollutants and harmful wastes. As a result of the rapid increase in land and water pollution in the mode of garbage, aquatic animals' lives are being disrupted and they are becoming endangered. A remote-control machine will collect waste products from water bodies, resulting in a reduction in contaminants in the water, with little disruption to aquatic life and fewer difficulties. The conventional and popular ways of collecting floating trash, which is positioned close to the river's shore, are by hand or by boat, for instance. However, these methods require a sizable workforce, are costly, risky, and time-consuming. After taking into account every aspect of river surface cleaning systems and removing the shortcomings of all previously described approaches, the remotely operated river cleaning machine was created. It effectively, efficiently, and environmentally-friendly helps clean the surface of rivers. The main objective of the project is to decrease the time and labor needed to clean water bodies. With the use of a motor and belt drive system that is powered by a battery that stores energy, this gadget cleans water.

***Key Words*: Water Cleaning, Sewage Waste, Aquatic Animals, Floating Trash, Remotely Operated.**

1. INTRODUCTION

One of the project's main goals is to repay our mother nature with at least a few favors. " Water is Life, Life is Water," as the saying goes, therefore protecting our limited water supplies is essential. We all know that water covers 71% of our planet, yet we can't use it all due to our disadvantage, or lack of technical innovation. Rivers, lakes subterranean water sources, glaciers other waterbodies make up the only fraction we may use from overall water resources. This 3% is the only water that is life for humans, as it is the only percentage of water that they can take to quench their thirst and live their lives. The remaining 97%, which is found in oceans and seas, is now useless due to a lack of technological innovation. It's not that current technology isn't capable of converting ocean and sea water into drinkable water, but the cash and investment required, as well as the efficiency, are off the charts. As a result, more research and development will be required to transform ocean and sea water into consumables. It is possible to build and refine it, but it will take at least a few decades before it becomes a reality. Due to the fact that just 3% of all water sources are safe for human use and that the majority (97%) of that water is stored in the seas, we can see that river sewage surface pollution is the biggest issue facing our planet today. The "Fabrication of semi-automatic water cleaning system for" is mostly utilized in situations when water has become contaminated by waste and needs to be removed. This model collects and removes waste from the surface of water using a conveyer mechanism. It also includes a container at one end of the conveyer belt, which alleviates the problem of garbage collecting. This machine will remove waste products from water bodies, resulting in a reduction in contaminants in the water, resulting in less disruption to aquatic life and fewer difficulties. The most important application of this model will be in cleaning waste products from lakes, rivers, and other water bodies. In this era of world, beach is the best attractive tourism place, cleaning of beach plays a major role. For this purpose, we need a machine to clean the beach. Our project is a semi-automatic beach plastic collecting system which cleans and collects plastic off seas, lakes, etc. This machine operates with a dc electric lithium polymer battery and is controlled by the help of RF transmitter and receiver. In the front of machine there is a collector which collects plastic and a loader chain which loads the plastic to the boat. Then boat is driven by the help of high-powered brushless motor. We created this project with the goal of fulfilling the dream of clean rivers. So, in order to protect the limited amount of water resources, thus we have designed & fabricated a System to clean the waterbodies.

1.1 Problem statement

a) Due to a lack of waste dumping facilities, people continue the practice of throwing trash into surrounding water bodies has been increasingly popular in recent years, posing long-term harmful repercussions on the area's biodiversity as well as the local ecosystem.

b) Many water creatures accidentally consume flotsam because it resembles their natural prey. Bulky plastic waste has the potential to become permanently ensnared in the digestive tracts of these animals, obstructing the passage of food and causing starvation or disease that leads to death.

c) To achieve a clean water body in order to reduce pollution of rivers

1.2 OBJECTIVES –

• To remove the trash from both large and small bodies of water.

• To reduce the use of garbage collectors that run on fuel.

• To address the issue of waste plastic and food materials found in water bodies.

• To save aquatic wildlife by purifying the polluted water.

• In order to reduce the amount of labour needed to clean the lake, we can set up a timer in accordance with the needs of the farmer.

