

THE IMPACT OF WATER POLLUTION AND PRELIMINARY STUDY ON RIVER TRASH COLLECTING MECHANISM

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Abstract—Today, we people are facing pollution everywhere. Due to rise in pollution our environment is getting adversely affected. One of the most recent problems we are facing is pollution of the water in rivers and lakes. This paper highlights a proposed design of trash collecting system effective and efficient for cleaning up trash from rivers, canals and lakes, or known as inland waterways. Another main objective of research work is cleanliness of surrounding and, safety, welfare of people in public health. The trash or debris collecting system is specifically supervised and control to application in highly maneuverable vessels equipped with means for picking up floating solid and liquid trash, storing waste on the vessel, and discharging the waste from the vessel to a storage area, either for ashore purpose or as garbage transporter.

Cleaning the trashes by using manual processes would be ineffective as it often covers vast area of works and efforts. Therefore, this paper presents a proposal on trash collecting system for inland waterways. The system designed will be the easiest way to manage the inland waterway environments, time saving and cost efficient, thus deemed as the most viable solution as means to clean up the mess created by human. A trash skimmer work boat collects and discharges debris from the front or bow. A storage conveyor positioned approximately amidships and along the center line, and is mounted to the hull on a slide or track arrangement that permits fore and aft motion.

Index Terms— Trash collector boat; Inland Waterways; Waste; Trash.

I. INTRODUCTION

India is a country which is surrounded by water in three directions. India has an immeasurable network of inland waterways in the form of rivers, canals, back water and creeks. The total navigable length is 14,500 km, out of which about 5,150 km of the river and 4,030 km of canals can be used by mechanized crafts. Water pollution is a major environmental issue in India. The largest origin of water pollution in India is untreated sewage. Other sources of pollution include agricultural runoff and uncontrolled small scale industry. Most rivers, lakes and surface water in India are polluted. Sewage

discharged from cities, towns and some villages is the predominant cause of water pollution in India.

Cleaning the trashes by using hand operated processes would be ineffective as it frequently covers immense area of works and efforts. Therefore, this paper presents a proposal on trash collecting system for inland Waterways. There are many waste types defined by progressive systems of waste management, and they are basically in the form of solid, liquid, and gas. Solid waste includes plastic, glass, iron or tin, paper and natural substances like wood, leafs. Figure shows the current condition of Indian rivers.

The system consists of a heavy duty marine work boat designed for use in inland waterways where there is a need to collect floating trashes and litters. The design will also prove instrumental in small scale oil recovery operations. The system designed will be the easiest way to manage the inland waterway environments, time saving and economical, thus judge as the most viable solution as means to clean up the mess created by human. This invention relates to a trash or debris catching device particularly adapted for use in an irrigation field.

TABLE I. MAJOR SOURCES OF TRASH

Major Resources	Types of Area
Biological	Wood, Animal dump
Commercial	House, shopping center, warehouse, airport, restaurant
Institution	School, university, hospital, prison
Industrial	Factory disposals, toilets, wrapping components
Residential	Individual housing, apartment, flat, city houses

This invention relates to skimmer boats, i.e., work boats for collecting and disposing of floating solid waste materials in harbors and waterways. The invention is more specifically directed to highly maneuverable vessels equipped with means for picking up floating debris, means for storing the debris on the vessel, and means for discharging the debris from the vessel to a storage area, which may be ashore or which may be another vessel. Such as a barge. Many work boats and vessels have been proposed for collection of floating solid waste and other debris. These may typically be formed as a catamaran-type hull, i.e., a pair of pontoons or sponsons, or as a mono hull, with paddle wheel or screw driver propulsion, and an operator station. In one typical trash skimmer design, one or more hydraulically powered open mesh conveyors are positioned between the pontoons of a catamaran-type twin-hull vessel. Twin over-the-rear propellers are used to propel and maneuver the vessel and these can be tipped up for cleaning weeds and debris from the propeller blades. A main pickup conveyor extends off the front end, and extends into the water to catch the floatables, which it picks up and carries back to a main storage conveyor.

When the storage conveyor is completely loaded, the boat is taken to a discharge position where the debris can be transferred to a truck or barge or other facility. A rear conveyor at the stern of the craft carries the debris from the storage conveyor up and back to drop it into the barge or on-shore storage facility. In some cases, a separate, on-shore conveyor can be used to pick up the trash discharged from the vessel. In the vessels of this type, the debris or trash is picked up and loaded from the front, and is discharged from the rear or stern of the vessel.



Fig I. Current Condition of Indian Rivers.

This means that there have to be three conveyors System, i.e., a pick-up or loading conveyor, a storage conveyor, and a discharge or unload conveyor. Second, because the region of the vessel on the centerline and sternward of the storage conveyor is occupied by the discharge conveyor, the motor,

the cockpit or operator control position, and any other necessary equipment have to be located to one side or the other, usually atop one of the pontoons. The control position may be located on a bridge standing over the storage area.

