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# Improving Solid Waste Management for Barshi City

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**Abstract:** ***Our project is related to the analytical analysis of past solid waste management which is already running in city by BMC (Barshi Municipal Corporation) and new proposed method which helps to keep the city clean, and also some review on the method which is running in other state successfully and they may be helpful for Barshi city also. Solid waste management is one among the basic essential services provided by municipal authorities in the country to keep urban centers clean. However, it is among the most poorly rendered services in the basket—the systems applied are unscientific, outdated and inefficient; population coverage is low; and the poor are marginalized***

**Keywords:** waste management, recycling, waste collection, Disposal, environmental protection, waste collection

## 1. Introduction of Barshi City in Brief

It is a headquarter and the largest city in Barshi Taluka. It is famous in the region for its quality toor dal (lentil) production and other agriculture products. The town is traditionally considered as a gateway to the neighboring region "Marathwada". Barshi has one of two temples dedicated to Vishnu as Lord Bhagwant; the other is at Varanasi. Barshi had one cotton textile mills, although only one survives. The one were Barshi Textile Mill (calledBTM - Old Name Jai Shankar Mills Ltd.). Nargis Dutt Memorial Cancer Hospital, initiated by film actor Sunil Dutt, is situated in Barshi. Barshi is also known for its wholesale trading market, called "Krishi Utapanna Bazar Samiti (adhatbazzar)"

Location: 78º96'29" N Latitude to 20º59'37" E Longitude.
Height from: 473m. Mean Sea Level
Area adjoining: Western Ghats, area in sina-bhima river basin
Geology: Black soil, Basalt rock.
Temperature: Minimum 24o C, Maximum 31o C and average
Humidity: 43 %
Average wind speed: 3 km / hr.
Wind: from East
Rainfall: Average 594.8 mm Lowest: 150.50 mm (1980)
Highest: 1100 mm (1965), 900.6 mm (1992), and 950.8 mm (1995)
Average rainfall days: 55
Average Flood Line: 430.90 m
Maximum Flood Line: 450m
Geographical Area: 3626.5sq.km.
Population:18722 (2011census)
Solid Waste per day: 50 to 60 tons
Treatment on: Biodegradable waste –composting and making stone coal
Sewage per day: 40 M.L.D.
Centers to measure: 3 (somwar peth, shivaji chowk, cancer hospital.)
Historic sites:Jain mandir, cancer hospital. Bhagwant temple.

## 2. Municipal Solid Waste

Municipal Solid Waste (Management and Handling) Rules, 2000 Schedule – II (Rule 6 (1) and (3), 7 (1) includes:

- Collection of Municipal Solid Waste
- Segregation of Municipal Solid Waste
- Storage of Municipal Solid Waste
- Transportation of Municipal Solid Waste
- Processing of Municipal Solid Waste
- Disposal of Municipal Solid Waste

Total population of Barshi city according to 2011 census is 11, 87, 22 and projected increase in next ten years is 2, 79,281. The total solid waste generation in the city is about 46-50 metric ton / day and per capita per day generation are250 – 260 Gms. The dry and wet waste generation is approximately 20% and 40%.Area of the city in Sq. Km 36.26 sq. km
No. of wards Sanitation wards 10
Population as per 2011 census 1, 18,722
Urban population 2, 56,200
Slums and Urban poor 58,200
Floating population 5,000

### A. Urban Challenges

Sources of Solid Waste
Domestic Waste
Road Sweeping
Commercial Waste
Industrial Waste
Slaughter House Waste
Garden and Park Waste
Other Solid Waste

#### 1) Current Situation in Barshi City

**Special/ Unique Schemes Or Initiatives**
Various schemes are implemented by Barshi Municipal Corporation for development of the waste management some of them are as follows:

- Recycling scheme for plastics, PET bottles
- Encouraging community activities such as ALM formation.
- Encouraging people's participation by building wise or building complex wise waste segregation and

processing of organic waste by vermicomposting or composting.
- Training needs for sanitary workers on health and safety issues.
- Development of tools and implements

**2) Solid Waste Processing and Disposal**

**Composting**
Composting is done mechanically.

**Land Filling**
Methane gas is generated from land fill site and the methods applied for dumping are open ground dumping.

**Methane Gas**

**Privatization**

**3) Innovative approach to solid waste management**
Focus on private sector participation
a) PSP in Navi Mumbai
b) PSP in Surat
c) PSP in Rajkot
d) PSP in Hyderabad

a) Reasons for improper management of waste:
- Lack of planning for waste management while planning townships.
- Lack of proper institutional set up for waste management, planning and designing in urban local bodies.
- Lack of technically trained manpower.
- Lack of community involvement.
- Lack of expertise and exposure to city waste management using modern techniques / best practices.
- Lack of awareness creation mechanism.
- Lack of Management Information Systems
- Lack of funds.

