

# SMART GARBAGE COLLECTION SYSTEM

By:

A S Karthikeyan

G Shanthini

N Soundhariya

T Shiyam Ganesh

Mentor:

Mrs B Sathiyavathy

**JAWAHAR VIDYALAYA SENIOR SECONDARY SCHOOL  
ASHOK NAGAR, CHENNAI**

# OBJECTIVE:

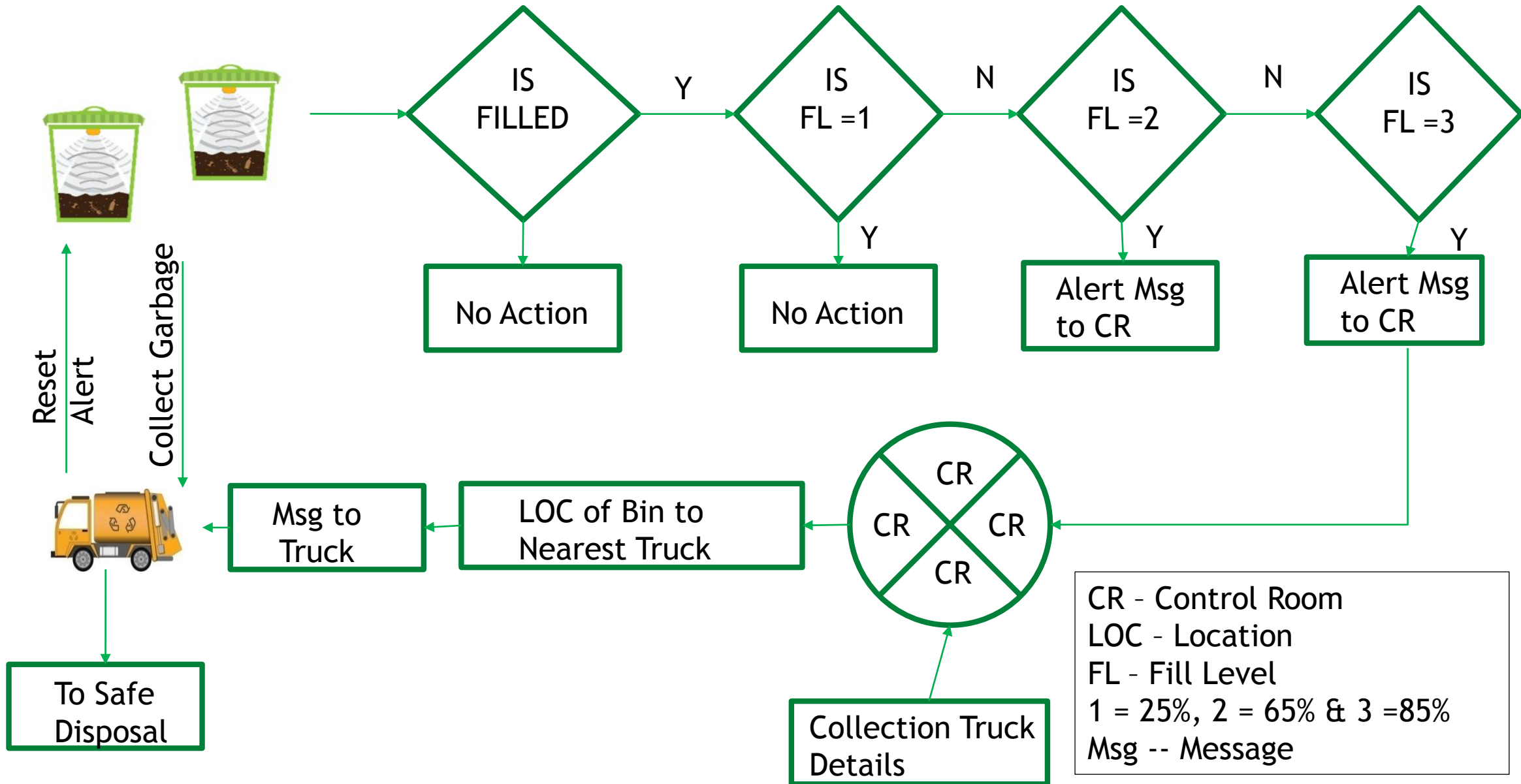
- To provide a sustainable CLEAN Environment by adapting the latest electronics and communication technology for Garbage Collection System.

# SCOPE:

- To develop a blueprint for Smart Garbage Collection System using the latest technology.



