International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 04 | Apr 2019 www.irjet.net p-ISSN: 2395-0072

SOLID WASTE MANAGEMENT: A CASE STUDY OF MANDVI

Prof. Mohit sagar[1], Priyanka panchal[2], Jalal saiyad[3], Mo. Juber raj[4], Sohilkhan Pathan[5], Rahul jepar6

[1]*Assistant professor, Department of Civil Engineering, Sardar patel college of engineering, Gujarat, India*
[2,3,4,5,6]*B.E.Student, Department of Civil Engineering, Sardar patel college of engineering, , Gujarat, India*

ABSTRACT: *Solid waste management is one among the basic essential services provided by municipal authorities in the country to keep urban canters clean. However. It is a major problem in India, to manage and dumping of solid waste Due to this problem like air pollution, ground water pollution, bad smelling& mosquitoes generated which create diseases. Overall it is bed mark on city map. This all problem occurred in our study region Mandvi in Kutch there solid west dumping site at near sitla temple those region population is 52 thousands and spread over an area of 320.21 sq.km. (As per census 2011), all most 350 metric tons of solid waste is generated on daily basis. Due to this continuous proceed many problems occurred in the site like land pollution, mosquitoes problems, generation of bed small, air pollution. So due to this problem we suggested the secured landfilling method to overcome the problem and providing safe, healthy and secured atmosphere for the people.*

Keywords: solid waste, pollution, collection, disposal, landfilling

INTRODUCTION

Municipal solid waste management continues to be a major challenge for local governments in both urban and rural areas throughout the world. This challenge is particularly important for the developing world. The available statistics show that although the municipal solid waste generation in the developing countries is still low per-capita level compared to that in the developed world the developing countries account for a disproportionately high share of the world's solid waste generation relative to their share of world income.

Solid wastes are being produced since humans started living in smaller or larger societies. It is was not difficult to dispose of the solid waste during ancient period because the population was small and the quantity of waste generated was also small and very vast area was available for disposal. Moreover from a dynamic point of view the municipal solid waste management in developing countries faces even greater challenges in the future because of their rapid urbanization and economic growth. Empirical analyses using macroeconomic data3 indicated that the per capita generation of solid waste was at least 0.3-0.4 kilograms per day even for the poorest people. In general, a 1 percent increase in population is associated with a 1.04 percent increase in solid waste generation, and a 1 percent increase in per capita income is associated with a 0.34 percent increase in total solid waste generation. Considering that most of the developing countries are still in the early stage of their urbanization and economic development process, people generally believe that a fast increase in solid waste generation should be unavoidable in the developing world. Poor solid waste management in the developing countries consists of a major threat to public health and environmental quality, and reduces the quality of life, particularly for the poorer residents in both urban and rural areas. One of the principal reasons for the inefficient SWM systems in the developing countries is the financial constraint. As SWM is given low priority in the developing countries, except in capital and large cities, very limited funds are provided to the SWM sector by the government. Solid waste is the unwanted or useless solid materials generated from combined residential, industrial and commercial activities in a given area. It may be categorized according to its origin (domestic, industrial, commercial, construction or institutional)according to its contents (organic material, glass, metal, plastic paper etc); or according to hazard potential (toxic, non-toxin, flammable, radioactive, infectious etc).

OBJECTIVE

- To protect the health and wellbeing of people by providing an affordable waste collection service.
- To ensure the protection of the environment through effective waste management measures.
- To providing a good land filing method to overcome the problem and providing safe, healthy and secured atmosphere for the people.

TYPES OF SOLID WASTE

1. Industrial waste
2. Municipal solid waste
3. Agricultural Waste

SOLID WASTE COLLECTION METHODS

House To House Collection

In house to house collection the solid waste generated and stored in individual premises is collected by several methods as discussed below:
1. Curb service
2. Alley service
3. Set out set back service
4. Backyard service

Street Collection

Wastes are generated on streets and public places. The collection of which is the responsibility of civic authority (Nagarpalika municipal Corporation). In developing countries the collection is manual. The tractor coupled with trolleys are normally used for collection and conveyance of street waste insmall towns. In cities dust bins are located at road side and the solid waste is collected and conveyed to the site of treatment by vehicle.

