

# AUTOMATED WASTE SEGREGATION SYSTEM

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**Abstract:** Due to steep and tremendous increase in solid and hazardous waste the economic growth, industrialization and urbanization is becoming a major problem which needs to be solved for national and international governments to maintain balance in environment and life. When the waste is segregated at the primary level, the economic value will be realized at its best. Segregation of waste at dump yards is time consuming that makes recycling ineffectual. The segregation, handling, transport, and disposal of waste is necessary to manage properly to reduce the ill risk of public health and environment. *This project aims on making a cost effective and compact automatic waste segregator. Here, the waste segregator is designed to segregate waste explicitly in step by step process using blowers of different to separate dry waste (Plastic and paper) and wet waste and magnets are used along with a scrapper arrangement to separate the metallic waste. They are further disposed into the bins. Further this disposed waste can be easily recycled and reused. The main feature of this project is the use of ultrasonic sensors to detect the level of the bins.*

**Index Terms – Industrialization, Environment, Segregation, Recycling.**

## I. INTRODUCTION

Waste disposal problems have become a pressing issue for many countries, and it has become a global problem everyone needs to address. Waste disposal is a lengthy but methodical process that includes burial, burning, recycling, discharge, and other processes. Indeed, many organizations and localities in the world are grappling with the problem, unable to handle it completely. Waste segregation is included in law because it is much easier to recycle. Effective segregation of wastes means that less waste goes to landfill which makes it cheaper and better for people and the environment. It is also important to segregate for public health. In recent times, garbage disposal has become a huge cause for concern in the world.

A voluminous amount of waste that is generated is disposed by means which have an adverse effect on the environment. The common method of disposal of the waste is by unplanned and uncontrolled open dumping at the landfill sites. This method is injurious to human health, plant and animal life. In India, rag pickers play an important role in the recycling of urban solid waste. Rag pickers and conservancy staff have higher morbidity due to skin infections, respiratory, gastrointestinal tract and multisystem allergic disorders, in addition to a high prevalence of rodent, dog and other vermin bites. Dependency on the rag pickers can be diminished if segregation takes place at the source of municipal waste generation. The purpose of this project is to design a system with low cost and user-friendly which segregates wet, dry and metallic waste using suitable sensors or blowers.

## II. LITERATURE REVIEW

**Aleena V.J. et.al [1]:** The proposed system “automatic waste segregator and monitoring system” sorts wastes into three different categories, namely metal, plastic and the wet (organic) waste. Wet waste refers to organic waste such as vegetable peels, left-over food etc. Separating waste is essential as the amount of waste being generated today causes immense problem. The proposed system would be able to monitor the solid waste collection process and management of the overall collection process. The inlet section is provided with open and close mechanism to regulate the flow of waste on to the conveyor. Inductive proximity sensor is used to detect the metallic waste. A blower mechanism is used to segregate dry and wet waste. The timing and movement of the conveyor belt is controlled by Arduino Uno. Continuous and unnecessary operation of any particular section is thus avoided.

**Ashwini. D et.al [2]:** Experimental result shows that the waste has been successfully segregated into glass, metallic, wet and dry using the Automatic Waste Segregator. The project has been tested for different categories of waste namely wet, dry and metal. Wet waste means organic wastes such as vegetable peel, garden wastes etc, dry waste include paper wastes, plastic bottles etc, and metallic waste include safety pins, foil paper etc. glass waste include frame glass, glass bottles etc.

**Nagaraj .D.C et.al [3]:** This paper proposes an Automated Waste Segregator (AWS) which is a cheap, easy to use solution for a segregation system at households, so that it can be sent directly for processing. It is designed to sort the refuse into metallic waste, wet waste and dry waste. The AWS employs parallel resonant impedance sensing mechanism to identify metallic items, and capacitive sensors to distinguish between wet and dry waste. Experimental results show that the segregation of waste into metallic, wet and dry waste has been successfully implemented using the AWS.

