



## Pond Skimmer

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### Abstract

Rivers in our country considered sacred, but very few people talk about their conservation. Due to the dumping of waste into the rivers are polluted and lost their existence. Many river cleaning projects like "Narmada Bachao", "Namami Gange" are operated by the Indian government. Many other large and small cleaning projects are operated by the government which requires huge capital investment. By considering to the remedy of such a serious problem we made a project which name is pond skimmer. Pond Skimmer is designed in such a way that it collects all the garbage floating on the surface of the water. It collects all types of waste such as plastic wastes, bottles, etc. After the collection of waste, the collected waste can be easily disposed. It is a water boat having a conveyor and propeller placed on the shaft and bearing supports. A geared dc motor (1308 series) has been used to drive the conveyor. As the conveyor rotates, it collects the waste and puts into a collector box situated at the hind. Pond Skimmer is an RF-based wireless boat that contains Rx-Tx modules (434MHz). The boat remotely controlled up-to 100 meters(maximum) distance. By making this project we can collect all the wastes from the water surface and reduce human intervention such as minimizing labor work, sending the man into pond, etc. We can use this project in the future for other purpose such as checking of water quality, the temperature of the pond, oxygen level of pond, etc.

**Key Words:** Pollution, waste collector, geared dc motor(1308 series), RF Tx-Rx 434MHz module, conveyor, propeller.

### I. INTRODUCTION:

These days, environmental issues emerge in numerous towns in India. These issues tag along by evolve venture, for example, the development of houses, workplaces, and other business regions. The environmental issues happen because of a few reasons, low budget allotment on condition the executives and poor management in waste disposal. The environmental issue which comes up from year to year and still can't be fathomed is about trash and waste from different spots arrange into streams. The trash could stop up water stream getting filthy, rank, what's more, frequently over stream causing floods. Not all the waste arranged is dumped in a landfill, in most of the cases wastes are dumped in the rivers. River environs that get most contaminated in Agra are the Yamuna River. This river goes through numerous towns which have poor cleaning conditions all in all. During the rainy season, this river frequently overflows and causes floods. Our primary objective is to clean the ponds and for that reason, we are making an effective aquatic robot that is efficient to collect floating waste from the ponds. The boat consists

of two propellers for the movement in the pond, which is controlled by RF-based wireless remote. The conveyor collects the waste which is floating on the water surface and then is dumped into the collector box which is mounted at the back part of the boat. It is the best and cheap solution for cleaning the pond. The boat is made from scratch (i.e. all the components are easily available in local markets) and easy to use.

## II. LITERATURE REVIEW:

**M. Mohamed Idhris, M. Elamparthi, C. Manoj Kumar Dr.N. Nithyavathy, Mr. K. Suganeswaran, Mr. S. Arun kumar,**

### **DESIGN AND FABRICATION OF REMOTE CONTROLLED SEWAGE CLEANING MACHINE[1]**

The motive of the project is to automate the sewage cleaning process in drainage, to reduce the spreading of diseases to human. It also improves the shelf life and sensory quality of food products. In the proposed system, the machine is operated with remote control to clean the sewage. The system has a wiper motor that starts running as soon as the set-up is switched on. Two power window motors are connected to the wheel and it is driven with the help of the remote control set-up. The process starts collecting the sewage wastes by using the arm and it throws back the waste into the bin fixed in the machine at the bottom. An arm is used to lift the sewage and in turn a bucket is used to collect them. The set-up runs even in sewage area with water (limited to a particular amount) so that the wastages which floats on the water surface also gets collected. The garbage which affects the drainage is also picked up and removed.

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### **Design and Fabrication of River Cleaning Machine[2]**

This project emphasis on design and fabrication of the river waste cleaning machine. "River cleaning machine" a machine which involves the removing the waste debris from water surface and safely dispose from the water body. The work has done looking at the current situation of our national rivers which are dump with crore liters of sewage and loaded with pollutants, toxic materials, debris etc. Due to increase in water pollution in the form to waste debris; it is hampering the life of aquatic animal and make their life in danger. A machine will lift the waste surface debris from the water bodies, this will ultimately result in reduction of water pollution and lastly the aquatic animal's death to these problems will be reduced. The main aim of the project is to reduce the man power, time consumption for cleaning the river. In this project we have store the energy in the battery and used this energy for river cleaning with the help of a motor and chain drive arrangement.

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### DESIGN & FABRICATION OF RIVER CLEANING SYSTEM [3]

India is holey country & during lots of festival like ganesh visarjan, navratri durga puja & mainly Siahnsth kumbhmela there is lots of water pollution of Godavari River at Nashik. The water pollution is very important problem in rivers, ponds and water bodies near Godavari River at Nashik. Due to increase in water pollution in the form to waste debris; it is hampering the life of aquatic animal and make their life in danger. Similarly sometimes the aquatic animal tends to eats surface waste debris considering it as a food; which ultimately cause the death of animals. Due to polluted water is are many skin deices to human kind are observed. So that to reduce the water pollution we are trying to make river cleanup machine. "River cleanup machine" a machine which involves the removing the waste debris from water surface and safely dispose from the water body. The river cleanup machine works on hydropower to extract waste water debris, plastics & garbage from Godavari river at Nashik.

