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Solid waste management for Aurangabad city

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Abstract: *Solid wastemanagement is among the basices sential services provided by municipal authorities in the country to keep citiesclean. Due to industrialization, ruralto urban migration and high growth rate of population have induced rapid urbanization in developing countries and obviously in India also. The haphazard urbanization create dacute problem of solid waste management. The per capita waste generation rate in India has increased from 0.44 kg perday in 2001 to 0.5 kg perday in 2011; such a steep increase in waste generation within a decade has severed the stress on all infrastructural, natural and budgetary resources. Aurangabad is one of the fastest developing city, it generates total quantity of waste is about 1300 to 1400 metric tons perday. So, there is need of the proper waste collection, transportation route for prevention of environment form the hazardous waste disposal.*

Keywords: *Municipal solid waste; collection of waste; disposal; wastemanagement*

I. Introduction

Solid Waste Management (SWM) is an organized process of storage, collection, transportation, processing and disposal of solid refuse residuals in an engineered sanitary landfill. It is an integrated process comprising several collection methods, varied transportation equipments, storage, recovery mechanisms for recyclable material, reduction of waste volume and quantity by methods such as composting, waste-to-power and disposal in a designated engineered sanitary landfill. The Implementation of Municipal solid Waste (MSW) Management is an important component of the Government of India's "Swachh Bharat Mission" (SBM).

Due to increase in population and changing life style the generations of solid waste also increase. A large quantity of solid waste coming from houses, street sweeping, commercial and industrial sectors. If solid waste disposed off on land in open areas then it causes leachets problems, water pollution and also effect on environment and health. If improper management of solid wastes increases it cause diseases, odor nuisance, hazards to atmosphere and effect economic losses. Basically in Urban, the solid waste generates in large quantity and that disposed on landfill which creates rodents and fleas to waste site. The disposal attracts birds which create serious problems to Air flight. Disposed (Landfill) Emission of Carbon dioxide and Methane other gases traces.

Aurangabad city generates large amount of solid waste. This large amount of waste poorly disposed and untreated. The city does not have an engineered or scientific landfill site and the capacity of existing dump site cannot cater the future demand of the waste generated. So, there is an immediate need for designed scientific integrated solid waste management.

1.1 SWM scenario-Aurangabad

Aurangabad is a city one of the historical city, in the Indian state of Maharashtra It is a municipal corporation and the headquarters of Marathwada region and divisional office It is also a part ancient Capital of Aurangazeb. The city is one of the major trading and business centers of the state and hence, it is also known for industrial corridor. The city is one of the metropolises in the state, with as of 2011census, the city had a population of 1,048,240, making it the second largest city in the state in terms of population and it had an urban agglomeration population of 1,491,202. The city has been recognized as a "Global City of the Future" by McKinsey Quarterly. It is one of the commercial hubs of Maharashtra with a GDP of $3 billion in 2010, and is expected to increase to $17 billion by 2025. The political, agricultural, industrial sectors are a boon for its recognition. It is the hub of transportation. Aurangabad is located near Godavari River. It is located west south of Maharashtra and is the fifth largest city in the state after The area of Aurangabad is 219 sq. km divided into 3 circles and 45 wards ,with a population of as per 2011 census.11,75,116 The total waste generated in the city is about 450 MT in year 2015. The proposed new capital city in the vicinity of Aurangabad may result in exponential population growth in another 5- 10 years. This growth of population would be more than 20% over and above the natural growth of the city. The SWM in the city is governed by Aurangabad Municipal Corporation (AMC).

Figure 1: Satellite view of Aurangabad

Table 1: Generatation and quantities from various places

Sr.No	Description	Quantity
01	Total MSW generation (MT/day)	400
02	MSW generation (gm/capita/day)	350
03	Total MSW generation	750
04	Quantity of domestic MSW (MT/day)	160
05	Quantity of commercial MSW (MT/day)	100
06	Quantity of industrial waste (MT/day)	40
07	Quantity of waste from markets (MT/day)	40
08	Quantity of waste from hotels (MT/day)	50

Table 2: Composition of MSW

Sr.No	Description	Quantity
01	Biodegradable	61%
02	Paper	3%
03	Plastic	2%
04	Glass	2%
05	Metal	15%
06	Building material	10%

1.2 Primary Collection of Waste

The city has certain segment, where door to door collection and source segregation is followed. In general, the mixed waste is put in secondary collection bins of 3.5 and 4.5 cum bins. These bins are serviced by Dumper Place vehicles. The segregation of waste is mostly in informal sector, where rag pickers and kabariwalas take out recyclable waste and send that to recyclers.

1.3 Secondary Collection & Transportation

The mixed waste (wet and dry) after is collected is transported to transfer stations through dumpers, tippers, large trippers, hook loaders, tractors etc. There are two transfer stations at Naregaon and other newly proposed at Naregaon. The waste collected at Transfer Stations (TSs) is being sent to Dumping yard by large trucks of 10

1.4 Existing Manpower and Equipment

There are 45 sanitary wards in Aurangabad, which are divided in 3 circles. The city is divided into 59 political wards. An elected body headed by the Mayor performs the Administration of the Corporation. The Commissioner acts as the executive head, and oversees the day to day functioning of the local body. The staff strength of the corporation is just over 5000. A detail of equipment for sanitation work is given in Table below:

Table 3: Type of Equipment & Vehicles Numbers.

