

# Landfill Management by Biomining Technique in Kannadapalayam Transfer Station

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**Abstract** – Globally, the waste generation is increasing day to day across the world. Around the world, waste generation rates are rising. With rapid population growth and urbanization, annual waste generation is expected to increase by 70% from 2016 levels to 3.40 billion tonnes in 2050. Solid Waste Management (SWM) is one among the basic essential services provided by municipal authorities in the country to keep urban centres clean. However, almost all municipal authorities deposit solid waste at a dumpyard within or outside the city haphazardly. Experts believe that India is following a flawed system of waste disposal and management. Most of the waste generated end up in Landfills. Landfills rank third in terms of greenhouse gas emissions in India. Landfill is a site for the disposal of waste materials by burial and it is the oldest form of waste treatment. The landfills occupy and make use of the valuable lands that can be used for agriculture, industrial developments and other recreational activities. They pose a serious threat to environment and public health by causing land, water, air, noise pollution. To manage waste, Landfills were created and now to manage these stupendous landfills various techniques have been introduced. Some of these techniques are Biomining, Piggyback cell formation, Landfill capping, etc. In Tambaram Municipality of Chennai, most of the waste generated is dumped in the Kannadapalayam Transfer Station from where wastes may be transferred to Vengadamangalam Village for further treatment. The Kannadapalayam transfer station is used as a dumping yard for the past 35 years and the waste is spread over 10 acres. This poses serious health and livelihood problems for the public living there. So we have chosen Biomining technique for Landfill Management in Kannadapalayam which has been successfully implemented in Kumbakonam, Indore and few other landfill sites all over India.

**Keywords**— Environmental friendly, Landfill clearance, Waste management, Waste plastic, Biomining

## 1. INTRODUCTION

According to the Press Information Bureau, India generates 62 million tonnes of waste (mixed waste containing both recyclable and non-recyclable waste) every year, with an average annual growth rate of 4% (PIB 2016).

The generated waste can be divided into three major categories: Organic (all kinds of biodegradable waste), dry (or recyclable waste) and biomedical (or sanitary and hazardous waste). With rapid urbanisation, the country is facing massive waste management challenge. Over 377 million urban people live in 7,935 towns and cities and generate 62 million tonnes of municipal solid waste per annum. Only 43 million tonnes (MT) of the waste is collected, 11.9 MT is treated and 31 MT is dumped in landfill sites. Historically, landfills have been the most common method of organized waste disposal and remain so in many places around the world. Some landfills are also used for waste management purposes, such as the temporary storage, consolidation and transfer, or processing of waste material (sorting, treatment, or recycling). Unless they are

stabilized, these areas may experience severe shaking or soil liquefaction of the ground during a large earthquake. In the last two decades, Indian cities have seen a rising tide of waste that's disposed of in open dumps. Such landfills, often on fire, are only aggravating the pollution problem, contaminating both air and groundwater. 45 million of India's 62 million tonnes of annual garbage remain untreated, a dangerous statistic that would lead India to severe garbage crisis by 2030. Biomining process is a popular solution for huge landfills. It is a near zero emission process where the dump-hills can be cleared as if they never existed. The process starts with pre-stabilisation where bioculture is sprayed. Bio-culture is basically bacteria which will rapidly degrade the material that is not fully biodegraded. It will stabilise the dump, which includes sanitising it, freeing it from pathogens and making it free of ammonia, methane, hydrogen sulphide and other obnoxious gases. A set of machinery would be set up near the garbage hill to segregate the combustible and non-combustible materials with an automatic machine.

## II. MATERIALS AND EQUIPMENTS USED

### A. Earth moving Equipment

Earth moving equipment is used to spread the waste from the lumped landfill mass.