b) Effects On Human Health:
The solid waste which is carried out from houses is not dumped properly in dustbins, contamination spreads and its effects on the human health. Because of this reasons all types of hazardous diseases like cholera, swine flu, typhoid, jaundice, skin diseases, etc. increases rapidly.

c) Necessity Of Solid Waste Management
- To keep the environment clean and healthy.
- The frequency of collection manly depends on, quantity of solid waste generated, size of storage faculties, seasons & funds available.
- To prevent the start of odour & fly breeding problems.
- To kill the germs into the atmosphere which increases due to open waste in the city.
- To avoid the deceases like typhoid, cholera, parasitizes, swine flu, bird flu, etc.
- To save the life of human and animals from hazardous waste materials like plastic, glass, metals etc.
- To decrease the pollution of water, land & air.
- To avoid the spreading of waste because of the industries.
- To avoid the waste due to the temples & other religious area.

**4) Physical Processing**
- Collection
- Screening
- Manual Separation
- Magnetic Separation
- Compost Refining

**a) Methods of Solid Waste:**

*Traditional Methods:-*
Composting-
Open Window composting
Mechanical composting
Land filling
Incineration

*New Methods:-*
Pallet
Coal Manufacturing Plant
Composting:
A definition that distinguishes composting from other biological processes is:

"Composting is the biological decomposition of biodegradable solid waste under controlled predominantly aerobic conditions to a state that is sufficiently stable for nuisance-free storage and handling and is satisfactorily matured for safe use in agriculture".

**Principles of Composting – Manual and Mechanized Methods**
Composting can be carried out in two ways i.e., aerobically and anaerobically.

**Bangalore Methods of Composting:**
The Bangalore method requires longer time for stabilization of the material & hence needs larger land space, which is in short supply in urban areas. The gases generated in this anaerobic process also pose smell & odor problems.

**Indore Methods of Composting:**
The Indore method on the other hand stabilises the material in shorter time & needs lesser land space. As no odorous gases are generated in this process, it is environment friendly & hence commonly preferred. While the organic matter is stabilised during the composting process, the moisture content also changes. The non-decomposable are also rejected. Hence the quantity of compost is much lesser than the input & is normally around 50%, and the exact value depends upon the characteristics of the input material.

**Sanitary Land Filling**
Unmanaged and uncontrolled, solid wastes openly dumped on the land: 1) generate liquid and gaseous emissions (leachate and landfill gas) that can pollute the environment and 2) represent a breeding ground for disease-bearing animals and microorganisms. Other risks to the public health and safety and to the environment are also posed by the uncontrolled land disposal of solid wastes.

**Basic principles**

In order to be designated a sanitary landfill, a disposal site must meet the following three general but basic conditions: 1) compaction of the wastes, 2) daily covering of the wastes (with soil or other material) to remove them from the influence of the outside environment, and 3) control and prevention of negative impacts on the public health and on the environment e.g., odours, contaminated water supplies, etc.).

**Planning for a Landfill**

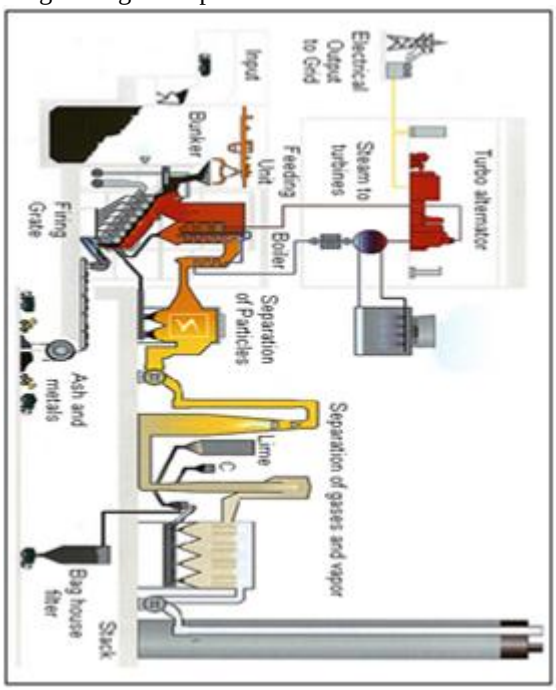
For this chapter, planning involves the collection of information on type, amount, generation rate, and characteristics of the wastes to be accepted for landfilling.

**Landfill Processes**

Physical, chemical, and biological processes are discussed in this section. Of the three types, the biological processes probably are the most significant. However, the biological processes are strongly influenced by the physical and chemical processes. The last part of this section considers some of the consequences of the three types of processes.

*Incineration:*

Throughout this chapter, the terms "incinerator" and "incinerator system" are used to describe equipment and systems that combust solid waste or fuels derived from solid wastes. Thus, as used herein, the above terms are synonymous with "combustor" or "combustion systems". While, in earlier times, the term "incinerator" connoted uncontrolled combustion, the incinerators of today have a much higher degree of process control.




