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WATER FLOATING WASTAGE CLEANING MACHINE

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ABSTRACT

Conventional methods for collecting floating waste from water bodies, such as manual labor, boats, and trash skimmers, are often risky, costly, and time-consuming. To address these challenges, we have designed a remote-operated river cleaning machine that enhances efficiency, safety, and eco-friendliness. The Water Floating Wastage Cleaning Machine targets water bodies polluted with debris, garbage, and plastic waste. It employs DC motors, a receiver, propeller, and a chain-driven conveyor system to collect and remove floating waste. This machine tackles the ethical and health risks faced by manual laborers in waste removal, providing a safer and more effective alternative. The system features metal teeth-based jaws mounted within a vertical frame that allows water to pass through while capturing solid waste. Periodically, the jaws lift and dump accumulated waste into a filter basket, powered by a motorized shaft. This automated mechanism requires minimal power and operational effort, making it an efficient solution for cleaning rivers, gutters, and drains. The innovation significantly improves waste management in water bodies, reducing environmental impact and health hazards associated with traditional cleaning methods.

I. INTRODUCTION

Conventional methods for collecting floating waste in water bodies, such as manual labor, boats, and trash skimmers, are often risky, costly, and inefficient. To address these challenges, we designed a remote-operated river cleaning machine that offers an effective, efficient, and eco-friendly solution for river surface cleaning.

The Water Floating Wastage Cleaning Machine is engineered to remove waste debris from water bodies, utilizing DC motors, a receiver, a propeller, and a chain-driven conveyor system. These components work together to collect and remove garbage, plastic waste, and other debris from rivers. This innovation improves waste collection efficiency and addresses the ethical and health concerns associated with manual cleaning. Laborers cleaning river water face high risks of infection or poisoning due to waste and chemicals, making manual methods both dangerous and labor-intensive.

Our system employs a mechanism that allows fluids to flow through while capturing large solid waste such as bottles and plastics. Metal teeth-based jaws are positioned at the bottom of the mechanism, mounted within a frame that allows liquid to pass through while trapping solid waste. A filter basket at the top collects the waste. Periodically, the jaws lift using a motorized shaft connected via a chain, dumping the waste by inverting the jaws. After disposing of the waste, the motor lowers the jaws back to their original position, ready to collect more debris. This automated system is highly efficient for cleaning rivers, gutters, and drains, requiring minimal power and operation. It significantly enhances water body waste management, reducing environmental impact and health hazards associated with traditional cleaning methods.

II. LITERATURE SURVEY

Extensive research has been conducted globally on natural water bodies, focusing on both freshwater and marine environments. This comprehensive literature review explores a myriad of scholarly works sourced from various books, internet resources, and national and international journals. The primary objective was to gather critical insights into the prevalent issues related to water pollution and its impact on aquatic ecosystems.

The literature review revealed substantial research efforts addressing various facets of river water pollution, particularly concerning heavy metal contamination and its repercussions on aquatic life. Noteworthy institutions such as WHO, CPCB, MPCB, NEERI, and others play pivotal roles in advancing hydrobiology and water quality research globally.

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III. METHODOLOGY

In this section, we provide a detailed description of the proposed approaches to outlier detection. The methodology and steps to solve the problem are illustrated in the flow chart below, which shows the sequential operations that will be performed during the project process.

The methodology outlines a systematic approach to the work, describing the process in the simplest manner. The design involves the application of scientific principles, technical information, and creativity to develop a new mechanism for performing a specific function. The total design work has been divided into two parts.

Table 1: Methodology

Task	1	2	3	4	5	6	7	8
Field observation								
problem identification								
Literature survey								
Objectives & Problem statement								
Conceptual Model Development								
Project Design								
Material Purchase								
Production Process sheets								
Manufacturing								
Model Testing								

IV. DESIGN AND DEVELOPMENT

The Water Floating Wastage Cleaning Machine (WFWCM) is designed to efficiently remove floating waste from water bodies. Key components include shafts, pillow block mounted bearings, sprockets, master links and chain, collector jaws and bins, and a wiper motor. Shafts, typically made of mild or alloy steel, transmit power from the motor to components such as sprockets and collector jaws. They undergo precise manufacturing processes and stress analysis to ensure they can withstand torsional and bending loads in aquatic environments. Pillow block mounted bearings support shafts, allowing for misalignment and reducing operational stress. Load ratings and bearing life calculations ensure reliability under varying conditions. Sprockets, coupled with chains, facilitate torque transmission and speed adjustment in the WFWCM. Design considerations include tooth count, pitch diameter, and alignment for smooth operation.

Master links and chains connect sprockets, enabling efficient power transmission and facilitating easy assembly and maintenance. Proper chain length and sprocket spacing optimizes performance. Collector jaws, typically lightweight and made of materials like aluminum, lift waste into storage bins. The design of jaws and bins maximizes waste collection efficiency with dimensions tailored for effective waste storage. The wiper motor powers the machine, utilizing a robust design and worm gear mechanism for reliable performance in marine environments. Operating on a 12V DC supply, it ensures durability and efficiency in cleaning operations. Each component is meticulously integrated into the WFWCM to maximize functionality, durability, and environmental sustainability, addressing the unique challenges of cleaning floating waste from water surfaces effectively.

Figure 1- collector jaw Pillow

Figure 2- Block Mounted Bearing

Figure 3 - Wiper Motor

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MODEL

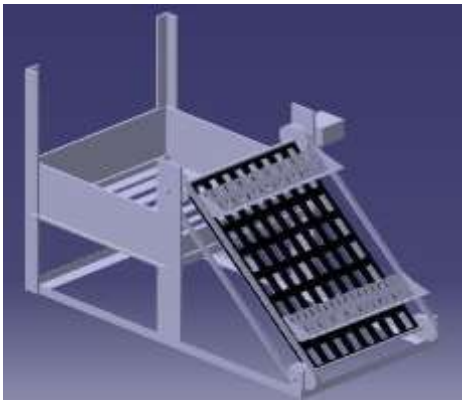

Figure 4: 3D view of Model.

V. RESULTS

Figure 5: Final Model.

VI. CONCLUSION

The water floating wastage cleaning machine represents a significant advancement in drainage wastewater treatment systems. By utilizing motor-driven mechanisms such as roller chains, sprockets, lifters, and a collecting bin, the system achieves semi-automatic control over sewage treatment processes. This approach not only meets stringent national emission standards for industrial wastewater but also ensures stable operation at a low cost while delivering effective results.

Moreover, the machine enables the treated drainage water to be repurposed for beneficial uses such as irrigation and sanitation, including watering plants and cleaning toilets. This dual functionality not only enhances environmental sustainability by reducing wastewater discharge but also supports practical applications in water resource management.

In conclusion, the water floating wastage cleaning machine represents a comprehensive solution for wastewater control, offering both environmental benefits and practical utility in various applications related to water management and sanitation infrastructure.

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