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*Ushering in the Age of Endemic*

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# *The 11th International Innovation, Invention and Design Competition 2022*

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# SAMBAK [FLOW TRAP] AS A SUSTAINABLE TRASH TRAP ON DRAINAGE

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## ABSTRACT

Garbage is still a problem that often occurs in society. Other than Indonesia, waste problems can be found in Asia and around the world. Several efforts have been made to reduce waste, but there are still many people who do not care about this issue. Garbage is still often disposed of carelessly, especially in waterways. Waterways become a place for garbage accumulation so that this also greatly affects the availability of clean water. Poor drainage system not only pollutes clean water but also affects the cleanliness and health of the environment. For this reason, this study aims to find an innovation in the design of a garbage collection device that can be placed in a drainage system or water channel in a community settlement. Other than in the community, this tool can also be used in urban drainage systems. The analysis used is glass box literature and design analysis. The results of the analysis show that the garbage net can minimize clogging of waterways by catching garbage in the channel but does not hinder the flow of flowing water. The conclusion of this study is that the sambak is a garbage collection tool in waterways that can be used by anyone with ease of operation. User-friendly Sambak can be a solution to reduce waste in open water systems and maintain water cleanliness and the health of the community's environment.

*Keywords: drainage, rubbish, clean water, healthy environment*

## 1. INTRODUCTION

Poor drainage system and its inability to work optimally are part of the causes of flooding. Floods in the drainage system often occur due to overflow of water caused by the accumulation of garbage (Novrianti, 2017). Garbage accumulation in water drainage, such as ditches to rivers, often occurs in market areas, around residential areas, especially densely populated areas where the environmental waste disposal system is not well organized. Countries that have problems in managing their waste are in East Asia and Southeast Asia, especially China. Indonesia is also one of the countries that is still having problems with their waste management by occupying the second position under China. The types of waste that are often dumped into rivers and drainage channels include wet e and dry waste.

In addition, the weakness of the control system for drainage channels in several areas in Asia is also still low: this has caused dirty and clogged drainage channels to be addressed too late. Hence, by using Sambak which is a sustainable drainage control system, it can help control the cleanliness of the drainage channel easily and effectively. Sambak is a waste filter so that water continues to flow properly and can reduce the accumulation of garbage in several drainages. Sambak or flow trap can minimize flooding by scavenging trash before it gets further into the

river area. The design of Sambak has been adapted to various conditions so that waste filtering can be more adaptive, efficient, and effective in its work.

## 2. FINDINGS

Sambak or flow trap is one of the garbage collection tools that can help drain waterways from being clogged. The purpose of the design of Sambak is to help reduce waste that enters waterways in an adaptive, efficient and effective manner. The novelties of Sambak compared to other filtering tools are; (i) the ease of picking up filtered waste without the need for tools, (ii) an ergonomic shape, (iii) water keeps flowing when there is garbage, (iv) can be applied to various types of open u-ditch, (v) economical, (vi) can be used by various groups without special knowledge, (vii) has business value as an industrial product, and (viii) works effectively to help prevent waste from going into larger waterways.
Sambak uses Acrylonitrile-Butadiene-Styrene (ABS) because ABS has resistance and toughness on impact and is easy to modify as it is formed by the factory molding process. Aluminum CNC (Computer-Numerical-Control) is also used in the handle because it has corrosion resistance, light weight, and strength. And the handle can be controlled lengthwise and shortened according to the width of the U-ditch. Industrial design and materials allow Sambak to be mass-produced and can be purchased by anyone to be used in environmental drainage.

## 3. METHODOLOGY

The method used is the glass box method, namely the design and planning were carried out logically and based on certain considerations. The activity stages were carried out by formulating problems which were related to health due to waste, disturbed ecosystem balance and caused flooding, sustainability, and operational management of drainage management. The next steps were based on these problems using the glass box method resulted in aspects that need to be considered in the design, namely:

i. Effectiveness- When using the garbage collection device that is available directly on the drainage channel device, the garbage becomes more efficient to lift and clean.
ii. Ease- The use of this product is easy to find, and its operation is also easier because it is more efficient.
iii. Durability- The material used is a type of plastic material whose durability can last up to 30 years.
iv. Ergonomic- Based on the issues raised such as the problem of garbage and floods that occur in various countries in Asia, to overcome flooding due to waste, namely by paying attention to drainage channels so that they work optimally with equipment that can optimize and minimize flooding.
v. Versatility- The product of the dumpster can be adapted and applied to various types of U-ditch.

From the design approach above, the Sambak Innovation (Flow Trap) is produced as the solution to the existing problems. The innovations offered by Sambak are as follows:

i. Design- Our product design is to see users use our products as efficiently as possible, and our products help/reduce waste flowing into larger waterways. Product design development resembles a Santa Claus train.
ii. Material- U-ditch materials used are cement, aggregate, water, reinforcing steel and superplasticizer. while the waste transportation equipment uses materials from Acrylonitrile-Butadiene-Styrene (ABS) plastic and CNC (Computer-Numerical-Control) Aluminum.
iii. Target- The intended target is global, as it can be accessed anywhere to streamline and help or reduce waste that flows into larger waterways.
iv. Drainage System- A sustainable drainage system with the installation of Sambak at strategic points on the U-ditch will provide an opportunity for water to continue to flow smoothly.

## 4. CONCLUSION

Sambak or flow trap which is the result of the development and innovation of various alternative designs on the drainage system is a superior and appropriate product to solve the waste problem. Sambak has been adapted to various conditions so that it can be used in several types of drainage. Garbage filtering can be more efficient without impeding water flow in the drainage. Meanwhile, the feasibility of Sambak can be seen from its performance in handling waste in the drainage which minimizes waste flowing into a larger stream.

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