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### Design And Fabrication Of River Waste Collector [4]

This project emphasis on design and fabrication of the river waste collector. India is a holy country with diversified culture and different religious festivals which sometimes causes pollution among which water pollution is major. . Different types of solution have been used by the government to solve such issues. So this work is done after focusing on the current situation of our water reservoir.The government of India has taken charge to clean rivers and invest huge capital in many river cleaning projects like "Namami Gange", , "Narmada Bachao"" and many major and medium projects in various cities like Ahmadabad, Varanasi etc. So that to reduce the water pollution we are trying to make river cleaning machine. "River Waste Collector" a machine that involves the removing the waste debris from water surface and safely dispose from the water body.

### III. PROBLEM IDENTIFICATION

The issue of water logging because of plastic, thermocole and metal prompts pest development and it favors infections like maleria, typhoid and so on. This is perilous for human life and thus the possibility of this venture rose. The goal of the proposed project is to design and fabricate an autometed machine for sewage cleaning so as to keep people from getting influenced by different sicknesses from the irresistible microorganisms present in the sewage while cleaning physically. This proposed project is to limit or defeated the issue confronted while utilizing man while worked machine and to limit the expanded dumping rate of waste. The proposed system is simple aquatic boat which float on the water surface within a certain range of distance and collect the floating waste.

### IV. CONSTRUCTION AND WORKING PRINCIPLE

The project consists of mechanical as well electronics parts. The component which drive the project is conveyor and propeller and two bearings. The conveyor system is fixed at the front while the propeller is fixed at both side of the boat for the direction.

#### A. HARDWARE REQUIRED

Gear Motor 3

Conveyor Belt

Rf 4 Channel (Rx-Tx modules 434MHz)

Battery 6 v

Water Propeller Wheel

PVC pipe

Waste Collection Box

Bearing

## B. PROPOSED DESIGN

To gather the design project, the pontoon will be joined by two propellers. The conveyor belt is placed in the front. A trash canister is put toward the end of the conveyor to gather the garbage. In building the undertaking structure, the various materials and parts are required. The materials and parts used for making project is cheap and easily available in the market. The design of the proposed project is simple such that it facilitate easy to use, cheap, fast and safe loading and unloading of waste with least human intervention.

In pond skimmer, two PVC pipe of 4 inches diameter and 4 feet in length is used as pontoon. This pontoon helps the system to float using the Archimedes principle. This pontoon can displace a 22 liter of water and can hold the weight of approx 20 Kg. A conveyor belt is fixed on this pontoon inclined at 45 degrees. The conveyor is rotated by the geared motor at the speed of 200rpm. one-tenth of the conveyor belt is sinking in the water. conveyor belt rotated in down to up direction.

Different parts of the boat is given as:

Collector Box: The Collector box is a plastic box which is located at the end of the conveyor. It is used to store the waste dumped by the conveyor. We use a detachable plastic box to dump waste manually when it filled.

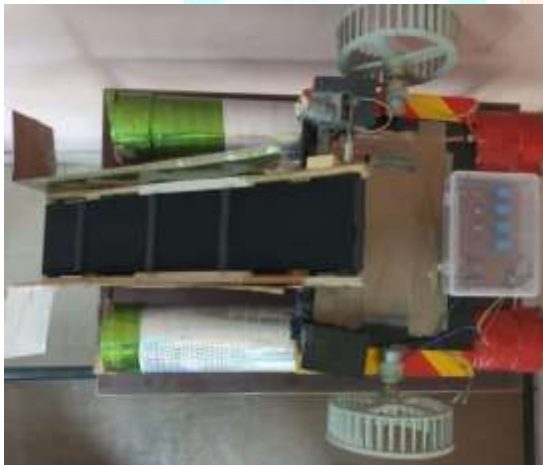


Fig.1. Prototype of the Project

Conveyor Belt: Conveyor belt is used to convey floating waste. For the movement of conveyor system we provide a 12v gear motor (200rpm). Bearing is used for the rotation of the conveyor. A coupler is used to couple gear motor with conveyor belt.

Propellers: Two propellers are used for providing direction and helps in the movement of the boat.

Battery: We use three batteries in which one is of 12v and two is of 6v each.

DC Geared Motor(1308 series): The 1308 series provide wide range of applications requiring a combination of low speed operation and bi-directional speed capability. We use two such motors for the propeller. Two 6v battery connected in series and then power is supplied to the motors. Since it is bi-directional motors it is used for direction of the boat.

Pontoon: A PVC pipe of 4 inches diameter and 4 feet long used on the both side of the boat. It helps in floating of the boat.

Movement of the system is controlled by the two water propeller wheels. These two water propeller is driven by a geared motor at speed of 20 rpm. Direction and movement is controlled by these water propellers.