DISPOSAL OF SOILD WASTE

Several method of disposal of solid waste arelisted below
1.Compositing
2. Incineration
3. Land filling in low lying area
4. Pyrolysis

OLD LANDFILLING

In the past, dumps were created very simply, digging a hole in the ground and filling it with trash. Once the trash reached a certain limit, it was burned and then the entire opening was covered with new soil. In the past, garbage was collected in open dumps. These uncovered and unlined sites allowed leachate, a liquid formed by decomposing waste, to soak into the soil and groundwater.

Toward the end of the 19th century, many cities realized that throwing waste into the streets was causing health and political problems. In response, cities created garbage and dispose of it in open dumps, incinerators, or at sea. Even in the 1920s garbage, incinerator ash, and dirt were commonly used to reclaim wetlands near cities. Dumped garbage was openly burned to save space for future waste disposal, creating air pollution and health hazards. When the waste reached a predetermined height, a final cover of soil was placed on top and sometimes

vegetation was planted.in many cases, the vegetation failed to grow or died because of metane gas escaping through the final cover.

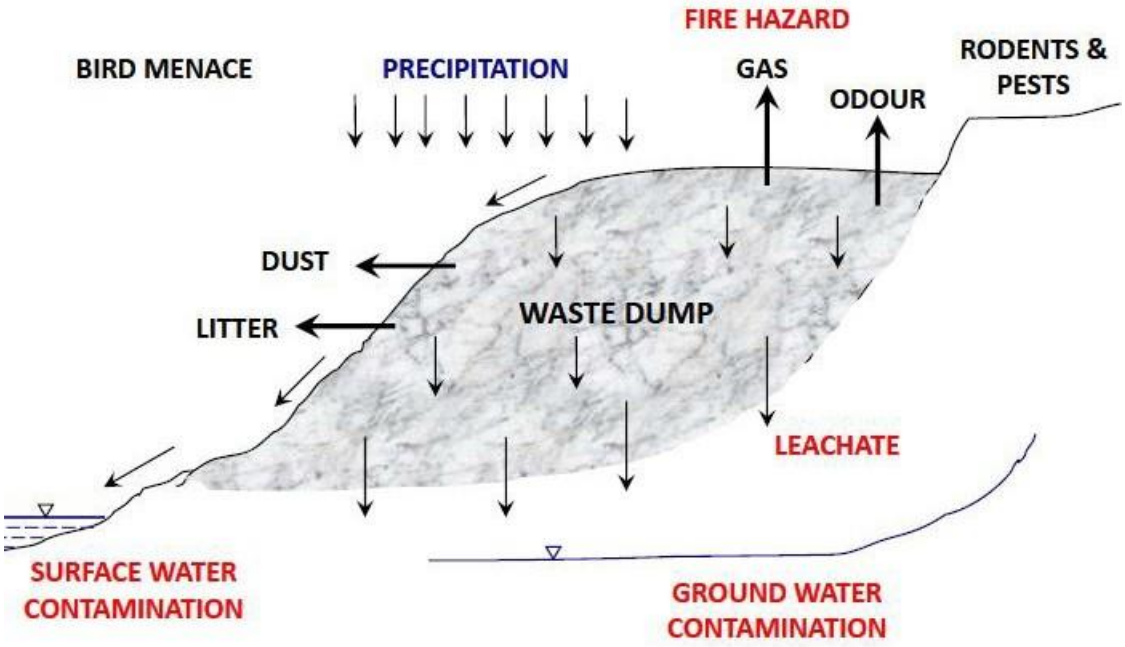

FIG.OLD LANDFILLING

MODERN LANDFILLING

Landfills are the physical facilities used for the disposal of residual solid wastes in the surface soils of the earth. Disposal of MSW designed and operated to minimize public health and environmental impacts. Landfills for the disposal of hazardous wastes are called secure landfills.

