

# REVIEW PAPER ON SOLAR POWER SEABIN

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**Abstract:** Water bodies across the world are facing existential crises. The human settlements are regularly dumping off the garbage and refuse to clean the water bodies. This is a major environmental hazard and causes a degradation of water bodies and affects the overall food chain. This work is emphasized on the design and fabrication of a floating debris interception device i.e. Seabin to curb this problem. The idea is simple if we can have garbage bins on land, why not have them in the ocean as well. The Seabin works in such a way that the water is pumped out of the catch bucket that is already submerged in the water. Through this suction, the water with all its floating litter collects in the bucket. The catch bag accumulates litter, separating it from the water. The water is again pumped out of the bucket. This whole process takes place simultaneously and fresh batches of litter settle down in the catch bag until the limits get exhausted.

**Keywords:** Plastic, waste, Seabin, Marine

## INTRODUCTION

Water contamination is a serious issue that affects the entire planet and is brought on by several causes. It can seriously destabilise whole ecosystems and be very detrimental to our economy and health. Water is one of the most crucial components for maintaining life on earth. Sadly, it is also extremely susceptible to contamination. This is primarily because water is an all-purpose solvent that can dissolve a variety of compounds. Water now serves as a resource for all living things and helps to maintain the ecosystem; nevertheless, plastic trash is bad for animals, the environment, and people. Every year, there is a rise in the use of plastic, and this trend is predicted to continue. "Mismanaged plastic garbage," or plastic debris that is not gathered and dealt with through recycling or burning but is instead discharged into the environment and not cleaned up, is the cause of most of the plastic rubbish that ends up in the ocean. A new marine assessment found that annually, the oceans get more than 6 billion pounds of trash, mostly plastic. Over 5 trillion pieces of plastic are thought to be floating in the world's seas and rivers, not to mention 10,000 times more in the deep water. Nearly all bodies of water contain plastic waste, which may be seen dwelling on the bottom, suspended in the water column, and floating on the surface. It is transported by rivers to the ocean, where it floats with the currents for years before disintegrating into ever-tinier fragments. Oceans across the world are filled with accumulated plastic trash. It is regularly eaten by fish and birds, concentrating hazardous compounds in their tissues, and filling their stomachs to the point that they cannot digest the plastics, leading to starvation. Aquatic plastic waste may also make it difficult to navigate, hinder commercial and recreational fishing, put people's health and safety at risk, and hurt tourism. The most hazardous debris for vessel navigation is big debris, including old fishing nets and lines floating at the surface or close to it. Ships can crash with big items, breaking hulls, and damaging propellers, while lines and nets can tangle in motor intakes and wrap around blades.

## PROBLEM IDENTIFICATION

Plastic products are commonly utilized by the maritime industry. For example, fishing net sand strapping bands used to secure cargo are typically composed of plastic. Plastic materials are also used to package food products and other items consumed by the crew members on commercial vessels. Disposal at sea has been the normal procedure that commercial vessels have followed to discard packaging materials and other waste products. The discarding of waste products in sea is not new. What has change dinrecent decades is that lot of products are now made of plastic. Another form of plastic litter is the raw material used by the plastic industry to manufacture their products. Raw plastic usually is fabricated into tiny pellets, or spherules, then shipped to factories where it is transformed into consumer products. Plastic pellets are also used for packing and insulating material for cargo transportation. In both instances, these pellets can enter rivers and seas by accidental or deliberate discharge. Plastic materials threaten the marine environment for the same reasons they are a commercial success: durability and economic affordability. Because of its low cost, plastic is readily and ubiquitously utilized as a source of disposable material. It is the durable properties of plastic, however, that pose the greatest threat; plastic materials persist in the marine environment long after they have been thrown away. Plastic pollution is the most widespread problem affecting the marine environment. It also threatens ocean health, food safety, and quality, human health, coast altourism, and contributes to climate change.

## IMPURITIES IN WATER

### Waste found in water Percentage

Cigarette butts	29%
Plastic pieces	25%
Food wrappers	26%
Foam pieces	5%
Bottle caps	4%
Straws	2%
Bags	1%

## LITERATURE SURVEY

A wide range of technological solutions to tackle marine plastic litter is either available or under development. As reviewed by the experts, the most impactful, proven, and cost-effective solutions are those that capture marine litter in streams and rivers, beaches and coastlines, and near offshore locations, including those that focus on fishing gear. Solutions to capture plastic litter from the open oceans are yet to be proven.

The present study gathered 15 technologies designed to collect and recover plastic litter from streams and rivers. They are able to capture plastic waste before it enters the oceans, at a stage when it has not been degraded or broken up into microplastics and can still be reprocessed economically. These solutions require little manpower and can be installed, maintained and operated with unskilled manpower. Most of these solutions were either at the pilot stage (2) or already implemented (11). The average cost per ton for the collection and recovery for all solutions was USD \$600, including the capital and operating costs.

