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SMART WASTE MANAGEMENT

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Abstract: *Solid waste management is a challenge for the cities' authorities in developing countries mainly due to the increasing generation of waste, the burden posed on the municipal budget as a result of the high costs associated to its management, the lack of understanding over a diversity of factors that affect the different stages of waste management and linkages necessary to enable the entire handling system functioning. An analysis of literature on the work done and reported mainly in publications from 2005 to 2011, related to waste management in developing countries, showed that few articles give quantitative information. The analysis was conducted in two of the major scientific journals, Waste Management Journal and Waste Management and Research. In this project, smart waste management has been done in such a way that Calculated how much waste is generated by studying their population in a particular area (Kasturi Park and R.N.P Park, Bhayandar (E)).By the help of calculation of waste if there are too many vehicles to carry that garbage, then reduce the number of vehicles in the area And they will be sent to areas where trucks are in short supply.*

Keywords: *Management, Generation rate, Developing Countries, Population, Disposal.*

I. Introduction

The two of the major scientific Increasing population levels, booming economy, rapid urbanization and the rise in community living standards have greatly accelerated the municipal solid waste generation rate in developing countries . Municipalities, usually responsible for waste management in the cities, have the challenge to provide an effective and efficient system to the inhabitants. However, they often face problems beyond the ability of the municipal authority to tackle mainly due to lack of organization, financial resources, complexity and system multidimensionality. In the last years, a large number of research studies have been undertaken to determine influential factors affecting waste management systems in cities in developing countries. An examination of the publications from 2005 to 2011, from journals, related to waste management, Waste Management Journal and Waste Management and Research, 37 showed information related to factors affecting the system. Surprisingly, few gave quantitative information. This research has the aim to determine the stakeholders that have an interest in the waste management system of cities under study and the factors that influence the performance of the system in three continents, from more than thirty urban areas in twenty two developing countries.

Municipal solid waste management (MSWM) is one of the major environmental problems of Indian cities. Improper management of municipal solid waste (MSW) causes hazards to inhabitants. Various studies reveal that about 90% of MSW is disposed of unscientifically in open dumps and landfills, creating problems to public health and the environment. In the present study, an attempt has been made to provide a comprehensive review of the characteristics, generation, collection and transportation, disposal and treatment technologies of MSW practiced in India. The study pertaining to MSWM for Indian cities has been carried out to evaluate the current status and identify the major problems. Various adopted treatment technologies for MSW are critically reviewed, along with

their advantages and limitations. The study is concluded with a few fruitful suggestions, which may be beneficial to encourage the competent authorities/researchers to work towards further improvement of the present system.

1.1 NEED FOR IMPROVEMENT IN WASTE MANAGEMENT SYSTEM

The following are the points which are going to be discussed:
1. By 2030, almost two-third of the world's population will be living in cities. This fact requires thdevelopment of sustainable solutions for urban life, managing waste is a key issue for the health.
2. Efficient and energy-saving waste management, reducing CO2,air pollution and vehicle exhaust emissionsthese are just a few examples for the demands of future cities. In views of that, the efficient use andresponsible handling of resources become more important.
3.Effectively managing waste is important in developed countries. Waste management may swallow upto 50% of a city's budget, but only serve a small part of the population.
4. Sometimes, upto 60%of waste is not being collected, it is often simply burned by the roadside. It can pollutedrinking water, it can spread disease to people living nearby.
5.Even with great route optimization, the worker must still physically go to the dustbin to check waste levels. Because of this, trucks often visit containers that do not need

FIG.1Solid Waste Management System

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1.ADVANTAGES

The following are the Advantages of smart waste management system:
1. Less time and fuel consumption as the trucks go only to the filled containers.
2.Decreased noise, traffic flow and air pollution as a result of less trucks on the roads.
3. Our smart operating system enable two way communication between the dustbin deployed in the city and service operator. Therefore the focus is only on collection of route based fill level of the containers.
4. The sensors installed in the containers provide real time information on the fill level.
This information helps determine when and where to prioritise collection.
5. In this way both service providers and citizens benefit from an optimized system which results in major cost savings and less urban pollution.