A lift a complete layer of cells over the active area of the landfill. Typically,landfill are comprised of a series of lifts bench is commonly used where the height of the landfill will exceed 50 to 75 ft. the final lift includes the cover layer. The final cover layer is applied to the entire landfill surface afrer all landfilling operationsare complete .the final cover usuallyconsists of multiple layers of soil or geommbrane material designed to enhance surface drainage, intercept percolating water,and support surface vegetation.

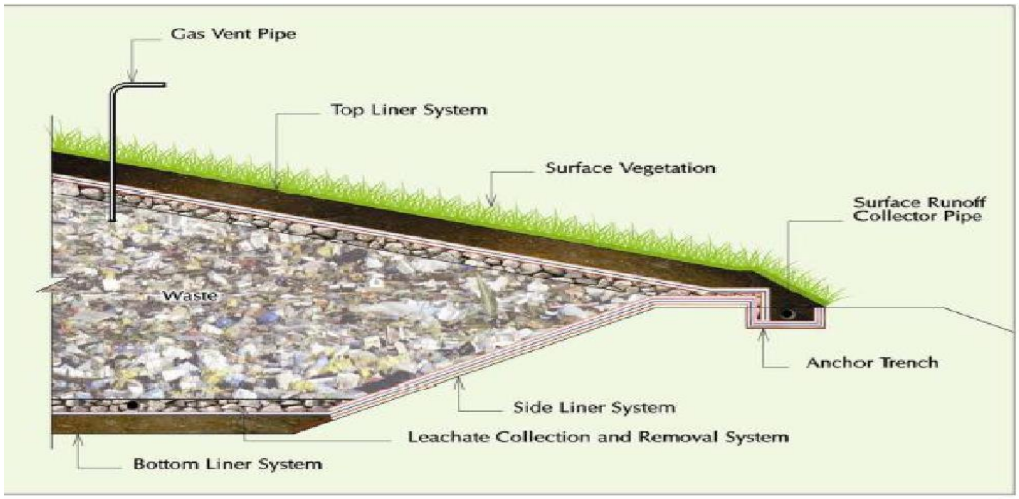

FIG.MODERN LANDFILLING

Phase 1- initial adjustment
Phase 2- transition phase
Phase 3- acid phase
Phase 4- methane fermentation phase
Phase 5- maturation phase

Data Collection

Data Collected From The Mandvi Town Are As Follows:
1. Population
2. Solid Waste Collection

1. Population

Ward	Level	Name	TRU	NO HH	TOP P	TOP M	TOP F
1	WARD	Mandvi (M) WARD NO.-0001	Urban	1074	6139	3334	2805
2	WARD	Mandvi (M) WARD NO.-0002	Urban	1767	9301	4681	4620
3	WARD	Mandvi (M) WARD NO.-0003	Urban	655	3295	1510	1785
4	WARD	Mandvi (M) WARD NO.-0004	Urban	1083	4385	2272	2113
5	WARD	Mandvi (M) WARD NO.-0005	Urban	1080	4825	2369	2456
6	WARD	Mandvi (M) WARD NO.-0006	Urban	1299	6161	3243	2918
7	WARD	Mandvi (M) WARD NO.-0007	Urban	1457	6728	3530	3198
8	WARD	Mandvi (M) WARD NO.-0008	Urban	1094	5129	2395	2734
9	WARD	Mandvi (M) WARD NO.-0009	Urban	837	5413	2441	2672
TOWN		Mandvi (M)	Urban	10346	51376	26075	25301

Table No.1

NOTIFICATION
HH=HOUSE HOLDERS
P= TOTAL MALE +TOTAL FEMALE
M=MALE
F=FEMALE

Collection of Solid Waste By Two Methods

1. Door to door method
2. Street method

By door to door collection 75% waste is collected from houses
Door to door collection 7% waste is collected from others
From door to door collection total 82% waste is collected

