RESEARCH ARTICLE

SAMRIDDHI Volume 15, Issue 1, 2023 Print ISSN: 2229-7111 Online ISSN: 2454-5767

Designing of Integrated Solid Waste Management at City Amanganj Dist. Panna Madhya Pradesh, India

Aditya D. N. Garg[1], Devendra Dohare[2]

[1]M. tech in Environmental Engineering. SGISTS College, Indore, Madhya Pradesh, India.

[2]Shri G.S. Institute of Technology and Science, Indore, Madhya Pradesh, India.

Abstract

The growth of cities might evidently manage the essential water supply and wastewater treatment services. It maintains the population to accelerate on amount of municipal solid waste generation. The revenues of SWM have managed around 28% of total spending. The study has revealed that 4MT per day has been obtained from Amanganj District Panna, Madhya Pradesh. It has quantity and properties that measure the market with the product to meet with the vermicomposting method. The waste consists of decomposable organic matter through high carbon-nitrogen ratio by bio-composting. The study show has added on an efficient process with a stabilized way to manage and solve the problems arising on the adverse effects of household waste. This can improve the current solid waste management services offered by the Municipal government of Amanganj to explore the constraints with the issues arriving on a suitable solution. Therefore, the site suitability has carried out through governmental records with the SWM system. It has derived on the different thematic layers with solid waste dumping. A solid waste management system design with the waste segregation and treatment of disposal as well as capacity of engineered with the composting yard with the multiple chamber and layout of the facility.

Keywords: Solid waste management, Municipal Solid Waste, Amanganj, RDF process, Landfill, MSW dumpsite.

SAMRIDDHI : A Journal of Physical Sciences, Engineering and Technology (2023); DOI: 10.18090/samriddhi.v15i01.10

INTRODUCTION

Solid waste management added on the scarce space with the urban cities where the acceptance of the material has been added for a large portion of the city enterprises and other nearby bodies. The antagonistic impacts on the landfill with the fundamental way to meet with the expanded range of the municipal corporation requirements.

The essential target of the strong waste administration plan is to guarantee effective and financial assortment, taking care of, use and removal of strong squander with least adequate climate impacts. Since such an arrangement as to be researched on a more drawn-out time period work. It is regularly alluring to remember squanders course of action for the metropolitan improvement end-all strategy. While executing such an end-all strategy, we have numerous imperatives to defeat in view of the amount and various nature of the squanders and furthermore, because of rambling metropolitan regions, subsidizing restrictions for public administrations, effect of innovation and impediments in both energy and materials. The complete number of independent sources on metropolitan decline is enormous, bringing about assorted squanders as expressed in IS: 9622-2010. The accompanying constituents are found all over; however, the extent stays steady from one day to another for any source and distinction among sources might be impressive. The overall organization of civil decline contain dust, soot, vegetable, natural products, putrescible matter, materials, paper, metals, glass bones, burnable matters, for example, wood, and non-ignitable materials, stones and earthenware pieces. The regular creations of strong metropolitan waste are featured in the reliable.

Corresponding Author: Aditya D. N. Garg, M. tech in Environmental Engineering. SGISTS College, Indore, Madhya Pradesh, India, e-mail:

How to cite this article: Garg ADN, Dohare D. (2023). Designing of Integrated Solid Waste Management at City Amanganj Dist. Panna Madhya Pradesh, India. *SAMRIDDHI: A Journal of Physical Sciences, Engineering and Technology,* 15(1), 73-77.

Source of support: Nil

Conflict of interest: None

Procedure for municipal waste collection

Dump to Dump Collection

It has added on the deposition with the Garbage bags where private sweepers have added on the clean yet proper premises-based density practices with the community points. It is believed that the environmental way to nuisance way

minimized it through depositors. 4/Km length of the road could be reasonable with the actual site condition with the layout premises with the guiding factor.

Block to Block Collection

In this system with the pre-determined way to approach to which the regular route has added on the intervals with the street sweepers have been approached. This has also added on the standing lorry system. This has arrival way to locality with the ringing of bell or other convenient means.

Kerb Side Collection System

In this system with the premises with the road Kerb with the garbage van where the collection of the owner at their convenience way to be successful way. This has added on the no danger with the rag pickers and stray animals.

House to House Collection

It has added on the block-to-block collection with the garbage is not brough by the residents with the collection system through low rise dwellings.

Low Rise Dwelling

It has planned out to the collection of the practices with the curb side areas and alley to the services which has managed the set back to meet the Dockyards carry services, Alley service.

High Rise Building

Building with more than seven stories with the following areas: Waste are picked with the building of the various floors and taken to basement or service areas. It has also added on the wastes that are taken into the basement or service areas by tenants. It has usually represented with vertical chutes and openings.

METHODOLOGY

The research activity has been separated into the following steps in order to achieve the objectives. The existing scenario of solid waste management for Amanganj, as well as predictions of future trash generation, sample collection, waste segregation, and waste characterization, are all part of the study.

