A Case Study on Municipal Solid Waste Management in Salt Lake City

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Abstract: Solid waste management is an important social problem throughout the world. In India it takes the shape of alarming dimension which has to be addressed urgently. It includes the collection and disposal of garbage, or municipal solid waste, compounded by increasing consumption levels. Among the solid waste generated in Indian cities, Kolkata’s position is second. Bidhannagar or Salt Lake City is a planned satellite township in Kolkata. The problem of municipal solid waste management (MSWM) also exists in the urban environment of Salt Lake. Therefore the present study was taken to find out the problems and prospects of Municipal solid waste in this city. A detailed investigation was made comprising the methods of practices associated with sources, quantity generated, collection, transportation, storage, treatment and disposal of Municipal solid waste in Salt Lake City. The relevant data of SWM in Salt Lake was obtained through questionnaire, individual field visit, interacting with people and bona fide record of Salt Lake Municipal Corporation. After this case study, it was found that there are several lacunas in existing system of SWM in Salt Lake as comparing with Municipal Solid Waste (Management & Handling) Rules 2000.

Key words: Municipal solid waste, Salt Lake City Municipal Cooperation, Garbage collection, garbage transportation

1. Introduction

Solid waste management is one among the fundamental and essential services provided by municipal authorities in the country to keep urban centers clean. Solid waste management has always been a serious problem for cities throughout the world. It is not different in developing countries like India. In certain regions of our country, the free disposal facilities have reached their own capacity and even local governments are confronted with difficult decisions. Modern civilization has brought a lot of luxuries and conveniences to our lives. However, with all of the amenities that modern life brings us, they also cause us to contribute to producing a large quantity of trash that needs to be taken care of. Fortunately, there’s the field of solid waste management, and it is with that Solid Waste Management that modern lives are enjoyable without the disturbance or refuse. Solid waste management is an integral element of modern society. Even if we don’t get to see what goes on at the facilities and plants that process and dispose of garbage, it still contributes to the well-being of our lives. There are many ways in which solid waste can be treated, and thanks to modernized practices and technological advancement, these methods are very safe and practical.

2. Salt Lake City and SWM

Bidhannagar or Salt Lake City as is a planned satellite township in West Bengal. It was developed between 1958 and 1965 to accommodate large number of population of Kolkata. It is now one of the important hubs for Information Technology in the Kolkata. The Chief Minister of West Bengal, Dr. Bidhan Chandra Roy, was main architect in formulating the plan to build this satellite area, and later the township was named Bidhannagar in his honor. The city was built on a reclaimed salt-water lake, which gave rise to its popular name of "Salt Lake City". The development of the area was done in "Sectors". The plots were classified as residential, residential (shop-allowable), commercial, institutional and industrial. By 1965, Sector-I was complete and by 1969, Sector-II and Sector-III were built for occupancy. After that the industrial Sectors IV and V (the location of
the IT industries) were developed. The Sector IV contains Nicco Park — the first amusement park of eastern India with 40 acres (160,000 m²) of land and the Nalban Boating Complex and so also the under-privileged area of Sukantanagar. The 12.35 km² area of the town initially composed of 12873 plots of land apart from 87 housing estates and blocks, got built up. Recently, the land area of this township has almost doubled to 33.5 km² due to the incorporation of Duttabad, Sukantanagar, Nayapatti, Dhapa-Manpur and Mahishbathan areas. The whole of Duttabad remains as an underdeveloped area till date [1].

For effective urban and environmental management, solid waste management plays an important role [2,3]. Current population of Kolkata city is 5,080,519 and initially Salt Lake was planned to accommodate nearly 4,50,000 population. In India, municipal solid waste management, like most of other infrastructural services has come under great stress, consider low priority areas, solid waste management was never taken up seriously either by public or by concerned agency or authorities and now the large amount of waste is threatening our health, environment and well being (Chouhan and Reddy 1996, Mazumdar 1994) [4,5,6 & 7]. Salt Lake Municipal Corporation is responsible for better management of solid waste that are produced everyday and the present study has been carried out in the urban environment of Salt Lake in the year 2011 to understand the problems and perspective associated with solid waste management in the city.

3. Materials and Methods

Salt Lake consists of five sectors. The solid waste from the different sector of society was collected, mixed and one Kg sample was prepared by using quartering method. The waste was then characterized and the percentage of each constituent was calculated. Secondary data regarding solid waste generation, collection system and disposal methods were collected from Salt Lake Municipal Corporation. Figure 1 shows the Salt Lake area which was considered in our study.