Rapily and slowly biodegradable organic constituents in MSW

Organic waste component	Rapidly biodegradable	Slowly biodegradable
Food wastes	√	
News paper	√	
Office paper	√	
Plastic		
Textile		√
Rubber		√
Leather		√

Table No.2

Percentage distribution of landfill gases observed during the first 48 months after the closure of a landfill cell

Time interval since cell completion months	Average , percent by volume		
	nitrogen	Carbon dioxide	methane
0-3	5.2	88	5
3-6	3.8	76	21
6-12	0.4	65	29
12-18	1.1	52	40
18-24	0.4	53	47
24-30	0.2	52	48
30-36	1.3	46	51
36-42	0.9	50	47
42-48	0.4	51	48

Table No.3

COMPARISON OLD LANDFILLING AND MODERN LANDFILLING

OLD LANDFILLING	MODERN LANDFILLING
1. In old landfilling Dumped garbage was openly burned to save space for future waste disposal, crerating air pollution and health hazards 2. The entire opening is covered with the soil. IN modern landfilling dumped garbage is put inside the ground and produce gases 3. Old landfill had liners and leacahate collection system to prevent leachate movement out of the landfill. 4. Older dumps were commonly only closed with athin layer of dirt and revegetated sparsely, if at all.	1. In modern landfilling dumped garbage is put inside the ground and produce gases 2. The entire is covered with the compacted clay. 3. Modern landfills are epuipped with liners and leachate collection systems that prevent the leachate from leaving the facility and contaminating groundwater. closure. 4. Modern landfill are designed from the to ensure protection of the environment and public health and the safe and productive use of the site after closure.

BENEFITE OF NEW MODERN LANDFILLING METHOD

1. There are many advantages of landfills. The main advantage is that burying can produce energy and can be obtained by the conversion of landfill gas.
2. The waste products of landfills can be used as direct fuel for combustion or indirectly they can be processed into another fuel.
3. Landfill is a specific location for waste deposition that can be monitored.
4. On completion of the landfill it can be reclaimed and it can be used as parks or farming land.
5. In properly designed landfills the waste can be processed and all recyclable materials can be used before closing.

CONCLUSIONS

- As per the site survey on sitla temple we seen that all the solid waste generated from the mandvi town is first collected to open ground and than dump to the ground.
- Due to this continous proceed many problems occurred in the site like land pollution, mosquiters problems, generation of bed small, air pollution.
- So due to this problem we suggested the secured landfilling method to overcome the problem and providing safe, healty and secured atmosphere for the people.
- By providing this method we can utilize the by product for the fertilizer and construction also utilize the gas for the cooking purposes this method control the leachate and protect the ground water.

REFERENCES

Papers:

1. “A Study on Solid Waste Management System of Dhaka City Corporation: Effect of Composting and Landfill Location” @ Faisal Ibney and M. Ashraf Ali
2. “A Study on Solid Waste Management System in Vietnam” @ Prof. Nickolas J. Theme is, Earth and Environmental Engineering
3. “Municipal Solid Waste Collection Problems” @ Jeroen Beliën, Liesje De Boeck, Jonas Van Ackere

Journal:

1. “Journal of Environmental Engineering” @ Michael S. Bruno

BIOGRAPHIES

Mohit Sagar
Assistant Professor
Department of Civil Engineering
Sardar patel college of engineering
Bakrol

Priyanka Panchal
B.E.Student
Department of Civil Engineering
Sardar patel college of engineering
Bakrol

Jalal Saiyad
Department of Civil Engineering
Sardar patel college of engineering
Bakrol

MO.Juber Raj
Department of Civil Engineering
Sardar patel college of engineering
Bakrol

Sohilkhan Pathan
Department of Civil Engineering
Sardar patel college of engineering
Bakrol

Rahul Jepar
Department of Civil Engineering
Sardar patel college of engineering
Bakrol