2. SYSTEM MODEL & DESIGN

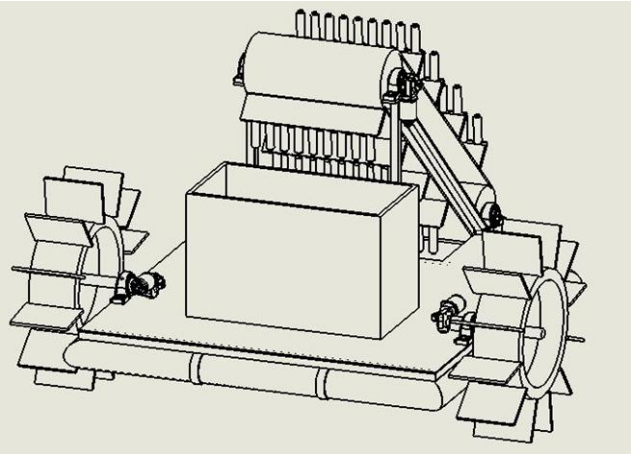

Fig: 2.1. System Design

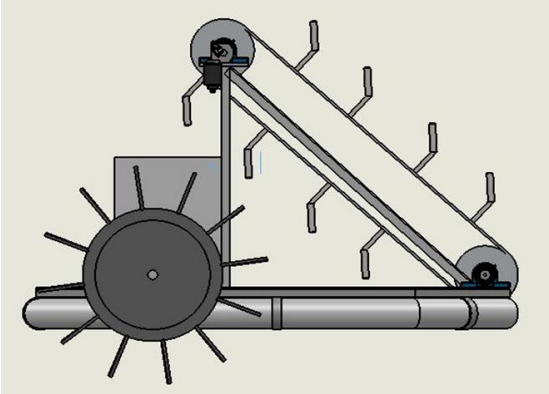

Fig:2.2. Side View

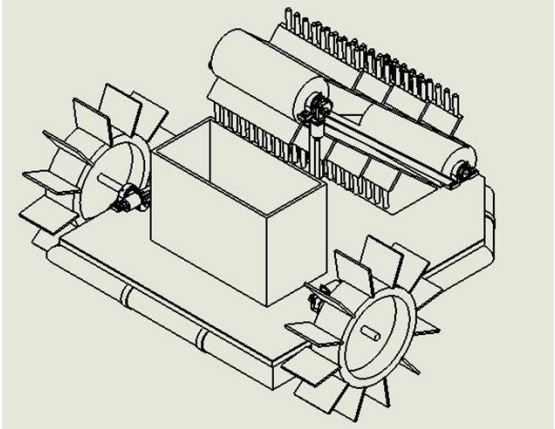

Fig: 2.3. Isometric

3. METHODOLOGY

For the actual working of the system there is need of several hardware and software requirements which are mentioned below.

3.1 Hardware Requirements

This system has been equipped following components which are necessary to build our system. These are the components which are necessary for proper working of the system. These components are easily available in market.

1. Base Frame
2. Pipe holder
3. Base Plate
4. Frame cut part
5. Frame Section 1
6. Frame Section 2

7. Bearing 1

8. Bearing 2

9. Shaft 1

10. Wiper Motor

11. Shaft 2

12. wheel

13. Conveyor Stand

14. Bearing holder plate

15. Side Frame

16. Conveyor plate

17. Conveyor

18. Conveyor arms

19. Trash Container

20. Main Frame

Frame

Here the frame is called the skeleton of the boat on which the tank, propeller, conveyor is to be mounted. Because of light weight and anti- corrosion property we have selected PVC pipe to make the frame of the boat. Here the frame is called the skeleton of the boat on which the tank, propeller, conveyor is to be mounted. Because of light weight and anti-corrosion property we have selected PVC pipe to make the frame of the boat There are so many advantages of PVC like; PVC is radially available and relatively in expensive. PVC is very dense & thus very hard so the resist impact is very well comparing to other plastics. PVC has very good tensile strength. It is very good resistant to the chemicals & alkalize.

Specification:

1. Base Frame Length = 1548mm, Breadth= 1248mm.

2. Base Plate Length=1548mm, Breadth=1248mm.

3. Frame cut part Length=50mm.

4. Frame Section 1 Length=458mm.

5. Frame Section 2 Length=529.5mm.

6. Side Frame= Length=1080mm.

7. Main Frame= Pipe Diameter=102mm

Pipe Holder

PVC pipes, a synthetic plastic polymer known as Polyvinyl Chloride, make up the boat's foundation. This pipe may readily float in water since it has a lower density than water. These pipes have an airtight seal.

1. Specification- Inner diameter = 104mm, Outer diameter = 109mm.

Conveyor

In this the conveyor is used to lift the garbage float on the surface of river or lakes. There are so many conveyors in practice but as per our boat concern we used plastic flat belt conveyor. As shown in picture the starting portion of the conveyor is deemed in the water and directly comes in contact with the water. If we use the metal conveyor it will corrode and we have to change the conveyor very earlier, also the metal conveyors are very costly so that's why we are using the plastic conveyors.

1.Specification - Length=1325.5mm.

Bearing

A ball bearing is a type of rolling-element bearing that is used for smoother action by reducing friction. It reduces the rotational friction during the operation and also emphasis to reduce radial and axially acting load.