# FLOWSCHEME:



# THE DUSTBIN:

This is a customized dustbin. It is completely made up of *Mild-steel*(MS). This material is cost efficient.



The bin is fully closed, except an opening through which garbage will be disposed. At the top, it contains a door through which the garbage will be taken away by the trucks.

# THE BRAIN:

The brain of the model consists of three main parts. They are:

- ☐ Arduino UNO microcontroller
- ☐ GSM Module
- ☐ Ultrasonic sensor



Arduino microcontroller: This is the most important component, as it controls the intelligence of the smart garbage bin. It helps to monitor the level of garbage.

GSM module: This component sends information about the level of the dustbin to the control room.





Ultrasonic sensor: This component senses the level of the garbage in the dustbin by sending out ultrasonic waves at a frequency of 40,000 Hz.

### LEVEL MEASUREMENT:

To measure the level of the garbage , we need to detect the distance between the sensor and the garbage.

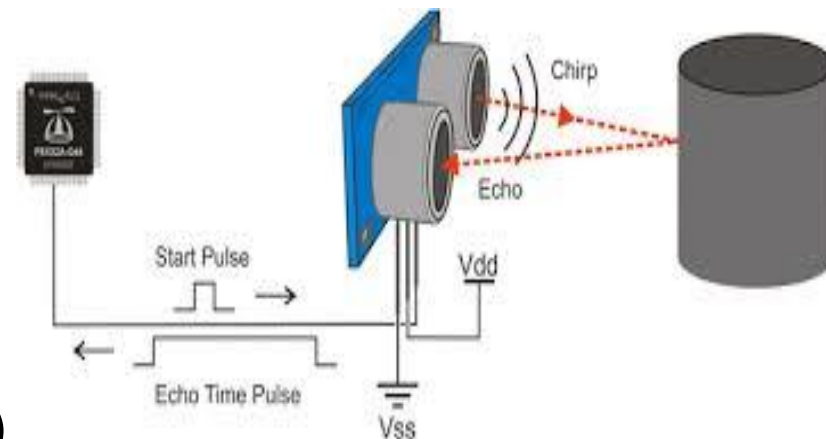
Velocity of sound = 343 m/s (at 20 degree C)  
= 34300 cm/s

1s =  $10^6$  mic.s (programming done in microseconds)  
=  $\frac{34300}{1000000}$  = 0.0343 cm/mic.s

$$V = \frac{D}{T} \quad D = V * T$$

$2D = 0.0343 * T$  (distance to and fro)

$D = \frac{(0.0343 * T)}{2}$  (V-Velocity D-Distance T-Time)



# THE COMPACTOR:

COMPACTION provides reduction of volume of garbage in the bin( to a certain extent).

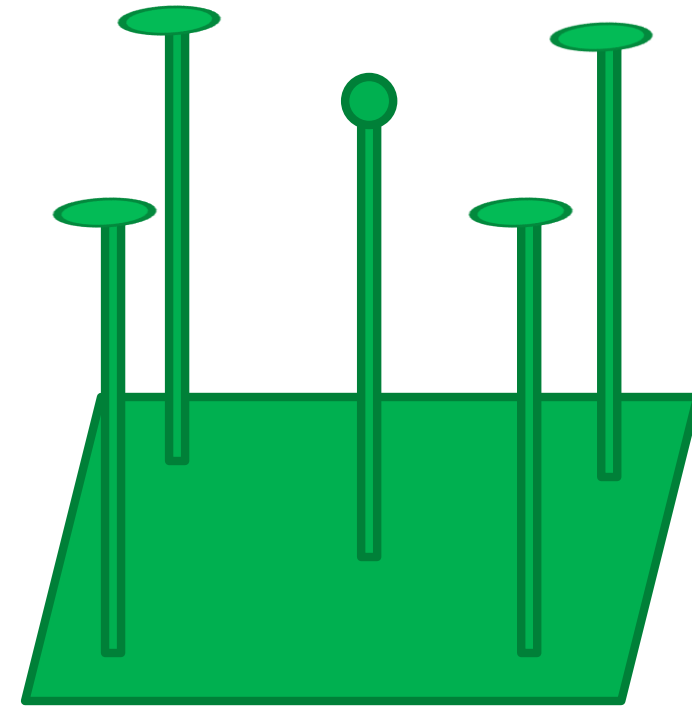
- The compactor used is a manual type.
- Needs manpower for compression.