### C. CONTROLLING

Since it is a remote control boat we use RF based wireless remote using Rx-Tx(434MHz) module. This module consist of transmitter and receiver. This radio frequency (RF) transmission framework utilizes Amplitude Shift Keying (ASK) with transmitter/collector (Tx/Rx) pair working at 434 MHz. The transmitter module takes serial input and transmits these signs through RF. The transmitted signs are received by the receiver module put away from the source of transmission. The framework permits one- way communication between two hubs, namely, transmission and reception. The RF module has been utilized with four channel encoder/decoder ICs. Here HT12E and HT12D have been utilized as encoder and decoder separately as shown in fig.1.

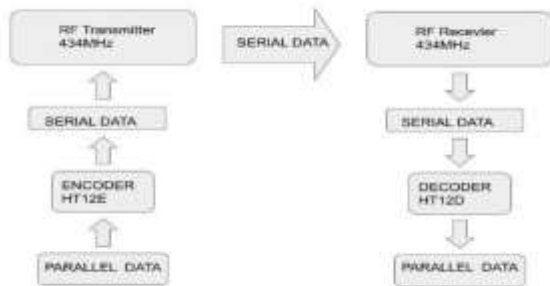


Fig.2. 434MHz Rx-Tx module working

The encoder converts parallel input (from the remote switches) into serial set of signals. These signals are serially moved through RF to the reception point. The decoder is utilized after the RF receiver to decode the serial arrangement and recover the original signals as output. This output can be seen on corresponding LEDs.

For controlling the boat remotely the transmitter circuit is shown in fig.2.

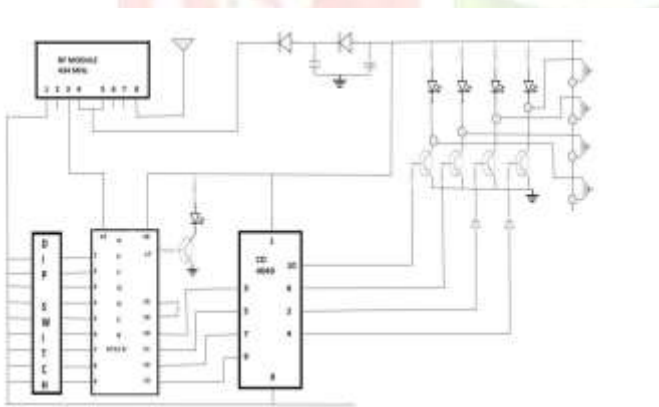


Fig.3.Receiver Channel circuit

In the above circuit, the antenna is connected to the pin number 8 of the RF receiver module. H12D decoder along with a dip switch connected to the RF receiver module. The decoder decode the input and the decoded output passed to the hex-inverter. The hex-inverter converts the logic and send to the corresponding relay. The relay is connected with motors that drive the propellers.

The circuit used for remote or transmission is shown in fig.3.

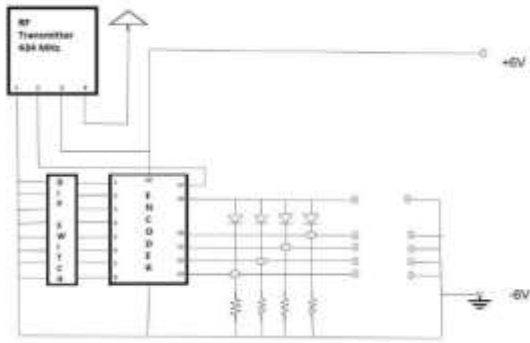


Fig.4. Transmitter or Remote circuit

In the above circuit the antenna is connected to pin number 4 of the RF transmitter module. Five switches are used to generate signals. The encoder encodes parallel data into serial for transmission through RF transmitter. TE pin which is active low, when triggered, the programmed data are transmitted by RF transmitter.

#### D. WORKING

The system has two switches, one to switch on the conveyor belt power and others to switch on the water propeller wheel. conveyor belt collects the waste from water and puts it into a waste collection box. Movement of water propeller is made as per giving chart below

| DIRECTION | LEFT MOTOR | RIGHT MOTOR |
|-----------|------------|-------------|
| FORWARD   | FORWARD    | FORWARD     |
| BACKWARD  | BACKWARD   | BACKWARD    |
| LEFT      | BACKWARD   | FORWARD     |
| RIGHT     | FORWARD    | BACKWARD    |

When the waste collection box is filled then the system is brought to the corner of the pond and manually emptied.

#### V. ADVANTAGES

It is eco-friendly.

Low maintenance cost

Easy to operate

Reduces the investment to clean the pond.

#### VI. CONCLUSION

Floating wastes on water destroy the beauty of the pond as well as make favorable conditions for pathogens. These pathogens are the reason for many diseases. It also affects the aquatic life of ponds. Typhoid, cholera namely some deadly disease caused by the polluted water.

The proposed system is a problem to the solution. This system collects all the floating waste from water and makes the pond look clean. The system has a zero-emission level. It also reduces the risk of disease and increases the beauty of a ponds.

**VII. REFERENCES**

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