### B. Biomining Equipment

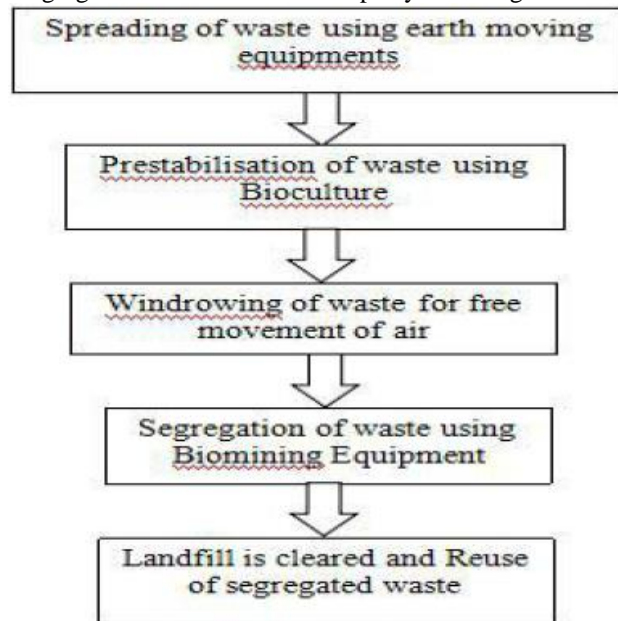
Biomining Equipment is used to segregate the wastes separately into different categories by using various components.

### C. Bioculture

Bioculture is a combination of non-toxic blend of natural bacteria and powerful enzymes and normally used as a fertilizer for plants and crops in gardens.

## III. METHODOLOGY

The main purpose of this project is to clear the landfill barging the residents of Kannadapalayam Village.



## IV. DISCUSSIONS

In Kannadapalayam Transfer station the landfill is spread over 10 acres. Nearly 1.45 lakh metric tonnes of lumped waste is dumped there for over 35 years. Initially the waste has to be spread for the process of prestabilisation. In Kannadapalayam, the prestabilisation may take upto 3 months. The Biomining project may cost upto 8 crores. In addition to this, plastic waste is converted into ecopost whose manufacturing unit and technology may cost extra 3 crores.

## IV. RESULTS

The dumping ground has been an eyesore of the neighbourhood for years. Several resident associations campaigned hard and fought for the trash to be removed as it was causing a lot of health and hygiene issues. We had to keep our doors and windows closed due to the stench from the dumping ground. It was worse during the rainy season. Biomining is a rarely used technique for the effective and efficient management of the landfill all over the country. It is gaining support from various people nowadays as the other techniques just postpone the problem due to landfills. Biomining provides a clear solution to their problems. This technique implementation is possible with good support and integration of the officials. Its success depends upon the cooperation from people. After the segregation of waste using the biomining equipment, the obtained products are just iron matters, light weight waste, paper bales, construction and demolition waste, plastic waste, glass materials, inert materials, etc. The landfill can be cleared by continuous progress in these steps. Usually after the segregation using the biomining equipment the bulk amount of plastic waste obtained can be sent to cement manufacturing industries. This is done because when the plastic is burned in the cement kilns at very high temperatures from 700°C to 900°C, the obnoxious and toxic gases generated due to the incineration of plastic does not affect the environment. So it is considered as an environment friendly technique.

## CONCLUSION

The Landfills can be cleared effectively and efficiently using the biomining technique. The cleared landfill area can be used beneficially for any other purposes. For example, In Indore, 13 lakh metric tonnes of waste dumped in 100 acres of valuable area was cleared within 6 months. Now the valuable land reclaimed is being converted into forest. Similarly in Kannadapalayam dump yard the useful land of 10 acres dumped with 1.45 lakh metric tonnes can be reclaimed easily within 6 months. After the clearance of landfill the land can be harnessed for any use. Before that condition of land in terms of leachate should be checked. While spreading the landfill the methane generation should also be checked. Approximately, the waste comprises of green waste (32.3%), inert materials like stone and glass (34.7%) and rest

are plastic and other biodegradable substances. Of these the plastic waste can be converted into ecopost while the green waste is converted into compost and the inert materials can be reused. Thus the clearance of Kannadapalayam landfill may solve the longtime query of the residents of Kannadapalayam village.

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