II. METHODOLOGY

2.1 STEPS FOR SOLID WASTE MANAGEMENT

1. SELECT LOCATION

2.SURVEY OF LOCATION

3.POPULATION FORECAST

4.CALCULATION OF VEHICLES

5.SMART ARRANGEMENT OF VEHICLES

6.PREPARATION OF SMART MAP

2.2 METHODOLOGY:

1.Select the location:

First select the location of project

(Kasturi park and P.N.P park, Bhayandar (E)).

2.Survey of location:

Found the population of that area where location is to be selected for project.

Kasturi park population-2000

R.N.P park population-3600.

3.Population forecast:

Calculate the population for next one or two decades of these areas.

4.Calculation of vehicles:

For these two areas no. of vehicles to carry the garbage is calculated. And also calculate the total quantity of garbage for these areas as per basis of population.

5.Smart arrangement of vehicles:

According to the calculation if there are too many vehicles to carry that garbage, then reduce the number of vehicles in that area And they will be sent to another areas where trucks are in short supply.

6.Preparation of smart map:

According to no of vehicles & total quantity of garbage produce in given area prepare a smart map for collection of garbage.

III. RESULT

(1)Residential Area- Kasturi Park, Bhayander (E)

Population= 2000

1) Container size (Vc) = 4.5 cum

2) container utilisation factor (f)= 0.75

3) average number of container at each location (Q)=

4) collection vehicle compaction ratio (z)= 2.5

5) collection unloading time (dbc)= 0.1h/container

6) average drive time between container locations= 0.1h

7) one way haul distance(x)= 6.5 km

8) speed limit= 56kmph

9) time from garage to first container location (t1)= 0.33h

10) time from last container location to garage(t2)= 0.25h

11) number of trips to disposal site per day(Nd)=1

12) length of workday (H)=8 hr

Given: Vc= 4.5 cum, z= 2.5, f= 0.75, uc= 0.1h, x= 6.5 km

t1= 0.33h, t2= 0.25h, Nd= 1, H= 8hr, dbc= 0.1h

Solution:

1.Determine time Available for each Trip

H=(T1+T2)+(Nd×Tscs)/(1-W)

8=(0.33+0.25)+(1×Tscs)/(1-0.15)

Tscs=6.22h

2.Determine pick time per trip

Tscs=PTscs+s+a+bx

Tscs=6.22h

a=0.034, b=. 018, s= 0.1h, x=6.5km

6.22=PTscs+0.1+0.034+0.018×6.5

PTscs=5.96h/trip

3.Determine number of container that can be emptied per trip

PTscs=ct×uc+(Q-1)(dbc)

PTscs=5.96 h/trip

Uc=0.1h/Container

Q=ct/1

Q=ct

dbc=0.1h

5.96= (ct×0.1) + (ct-1)

4. Determine required capacity of collection truck

Ct= Vvz÷Vc×f

Vv= Vol. of collection vehicle

z= Compaction ratio = 2.5

f= Utilisation factor= 0.75

Ct= 30

Vc= 4.5 Cu.m

Vv= ct×Vc×f/z

= 30×4.5×0.75/2.5

= 40.5 Cu.m

MSW generation (Kg/capita/day) per person= 0.5 Kg

MSW generation in one month = 0.5×30×2000

= 30000 Kg

= 30 cu.m

No. of trucks required to reduced= 40.5-30/4.5

= 2 No.

IV. Conclusion

This type of smart waste management helpful for proper collection, transfer and disposal of solid waste management. This waste management can present on the sheet and we can give to municipal corporation as a smart waste management. We are calculate the number of vehicle required for particular location such as first we can calculate for the area such as Kasturi park (Bhayandar) and then where as we calculate no. of vehicles required for particular amount of solid waste for second place.Then we conclude that the area where demand of vehicle to be used for work collection is less there supply is more. so we can manage this all things nearest routes for the vehicle that can easily over the all area without any obstructions such as traffic. So we can say in the conclusion we find that the trouble in the case of demand and supply of municipal corporation vehicles. We can prepare a sheet to understand smart waste management about municipal corporation vehicle and further we can also submit the sheet to our higher authority.

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