4. Analysis and Discussions

Salt Lake Municipal Corporation is responsible for collection of solid waste which is produced day by day from different areas of Salt Lake. It is already stated that there are five sectors in Salt Lake. Each sector consists of number of blocks. Total numbers of blocks in Salt Lake are 78. There are several sources for solid waste generation in this city which are as follows:

i) Markets
ii) Play Ground/ Parks
iii) Domestic Buildings/ Houses
iv) Houses containing shops
v) Institutions
vi) Offices/Bhawans/Complex
vii) Shopping Malls
viii) Hospitals
ix) Factories
Following are the statistical information of producing solid waste (in kg) per day from different sectors:

<table>
<thead>
<tr>
<th>Sector</th>
<th>House</th>
<th>Market</th>
<th>Playground</th>
<th>Park</th>
<th>Institution</th>
<th>Office</th>
<th>Mall</th>
<th>Bhawan/Complex</th>
<th>Hospital</th>
<th>Factory</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>47941</td>
<td>16200</td>
<td>6</td>
<td>20</td>
<td>421</td>
<td>859</td>
<td>2005</td>
<td>12562</td>
<td>750</td>
<td>0</td>
<td>807</td>
</tr>
<tr>
<td>2</td>
<td>35936</td>
<td>10000</td>
<td>4</td>
<td>15</td>
<td>90</td>
<td>183</td>
<td>0</td>
<td>1655</td>
<td>405</td>
<td>0</td>
<td>482</td>
</tr>
<tr>
<td>3</td>
<td>24272</td>
<td>6250</td>
<td>53</td>
<td>7</td>
<td>5047</td>
<td>612</td>
<td>502</td>
<td>13302</td>
<td>1000</td>
<td>0</td>
<td>510</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>140</td>
</tr>
<tr>
<td>5</td>
<td>1936</td>
<td>2000</td>
<td>12</td>
<td>10</td>
<td>1785</td>
<td>6170</td>
<td>200</td>
<td>5360</td>
<td>0</td>
<td>1600</td>
<td>190</td>
</tr>
</tbody>
</table>

It transpires from the above table:

a) Garbage production from house is higher in Sector 1 among all sectors
b) As Sector 1 is rich in market thus production of garbage from this sector is higher than rest of area
c) Both Sector 1, Sector 3 and Sector 5 are rich in offices and complex, thus production of garbage from this area is higher than rest of sectors
d) Numbers of factories are in Sector 5 and producing considerable amount of garbage

4.1 Garbage Collection Procedure

Salt Lake Municipal Corporation is responsible for collecting the garbage from different areas of Salt Lake. Municipal Authority is collecting this garbage in regular manner. Salt Lake is a planned city thus houses, shops, markets, offices, hospitals, factories – major sources of garbage producers are located at specific areas. There are numbers of big dust bins in several areas of the city and several blocks share each big dust bins. Garbage is accumulated in this bin from adjacent areas. In each block four sweepers are working and each of them wear blue dress with yellow colored helmet. Besides that two persons are involved for collecting garbage from door to door. In market area, extra two sweepers are provided. In Salt Lake area there is no open drainage system. So sweepers are involving in sweeping the roads and collecting the garbage and transferring the waste into the bins. The collection of waste from these dust bins is frequently done where numbers of sweepers involved are more. The collected garbage is carried by small cart, tractors or trucks which are dedicated for collection purpose.

4.2 Transportation of garbage

Collected garbage is transported to the disposal areas in specific manner. It starts from small dumper and ends into big dust bins. Among the collected garbage, both degradable and non-degradable wastes are present. It is alarming that several plastic products are dumped into the dust bins. Several types of vehicles are used for transporting garbage to disposal sites which are as follows:

i) Tri cycle cart
ii) Tractor
iii) Tipper Truck

Six tri cycle carts are provided in each block for collection of garbage from door to door. But in market area extra two tri cycle carts are provided. One tipper truck and one tractor are provided in each block. Tipper truck and tractor both are giving four trips from a block One truck can carry sixty five bins and one tri cycle cart can carry eight bins. Eight people are provided in the truck and five people are provided in the tractor. The tractors and dumpers carrying waste are not covered or partially covered during the journey and waste tends to spill on the roads. The loading and unloading of waste is done through manual as well as mechanical system.
4.3 Disposal of waste

Normally the collected garbage is disposed in specific site and garbage is recycled where it is possible. Though Salt Lake is a satellite township but all garbage is disposed into Moller Verrie area without treatment and recycling. So till now there is no recycling procedure of garbage according to the normal specification i.e. Municipal Solid Waste (Management & Handling) Rules 2000 of solid waste treatment.

5. Conclusions

The solid waste management in Salt Lake City appears to be inadequate and needs upgradation. The solid waste has to be disposed off scientifically through sanitary landfill and recyclable portion of the waste should be salvaged. Segregation of recyclable material would also lead to reduction in quantity of solid waste for final disposal. Higher priority needs to be assigned to the management of municipal solid waste by the local authority and a system approach needs to be adopted for optimizing the entire operation of SWM encompassing segregation at source, timely and proper collection, transportation routes and types of vehicles and development and proper operation of sanitary landfill site. The density of population along with number of offices and institutions are continuously increasing thus there should be effective management activity for managing the solid waste which is generated daily in Salt Lake area.

Reference:

[5] 3–5 December, 2003; Chennai, India, pp. 3-15