## Volume Reduction and Compaction Ratio:

- Volume reduction =  $( (V_i - V_f) / V_i ) * 100$
- Compaction ratio =  $V_i / V_f$

Where

- $V_i$  - initial volume before compaction (  $m^3$  )
- $V_f$  -final volume after compaction (  $m^3$  )



## Influencing Factors:

- Composition of Garbage.
  - Paper, Plastic, food waste...
- Moisture content in Garbage

## Advantages:

- More garbage can be accommodated
- Reduces spillage
- Reduce frequency of waste collections

## Challenges:

- Heterogeneous composition of garbage
- Non Segregation of garbage



# ADVANTAGES:

- Best Helpmate for our Environment
- Controls & Eliminates the spillage of garbage due to overflow
  - More hygienic clean Environment
  - Eliminates environment pollution
- Monitoring the Garbage Collections
- Resource Optimization
- Reduce Truck driving distance -  
By optimized routes
  - Time saving
  - Less fuel Consumption
  - Reduced gas emissions
  - Reduced maintenance cost



# IMAGES

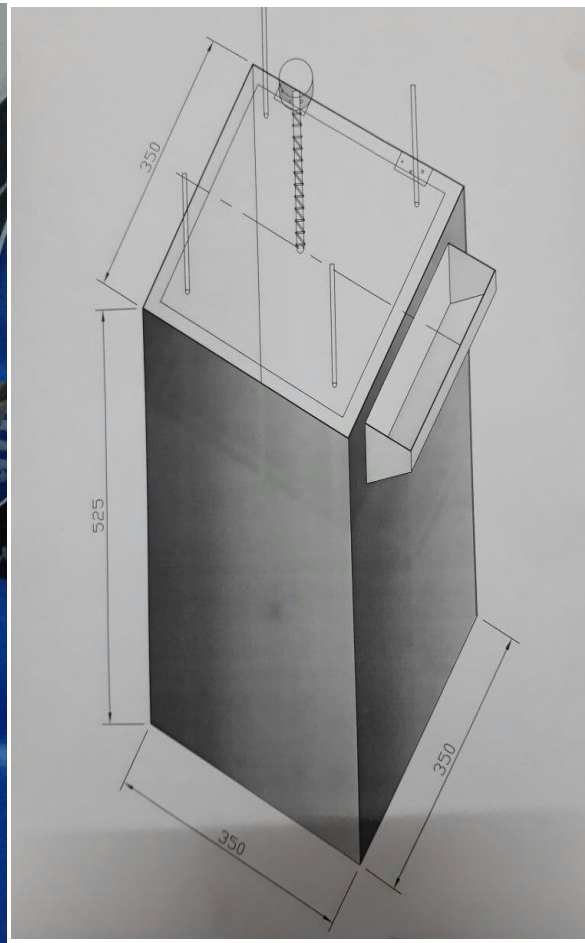
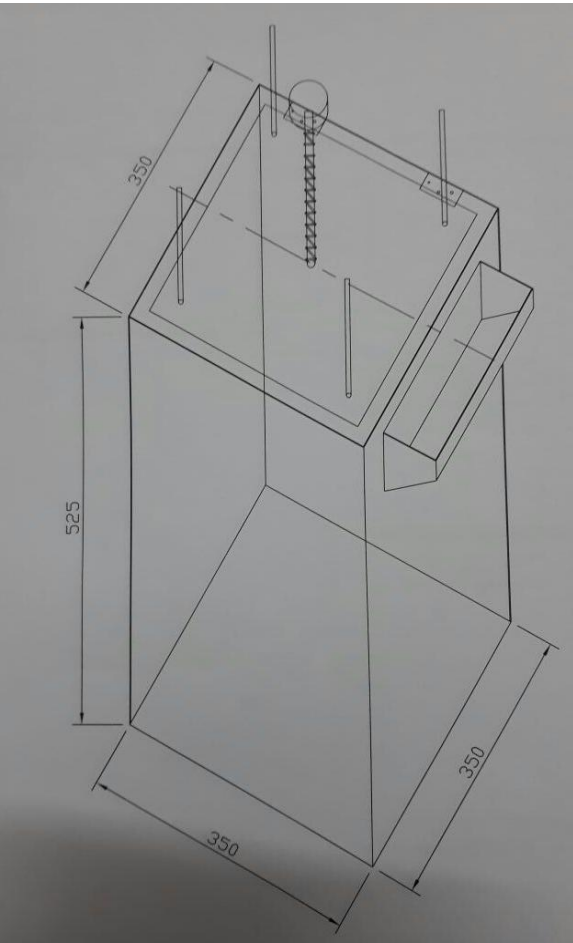




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**THANK YOU**