II. PROBLEM DEFINITION & ENVIRONMENT CONSEQUENCES

Trash can travel throughout the world's rivers and oceans, accumulating on beaches and within gyres. This debris harms physical habitats, transports chemical pollutants, threatens aquatic life, and interferes with human uses of river, marine and coastal environments. Of all trash, plastic trash has the greatest potential to harm the environment, wildlife and humans. It can be found floating at the surface, suspended in the water column, or on the bottom of almost all water bodies. It is transported by rivers to the ocean, where it moves with the currents, and is often eaten by birds and fish, concentrating toxic chemicals in their tissues, and filling their stomachs, causing them to starve. Plastic aquatic debris is much more than a mere aesthetic problem.

A. HABITAT IMPACTS

Habitat alteration is caused by trash and debris in rivers and oceanic convergence (accumulation) zones, on beaches, and submerged benthic (at and near the bottom of rivers and oceans) habitats. As debris accumulates, habitat structure may be modified, light levels may be reduced in underlying waters, and oxygen levels may be depleted. These changes can undermine the ability of open water and benthic habitats to support aquatic life.

B. CHEMICAL IMPACTS

Chemical impacts associated with plastic aquatic trash include the accumulation and transport of persistent, bio accumulative and toxic (PBTs) contaminants, such as PCBs and pesticides. Aquatic plastic debris has been found to accumulate contaminants at concentrations that are orders of magnitude (thousands to millions of times) greater than the surrounding environment.

C. BIOLOGICAL IMPACTS

There is a substantial body of evidence documenting the harmful effects of aquatic plastic debris on river and marine organisms. The most common threats to wildlife include both physical hazards from ingestion and entanglement, and toxicological threats from ingestion of contaminants attached to and trapped within plastic particles.

D. HUMAN IMPACTS

In addition to degrading the habitats and ecosystem services that humans use, plastic aquatic debris can directly interfere with navigation, impede commercial and recreational fishing, threaten health and safety, and reduce tourism. Large debris, such as derelict fishing nets and lines that float at or just below the surface, pose the greatest threat to vessel navigation. Humans can also be directly harmed by aquatic trash, becoming entangled in nets and lines while swimming or

diving, or being injured by sharp debris that accumulates on beaches. It is not uncommon for SCUBA divers to become entangled in nets or lines. In most instances they are able to free themselves. In rare instances entanglement has resulted in injury and even death.

III. DESIGN METHODOLOGY

The typical methodology for design the mechanism is based on system engineering design and analysis manner. While giving regard to the preference and importance of design procedure, the methodology also gives reason for study where the process will improve the dependency on the system.

More attention is given to recent design of boats as it is the most difficult part in determining the overall configuration and specification. The data obtained can be further analyzed for better design of trash collecting system for river and lakes.

IV. OBJECTIVES

The study aims at proposing and designing a new debris collecting system that is effective and efficient for cleaning up trash from inland waterway, with objectives as follows:

- 1) *To improve water quality, also to improve aquatic life.*
- 2) *To compare the proposed design of rubbish collecting system by performing engineering design methods.*
- 3) *To design intended system for actual operation.*
- 4) *To verify the design by expert inputs.*

V. EFFECTS OF MECHANISM

1) *It is a non-conventional river cleaning system, as in old days the river was cleaned by workers using their manual efforts and getting in direct contact with trash.*

2) *Environment friendly system. It uses solar power to drive the mechanism also it is quiet in operation.*

3) *Easy in operation.*

4) *It is very useful for small as well as big lake, rivers where garbage is present in large amount.*

5) *Skill Worker not required to drive the system.*

VI. BENEFITS OF USING THIS MECHANISM

- 1) *Water pollution will be minimized.*
- 2) *Health related problems which are caused due to contaminated water can be minimized.*
- 3) *Aquatic life gets improved.*
- 4) *It is the cheapest way to clean the river trash.*

VII. FUTURE SCOPE

With advancement and modification in mechanism, it can be used for cleaning of floors or grounds and lawns. In future this project can be improved to sort more categories 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 to providing power to the boat instead of battery operation. The modification of the boat is done to increase its waste collecting capacity. This project is made only for small lakes and by doing some modification in its size and capacity it can be used in big lakes and rivers like Ganga.

VIII. CONCLUSION

Conclusion can be drawn that project based on the research article can be fabricated on the basis of literature survey. On this relevant work which would definitely help in cleaning the river and lake which ultimately will benefit the human life as well as aquatic life, also the study can provide flexibility in operation by modification in the mechanism. The innovation is easy and less expensive and has many advantages. This intended project can be designed with despair that it is economical and helpful to cleaning of rivers, lakes and overall our environment.

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