Specification-

1. Bearing 1 Inner Diameter=32mm.

2. Bearing Holder plate - Length=162mm, Width=45mm

Motor

The motor used here is DC which converts the electrical energy into mechanical energy. This depends on the force produced by the magneti field.

Specification- Voltage=12V.

Shaft

The power transmission is done through shaft which is its basic use.

Specification-

1.Shaft 1 Diameter=32mm, Length=320mm.

2.Shaft 2 Diameter=32mm, Length=572.5mm.

Conveyor

The part of the belt conveyor system which carries garbage from water to the collecting tray.

Specification-

1.Conveyor Length=1325.5mm

2.Conveyor stand=764.4mm

3.Conveyor arm's Length=480mm, height=100mm

Trash Container

Collecting container is used to contain the garbage taken out from the water body.

Specification-

Length=680mm, Breadth=350mm, Height=450mm.

4. WORKING

The entire system is powered by a 24 V dc supply. Controlled by rf transmitter and receiver of range 2.5 km. This system can travel in any kind of water bodies with its special floating technology. In the front of the system a loading conveyer has been provided which collects the waste and loads it to the collecting cabin. The collecting cabin can store up to 50 kg of waste in which can be easily attached or removed from the main body. The propelling blades connected to 12 v motor drive helps in both moving and removing of water weeds. It consists of a floating base provided by 2 driving motor connected with a two different drive propeller. The entire system is provided with radio frequency control system which enables the system to be controlled from a range of 2.5 km. At the front end a chain conveyer loading system is provided which helps in collecting and loading of plastic and a collecting bin of 50kg capacity is provided which can be easily attached or removed whenever required the system is powered by 24v battery of span 5 hrs. with full charge. This machine's primary function in this project is to remove waste materials from the water's surface and deposit them in a tray. The frame is welded and has the appearance of a slope-facing machine part. It consists of an arrangement of the conveyor that is installed on the shaft and bearings support; the shaft is connected to the pedestal bearing and the bearing is mounted on the M.S. angle frame. Waterwheels rotate as a result of hydropower; belt drives deliver this power to a conveyer system. Water debris, trash, and plastic are collected from water bodies as the conveyer moves. The waste debris in the water will be raised as the machine is submerged and will migrate upward. The trash will fall into the tray once it reaches the uppermost extreme point. As a result, the water surface will be cleaned and waste particles will be safely collected from the water. The second conveyer is used to remove the waste material from the river after it has been collected. The River Cleanup Machine makes use of long floating barriers that, when placed at an angle, may mechanically remove plastic.

5. RESULTS AND DISCUSSION

Semi-automatic water cleaning system which cleans the rivers, lakes and other water bodies. Highly efficient with a compact design. System is very flexible by using remote control. Battery operated system, will prevents the usage of fossil fuel. Because the lifespan of aquatic animals is harmed it creates harmful environment within the circle of water creature life cycle, thus our device focus to help the water creature life cycle.

6. CONCLUSIONS

The project places a strong emphasis on operational flexibility. This is simple to use and requires little upkeep. This project, "Fabrication of Semi-Automatic Water Cleaning System" was created in order to eliminate water contaminants including plastics, trash, and water debris that are floating on river and pond surfaces while also being very cost-effective. This is primarily highly helpful for preserving human health and lengthening the lives of aquatic creatures. In the process of the project study, we overcame a lot of obstacles and learned a lot. We initially simply began by defining the issue that affects society and the community, with a burning desire to take action. This led us to discover the expanding issue of trash disposal in a new light water source. As a result, we worked diligently to build the project that would solve this issue. We encountered many tasks along the way, including one that required substantial research on the current state of the rivers in India. We can therefore conclude that fresh water resources were not always scarce or depleted by looking at their current situation and comparing it to their state in the past. Growing population and their lack of societal and environmental awareness were the root causes. The first step is to show concern for the environment, which gives humans so much. The underlying message of this is that we must ceasepolluting our water supplies and raise awareness of them in more political and social contexts. The next step is to technologically clean the fresh water supplies, for which we have created our project. Therefore, the solution to the issue is quite straightforward: first, stop the ugly mentality of environmental pollution; second, stop the pollution itself on the physical level by adopting appropriate measures; and third, clean the already polluted fresh water resources in a more technologically advanced manner. Based on these findings, we can say that it is a creative way of reducing manual stress and thereby extremely dependably sustaining the in the pond. The project we completed was impressive in terms of environmental goals and is

particularly beneficial for small-scale projects. Even said, this technology can also be used by people to remove trash from lakes. The project's goal was successfully attained.

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