



# Design and Testing of Remote Control Trash Collector for Lake Water

Rakshith C P<sup>1</sup>, Prajwal B Y<sup>2</sup>, Mehul Kumar<sup>3</sup>, Raghavendra K H<sup>4</sup>

Sujesh Kumar<sup>5</sup>

Student, Aeronautical Engineering, MITE, Moodabidri, India<sup>1-4</sup>

Senior Assistant Professor, Aeronautical Engineering, MITE, Moodabidri, India<sup>5</sup>

**Abstract:** The remote control trash collector for lake water is a device designed to collect floating debris and waste from water bodies, particularly lakes, in a convenient and efficient manner. The system comprises a remotely controlled vehicle equipped with a debris collection mechanism, such as a conveyor belt or suction pump, and a waste storage compartment. The device aims to minimize the environmental impact of waste and debris in water bodies and provide a cost-effective solution for cleaning lakes, reservoirs, and other water resources. It is also designed to reduce the manual labor required for cleaning up lakes, making the process safer and more efficient.

**Keywords:** Trash Collector , DC Motor , Conveyor Belt , Chain & Sacket.

## I. INTRODUCTION

Water is life and life are water. Nearly 70% of the earth is covered with water, about 97% of it is in the form of oceans and is therefore unfit for human consumption. The remaining i.e., 3% is stored in various sources like glaciers, rivers, lakes, and other water bodies. The rivers and lakes that are found on the earth's surface are crucial for mankind.

The river water is used for irrigation which in return gives food to the people. The rivers also maintain the ecology and biodiversity of the region and bring prosperity. Unfortunately, most of the rivers and lakes are becoming more and more polluted. This is due to human actions like letting domestic and industrial wastes seep into such water bodies, not realizing the water is precious to all living organisms, which is slowly resulting in the death of aquatic life.

The proposed model of the machine consists of an DC Motor driven conveyer mechanism that collects and removes wastage, thereby preventing the entry of garbage and plastic waste into water bodies and reducing the difficulties which are faced when the collection of debris takes place. This project also consists of a belt-drive mechanism that propels the conveyer driving shaft which in turn runs the conveyer and it collects the waste from the sewage stream. Thus, preventing the waste from entering the water bodies

## II. LITERATURE REVIEW

[1] Prof. Sandesh M Prabhu, Mohammad Irshad K, Mujeeb Rahman, Muhammed Shahil, Prajwal (2019) "Design and Fabrication of River Cleaning Machine", The author discussed about the automate the sewage cleaning process in drainage, to reduce the spreading of diseases to human. The black water cleaning process helps to prevent pest infestations by reducing the residues that can attract and support pests. 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.

[2] Prof Ketan, Mr. Abhijeet. M. Ballade, Mr. Vishal S. Garde, Mr. Akash. S. Lahane and Mr. Pranav. Boob "Design and fabrication of the river cleaning system", This research aims to design and make AGATOR(Automatic Garbage Collector), a rotor robot model as automatic garbage collector to counter accumulation of garbage in the river which has no flow effectively and efficiently.

[3] Dr. Imran A. Khan, Prafful B. Dandare, "Design and Fabrication of River Cleaning Machine" , .The author discussed about 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.



[4] Dharmesh N. Kandare, Aniket N. Kalel, “Design & Construction of River Cleaning Mechanism”, The author discussed the project to clean the river. After implementing this project we can control the pollution of river it is very beneficial for our society. In this project turbine rotates by flow of river water and through the mechanical gear arrangement we arrange two conveyor belts. The first conveyor belt is used to pick solid waste from river and the second conveyor belt is used to draw solid waste out of river for solid waste management.

[5] Madhavi N. Wagh, Kashinath Munde, “Design and Analysis of River Water Cleaning Machine”, The author discussed about the machine is designed in such a way that it generates motion for its functions by itself through the action of running water thereby cutting out the dangers of the powering the machine by other sources of power because of the harshness of the rain on these other sources. The drainage system cleaner has three major parts which are the Propeller, the Cleaner and the Pan all make up for its effective functioning.

[6] Saif Ali Sayyad, Adarsh Dorlikar, “Design and Fabrication of River Cleaning Machine” , The discussed about the “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.

### III. COMPONENTS AND MATERIALS

Two floaters are placed below the main frame, as seen in Fig . On the front side of the frame, a cabin is built through which the machine will be controlled. A conveyor is positioned just behind the cabin, which is submerged in the water and runs from the bottom of the cabin. The engine, which is connected to the propeller shaft, will be situated beneath the conveyor belt. Finally, the garbage box is located at the end of the machine.

The driver will sit in the cabin to operate the machine. Floaters are the part that will constantly be in contact with the water. So, as the machine moves forward, (steering takes place through the use of cables) the solid waste that is in the river moves from the water to the conveyor, the belts carry it, and finally drop it in the garbage box.

To tilt the garbage box from the middle to transfer the garbage, a hydraulic actuator or lifter has been used. This is the basic functioning of our river cleaner machine.



Chain &amp; Sacket



DC Motor 1



PVC Pipe (5Ft)



End Cap(5 inch)

### IV. METHODOLOGY

The methodology consists of the following parts:

- Analytical
- Software results
- Experimental

Table 3.1 shows the process flow of Analytical in the left section in a downward direction till the study and understanding of different types of mechanisms for operation.

The process flow for software results begins in the middle section and flows downwards till the CAD model of the project and the experimental flow is in the right section and flows downward till testing and interpretation of results.