A group of technologies have been developed to recover plastic from harbors, lakes and areas of the ocean within easy reach of land. This study shortlisted 19 such solutions, with most of them being either at pilot stage (3), scale-up (3) or already in market (12). The advantage of these solutions is that the return logistics cost of collected debris is lower than solutions that collect litter from the open oceans, and most plastic waste gets captured before it spreads out to the sea or disintegrates on land by the action of waves. The average cost of these solutions amounts to roughly USD \$400 per ton of collected plastic waste. The biggest share of mismanaged plastic waste is believed to enter the oceans from land, namely from beaches and coastlines. Technological solutions to clean up beaches and shorelines include machines that capture plastic and other waste or combine human powered collection with a revenue model for the collectors. This study shortlisted five solutions in this category. However, the combined volume of plastic recovered by these types of solutions are currently very low. For these solutions to create a meaningful impact, significant seed funding needs to be provided.

## OBJECTIVES

The main aim of the Seabin project is to collect detritus from the ocean and seawater. The idea is very similar to the existing Seabin project but some changes have been done to improve the efficiency and performance of the Seabin project.

The system aims to fight against water pollution by means of innovative technologies and educational activities for businesses. A small floating device can be helpful to solve one of the world's biggest environmental problems.

- Collect different types of floating waste products.
- Minimize human effort in collecting the garbage from water bodies.
- It must collect maximum amount of waste. Environment friendly.
- Use of sensors makes it automatic.
- The system can be used to create and raise awareness about water pollution.

## METHODOLOGY

The Seabin moves floating in the surface and the water is sucked inside it thanks to a water pump capable of displacing 3.5LPM pump. The water is then pumped back into the marina leaving litter and debris trapped in the mesh placed inside the main body which is later disposed away properly. Each Seabin filters over 2 million litres of water each year. Within the seabin there is a mesh like structure placed which is made up of recycled plastic which will collect all the floating debris and waste around it. The mesh can withstand or can hold up to 4-5Kgs of debris and when it is full, the helper will take the catch bag, clean it and again place it to its original position. The seabin had been designed in such a way that it can be controlled by a single person. The Seabin floating rubbish bin can be installed in an unused corner of seashores, ports, docks, yacht clubs and commercial ports.

1. Water having various floating wastages, plastic is pumped into sea bin from the free water surface.

- I. All floating plastic wastages and rubbish get trapped inside the catch bag.
- II. Then water passes through the catch bag which is free from floating matter and rubbish.
- III. The systematic arrangement of solar panel and high pressure pump to return the water back .
- IV. Then the water which relies passes through another filter where it gets purified
- V. After that, the purified water gets discharges in the pond again.

## COMPONENTS

The main components used in this project are listed below

- SOLAR PANNEL
- DC DRY BATTERY
- DIAPHRAM PUMP
- PAPER FILTER CASING
- PIPES .

## WORKING OF SYSTEM

In this project the main goal of the system is to collect floating garbage from water bodies. The basic principle of the system is based on suction crated by pumping action. The bucket is use as a waste collector, which collects waste due to suction pressure created by the pump. There is a proximity sensor inside each bucket to indicate us the level of waste collected. Inside the bucket there are three layer nets which help to filter water and can be removed easily without disturbing the system. We can substitute the nets and due to this the working won't stop..

## ADVANTAGES

The following are some of the advantages of employing a seabin in the maritime environment:

1. It reduces the amount of effort required by humans to collect trash from the water bodies around us.
2. Doesn't require any additional help or attention while working.
3. Use of energy to the bare minimum
4. Removes garbage and other floating and suspended debris from water bodies.
5. Cost-effective and easy to construct

## FUTURE SCOPE

The project involves the construction of seabin which has a 2-horsepower electric pump installed in it. Seabin must be used because they make it a lot easier to collect floating garbage rather than a person with a scoop net. It requires relatively little energy to operate. The plastic which is obtained by Seabin can be used for creating more seabins. Constructing such seabins will prove to be helpful as well as economical. As the garbage is collected automatically there is no need of worker every time near the seabin. As India is a very attractive tourist place the water bodies are still being polluted with debris. This would be great step towards cleaning our water bodies.

## CONCLUSIONS

The Seabin aims of creating a localised solution to marine litter in urban maritime regions. Clean up efforts are typically made at harbours and marinas for two reasons: marina patrons dislike floating trash for aesthetic reasons. The novel developed Seabin provides the rotational motion along with the translation motion which can be effective for collecting more detritus from the water. Hence, enhancing the quality of water which can be beneficial for marine industries and water wild life.

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