**Amrutha Chandramohan et.al [4]:** The experiment has been conducted for large volume of dry waste objects, and a minimum quantity of one object each for wet waste objects. This is done to consider the worst case scenario. Waste is pushed through a flap into the proposed system. An IR proximity sensor in the proposed system detects this and starts the entire system. The waste then falls on the metal detection system. This system is used to detect metallic waste. After this, the object falls into the capacitive sensing module. This module distinguishes between wet and dry waste. After the identification of the waste, a circular base which holds containers for dry, wet and metallic waste is rotated. The collapsible flap is lowered once the container corresponding to the type of the garbage is positioned under it. The waste falls into the container and the flap is raised. The waste in the containers can now be collected separately and sent for further processing.

**Minal Patil et.al [5]:** This paper proposes implementation of an automated waste segregator at household level using PIC16F877 microcontroller, to control the entire process with ease and simplicity. The sensing unit consists of an IR (Infrared) sensor, a moisture sensor and a metal sensor used to detect and identify various types of waste respectively. The main architecture of the segregator comprises of three prominent stages consisting of an IR sensor, a metal sensor, a moisture sensor and the segregation bins. The IR sensor detects the arrival of waste. Identification and separation of waste is done by sensors. The microcontroller controls all the activity of sensors. Results have presented segregation of waste into metal, wet and dry waste.

### III. OBJECTIVES:

The objectives of our project work are as follows:

- To design and construct a low-cost Automatic Waste segregator.
- To fabricate a less complex Automatic Waste segregator
- Use of Ultrasonic sensors to detect the level of bins.



Figure.1 Methodology of Project work

The sequence of the work carried out is represented by a flow chart in Figure1. The project work commenced from identifying the problem followed by collecting the available relevant work through literature survey.

#### V.RESULTS & DISCUSSIONS:

The objective of the proposed system is to design and construct a low-cost Automatic Waste segregator, to fabricate a less complex Automatic Waste segregator and to use Ultrasonic sensors to detect the level of bins. The paper proposed here is to increase the efficiency of waste segregation by implementing the blower mechanism and using magnetic strips, while keeping it cost effective and sustainable to use.

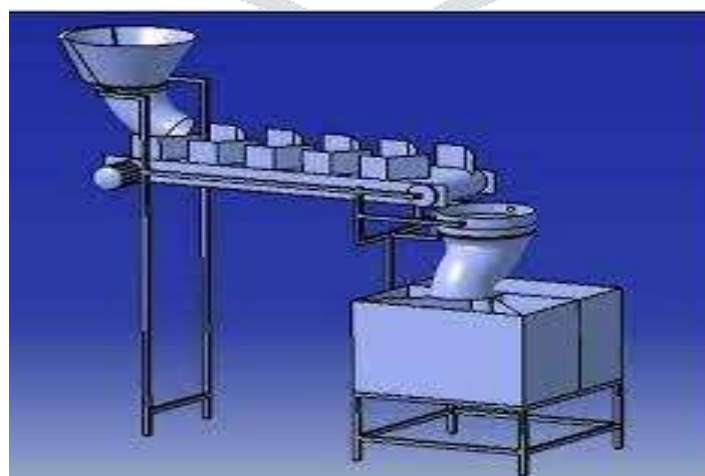


Figure.2 Automated waste segregation system using blower mechanism and magnetic strips

#### 5.1 BASIC COMPONENTS OF AUTOMATED WASTE SEGREGATION SYSTEM

The basic and essential components of an automated waste segregation system are Industrial grade magnetic strips, Mild steel tubes, Plastic conveyor roller, Conveyor Belt, Blowers

. The images of these components is shown below in above mentioned sequence.



Figure.3 Image of Industrial grade magnetic strips



Figure.4 Image of Mild steel tubes



Figure.4 Image of Plastic conveyor roller



Figure.5: Image of Conveyor Belt



Figure.6: Image of Blower

## VI. CONCLUSION

The conclusions of the project review work are as follows:

- ❖ In communities where appropriate sites are available, sanitary landfills usually provide the most economical option for disposal of solid waste.
- ❖ The amount of waste, which is been recycled or reused, stands for the reduction of waste to be managed by the authority.



- ❖ Automated Waste Segregation for Smart Waste Management System is an excellent example of proper waste management. The waste is segregated into metallic, dry and wet waste at a domestic level.
- ❖ The system can segregate only one type of waste at a time with an assigned priority for metal, wet and dry waste.

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