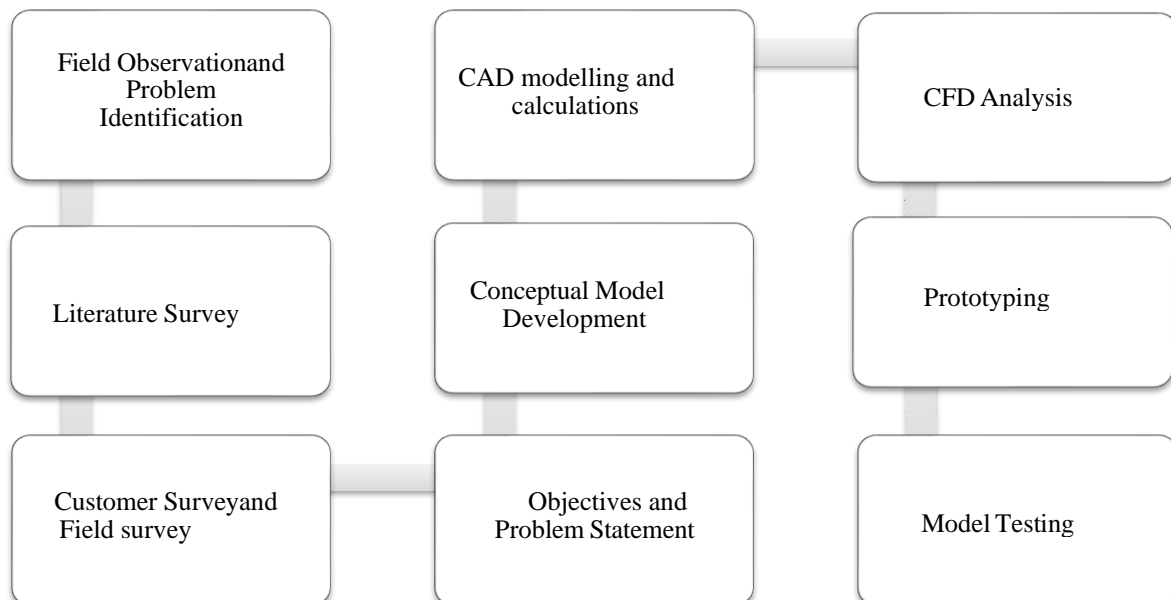
Table 1.1: Methodology Details

Analytical	Software results	Experimental
Literature review	CG of the body	Design and prototype offloating trash-collecting machine
Product Survey, Customer Survey	CAD model	Testing and interpretation of results
Identification of scope, Problem Statement & Objectives	Stress and force analysis	
Study and understand different types of mechanisms for operation	Floating conditions	

Fig. 3.1 describes the flowing points as follows:

- Firstly, do the field observation and identify the problem.
- Carry out an extensive literature survey, customer survey, and field survey along with a thorough understanding of objectives and model design.
- Design it on a suitable software like Solid works 2020.
- To enhance the view, Blender software was used.
- CFD analysis was carried out to do the analysis and verify the calculations.
- Manufacturing was done on a small scale and model testing was carried out to check its performance.

Fig 1.1: Methodology Flowchart



**V. CONCLUSION**

- The project “RC TRASH COLLECTOR” has successfully designed which is very much economical, easy to operate and helpful for water cleaning and it can be modified with more cleaning capacity and efficiency.
- The design criterions with problems definitions which, however were overcome by using references & teachers guidelines.
- The choice of raw materials helped us in machining of the various components to very close tolerance and thereby minimizing the level of balancing problem. It is very useful for society.
- Also, our product help in reducing the water pollutants to a certain extent.
- The major advantage is the safety provided by our product that is one need not risk his life while he is cleaning the lake ,we just need one person to control the boat.
- The product is socially helpful for the labourers who clean the lake and economically viable.
- If the product is used in large numbers and design in large scale it would be a perfect example for Technological application in environmental protection.

**REFERENCES**

- [1] Prof. Sandesh M Prabhu, Mohammad Irshad K, Mujeeb Rahman, Muhammed Shahil, Prajwal (2019) “Design and Fabrication of River Cleaning Machine” International Research Journal of Engineering and Technology (IRJET) Volume: 06 Issue: 07, July 2019.
- [2] Prof Ketan, Mr. Abhijeet. M. Ballade, Mr. Vishal S. Garde, Mr. Akash. S. Lahaneand Mr. Pranav. Boob “Design and fabrication of the river cleaning system”, IJMTER Volume 04, Issue2, 2017.
- [3] Dr. Imran A. Khan, Prafful B. Dandare, “Design and Fabrication of River CleaningMachine” International Journal of Creative Research Thoughts, Volume8, Issue 3March 2020.
- [4]. Dharmesh N. Kandare, Aniket N. Kalel, “Design & Construction of River CleaningMechanism” International Journal of Innovative Science and Research Technology, Volume 3, Issue 11, November 2018.
- [5] Madhavi N. Wagh, Kashinath Munde, “Design and Analysis of River Water Cleaning Machine” IJSDR, Volume 3, Issue 7, July 2018.
- [6] Saif Ali Sayyad, Adarsh Dorlikar, “Design and Fabrication of River Cleaning Machine” International Research Journal of Engineering and Technology(IRJET), volume: 06 Issue: 05, May 2019.
- [7] S. Arun Kumar, S. Shashikala “Effective Aquatic Waste Removal through Lake Cleaning Robot for Smart city Environment” International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-9 Issue-4, February 2020.
- [8] Ankita B. Padwal, Monica S. Tambe, Pooja S. Chavare, Reshma K. Manahawar, Mital S. Mhatre, “Review Paper on Fabrication of Manually Controlled Drainage Cleaning System”, IJSER Volume 8, Issue 2017