## 3. Principles

Incinerators may be classified in a variety of fashions: by type and form of the waste input; by the throughput capacity (with or without heat recovery); by the rate of heat production (for systems with energy recovery); by the state in which the residue emerges from the combustion chamber (e.g., slagging); and by the shape and number of furnaces (e.g., rectangular, multiple). The key system elements involved in the incineration of urban wastes are: 1) tipping area, 2) storage pit, 3) equipment for charging the incinerator, 4) combustion chamber, 5) bottom ash removal system, and 6) gas cleaning equipment (i.e., air pollution control system). If energy is to be recovered, a boiler is included.

In the last 10 to 15 years, considerable research and development effort has been expended on "trace" air pollutants formed as byproducts of solid waste combustion, the relevant chemistry, and methods of control [14]. Examples of these trace pollutants are mercury, and dioxins and furans.

**Pallet formation**

- Assess Pallet Use
- Investigate Pallet Waste Reduction Options
- Use High-Quality Pallets
- Design a Pallet-less System
- Slip-sheets

**Coal manufacturing plant**

- The solid waste generated throughout the whole city is collected by various collection means.
- This collected solid waste is brought near the coal formation plant.
- The sufficient empty space should be provided to deposit all the waste collected near the plant.
- Plant should be at sufficient distance from the city.
- From this deposited waste the steel, plastic, glass are separated. Because, steel has a good scrap value or it can be recycled & reused.
- Plastic can cause various defects in coal manufacturing machine & if it is used in coal formation & also its cause pollution if it is burnt so, plastics & steel separated from the waste.
- Remaining waste material is dried well until it becomes totally moisture free. (at least 98%)
- After drying, this dried waste is fed to bracketing machine.
- In this machine it is compressed well due to its internal mechanism.
- And finally the coal is formed & can be taken out from the other side.

**About Coal Formation Plant**

- Generally 3-5 acres of plant, near the city is required to set up this plant.
- This plant includes, brickiting machine having cost near about 16 lacs.
- This machine is installed in built up shed or go down.
- Sufficient empty space should be required to deposits store & segregate the waste.
- Also this plant includes separate go down to store the coal formed, connected by roads so easy to transport it.

**Total Cost:** 1, 20, 000, 00 /-
**Machine:** 16, 000, 00 /-
**Land:** 1,00,000,0 /-
**Labours:** 3, 000, 00 /-
**Other:** 1, 00,000 /-

Comparison between ordinary coal & newly formed coal, IF, a 1kg sample of both the coal is burnt,Ordinary coal burns for 1hrs.

**Revenue**

1) The cost of formation for 1 tons of coal =600 /-
2) The revenue generated from 1 tons of coal = 5500 /-

**Statistical Data for Wardwise Waste**

1) Organic Matter Per day = 29.116 MT/ day
2) lactic Waste Per day = 6.81 MT/day
3) Steel waste per day = 21.47 MT/day
4) Total Waste Per day = 57.386 MT/day

Plastic cannot be recycled and steel can be reused. Therefore there is no need to calculate the cost of it. Also the cost of organic matter is as following table:

| Method of SWM | Operating Cost per MT/day in Rs/- | Capital cost in Rs. | Cost of organic matter in Rs/- (57.4 MT/day) |
|---|---|---|---|
| 1] Traditional Method a]composting+ landfilling | 2500 | - | 87500 /- |
| 2] New methods A] pallet formation | 650 | - | 1,12,193/- |
| B] coal manufacturer | 600 | 1.20 millions | 21000 /- |

**Recycling of Plastic Waste by Using Sand for Making Paving Blocks**

The technological process includes the fusion of the collected bags, adding sand, and then the mass is poured into a specially designed mould. 45 minutes are enough to dry the dough into the mould and the stones are ready to be used in paving. 20 kilos of plastic bags are needed to put together 5 Kilos of raw material. All plastic litters can be used as a combustible, considerably reducing the final cost of production. The paving stones production technology recycling plastic bags now adopted in many countries of the region is an example of the great impact of RESEDA's work on innovative technologies responding to development needs of local communities. The production process is described

## 4. Conclusion

As Barshi city is facing a huge problem of solid waste management, so we had to study least possible method to manage the solid waste and also to minimize pollution, in order to make city free from diseases, infections etc.

Even the appearance of city gets ugly due to scattered material all over. So we have choose

The following new method of : “Coal Manufacturing Plant”

This is the one of the best method. This method is suitable for all types of hazardous solid waste. From this method waste is converted into wealth, this converted energy is used for electrical purposes. And also we propose COMPOSTING METHOD for solid waste management.

This method is suitable for all types’ organic solid waste. This composted solid waste is used as a good fertilizer.

As compared to other method cost of “COAL MANUFACTURING PLANT” is economical it is about 1.20 million rupees.

## 5. Acknowledgement

With immense pleasure I submit my project on “IMPROVING SOLID WASTE MANAGEMENT FOR BARSHI CITY”.Under the valuable supervision of our guide Prof. Patil G.L,who guided us for each and every work of our project and gave us valuable suggestion and constant inspiration.

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