Sr.No	Equipment	Numbers
01	Community bins	456
02	Auto-tipper	110
03	Skip-loader	6
04	Hook loader	7
05	Tractor	8
06	Trucks	20

Disposal
1) Disposal site: At Naregaon
2) Distance of site: 5km away
3) Land area: 46 acres

There are one dumping yards in the city, at Naregaon which is about 15 km in 2.5 acres (Already in possession of Aurangabad Municipal Corporation (VMC)) and other is at Naregaon village another site for land filling which is of 8 acres (on Lease base for one year). Presently collected solid waste is mostly being dumped Naregaon, which is about 5km from the city. The present dumping yard is an open site, very near to forest land. It was also observed that the Naregaon dumping site is an abandoned quarry, where large volume is available for waste dumping. However, the site is very near to forest area. The waste burning is also observed at the dumping site. Another site is identified at Naregaon for proposing new dumping yard. Land acquisition, procurement of scientific dumping yard is in process.

Figure 2: Disposal site

Waste management: Integrated waste management (Collection, transportation treatment and Disposal)
Following are the steps for effective solid waste management within the township

- Segregation of waste at source
- Primary and Secondary collection system
- Separate collection & management of waste from bulk generators
- Road sweeping & Nuisance detection
- Waste processing and land filling
- Biomedical waste as per Biomedical Rules 2000 and should be managed by separate agency

1.5 Segregation of waste at source:

Segregation of solid waste is the first criterion for effective management of solid waste of city. Depending upon the nature of the solid waste, they should be segregated as far as possible at the source of generation. The segregation of waste should be facilitated with the help of colour - code bins. Separate bins would be provided for dry and wet wastes to the residents. Such bins should be distributed free of cost in LIG and Slums, whereas, HIG, MIG, Institutional areas should maintain their own bins in premises.

1.6 Primary and secondary collection system

Door to door collection will be conducted by common collection bins followed by Compactor Truck to collect waste from each household as well as from commercial and institutional generators. At present, Aurangabad has Dumper Placer Vehicles (DP) and Auto-tippers for waste collection from Secondary Collection points. However, DP vehicles need to be replaced with Compactor trucks in future for better collection and transportation of waste. The stepwise process for SWM Segregation at source, Collection to secondary collection bins, Transportation to Transfer Station cum treatment facility (composting andbiomethanation), Disposal of residual and inert waste to landfill.

1.7 Separate collection & management of waste from bulk generators

Separate collection and management of Bulk Waste is most critical and cost effective way for waste management in city. The waste processing is also easier if such bulk waste is not allowed to get mixed with rest of waste. Such waste is more homogenous concentrated (containing mostly wet garbage) and thus can easily be treated and disposed without additional cost incurred on segregation Independent collection and transportation of waste from bulk producers helps in establishing a system of collection and transporting segregated waste.

Who should be covered?

Waste generated from construction materials/ debris

Waste generated from restaurants, canteens, marriage halls, temples

Waste from vegetable & fruit markets, meat and fish market

Waste generated from parks and gardens, household garden waste etc

1.8 Road Sweeping & Nuisance Detection

Once the waste is collected directly from the generators, the road cleaning load would come down sharply. Road in commercial areas may be swept twice a day. The arterial and main roads where there is heavy traffic and are crowded during the day time could be cleaned up at night. Good painted litter bins will be kept along the roadside and walkways for picking up garbage generated along the roadside. Litterbins should be providing at a distance ranging from 25m to 250m depending on the site condition. Removal of waste from these litterbins should be done by beat sweepers and directly transferred into the handcart. From handcart waste will be transferred to the transfer station.

1.9 Waste Processing and Land Filling

The processing of waste becomes simpler in case segregated waste is obtained. This can be achieved through following steps: Separate collection & transportation of bulk waste Debris not getting mixed up in municipal waste House to house collection of segregated biodegradable waste various treatment technology options are currently available for handling waste. Bio-methanation is the simple technology, which can be used to treat source segregated biodegradable waste.

1.10 Population projection

The waste generation is function of population and lifestyle of people. Therefore, it is essential to project the population for 20-25 years for setting out the infrastructure for SWM.

The population projection is Aurangabad city is carried out based on following methods:

i. Incremental increase method

ii. Arithmetic increase

iii. Geometric increase, and

iv. Exponential method.

II. Conclusion

In summary four main reasons which will shows reduction in volume of solid waste

- Awareness is given to citizens about solid waste separation i.e. Dry and wet, organic and inorganic, biodegradable and non-biodegradable. Biodegradable can be converting in composting. So it will reduce the volume waste.
- Promote recycle industries and agencies so that non-biodegradable or manmade products are recycle again and again.
- Waste disposal today is done primarily by land filling or closure of existing dump sites. During land filling waste that can be use as energy fuel. (Electricity generation, energy fuel.)
- Proper planning collection and transportation of solid waste from ward to ward and send to recycle industries and agencies

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