Market waste vermicomposting, Pit composting, and land fill design.

The primary collection was done by push carts and tricycles going door to door, and the containers placed on the streets were collected by autos, tipper lorries, and dumper placers. Community bins, which are containers put in shared collection points, are used for secondary waste collection.

The samples of municipal solid waste used in this study came from various sampling stations in Amanganj. The collection mechanism in Amanganj is depicted in Solid waste generation. The waste through Vermi Composting and Pit composting has to be carried out for the integration of the design of MSW.

Figure 1: Waste Generation with MSW

A sample of around 6 municipalities (Amanganj, Gunnor, Pawai, Simariya, Ajaygarh, Shahnagar) for Panna District has been collected. However, for amanganj Panna; the disposal of MSW and manage the construction and demolition of wastes.

RESULTS AND DISCUSSION

Use of either source storage or segregation for the characterization of the MSW collected. It has been determined that source storage is the first stage in Solid Waste Management is to store waste somewhere. On a daily basis, every family, shop, and establishment generate solid trash. Normally, trash should be held at the point of generation until it is collected for disposal. Containers or storage bins are the sorts of storage equipment now in use. The kind, size, and position of containers at the point of generation for trash storage until they are collected are all factors to consider when designing an efficient garbage collection system. Stationary and Hauled containers are the two types of containers that may be found on the market.

On the other hand, segregation is used for the physical and chemical characterization of MSW, a net quantity of 10 kg of sample was collected from each of the six sampling points, which included residential areas of Amanganj such as commercial areas. The Papers, plastics, wood, leather/rubber, rags, organic wastes, glass, metals, detritus, bones, and other elements were separated from the gathered samples. A rough balance was used to weigh the separated components. The cone and quadrant approach were used to generate a homogenous waste for moisture content testing. Initially, 10 kg of sample was hand shredded, properly mixed, and piled into a conical stack. Flattening the apex and dividing it into four quarters. The opposing quarters of one set were eliminated, while the other set was extensively mixed. This was divided into four quarters again, and the operation was continued until a sample of about 500gms was collected.

Similarly, the integrated approach to find out the exact waste dumping in the Amanganj is evaluated through Landfill design process.

With the study, composting is a natural micro-biological process where the breakdown of the organic fraction of the MSW controlled under different conditions. It has remark on the properly designed compost heap to reach at 70 degree Celsius for 6 to 10 days. It has been adding the ambient

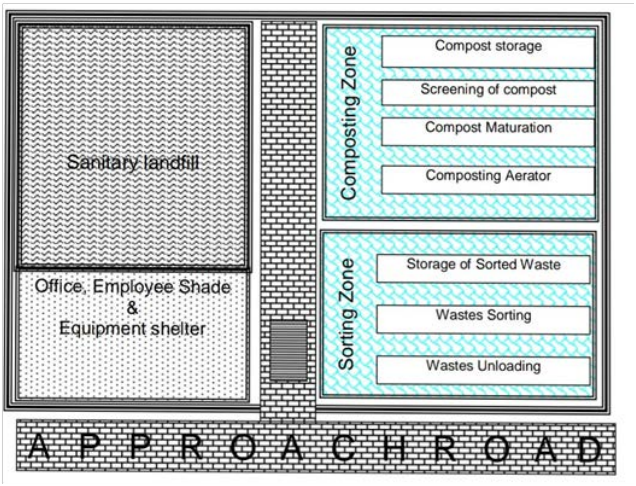

Figure 2: Landfill and Sanitary approach

temperature as a biological decomposition is completed. The composting takes place is added for 17 to 180 days.

Other than this, the bioreactor landfill has the objective of converting and stabilizing biodegradable organic components of waste within a reasonable timeframe. The stabilization for converting leachate emissions through environmental pollution.

Pit Composting process might bury the organic waste directly into soil. This is excellent way to annually plant on the waste with the root systems. The trenching has utilize on the underground band of nutrients rich humus for plants. It has been a slow, well-managed windrow with the retained way in more nitrogen during the process. The pit digs were in trench deep ways with wide long as a practical way to meet with the pile of the soil. The excavated soil through materials with the quite moist before burying them.

The final goal should be to choose a dumping site that provides the best protection for diverse environmental qualities. Before designating a location for garbage dumping, it is preferable to conduct a systematic survey of the area using a holistic approach.

The findings suggest that the quality of groundwater around the MSW dumping site has been impacted and is unfit for human consumption.

Domestic trash is said to be responsible for 80% of water contamination in developing countries like India (WHO). Consumers' water must be free of disease-causing microorganisms, poisonous compounds, and an excess of minerals and organic materials. MSW generation has increased significantly as a result of population growth, urbanization, and economic development.

Table 1: Waste generation at amanganj

Facility	*Waste generation*
Waste dump in Panna	29.75 tonnes per day
Compost and pit compost	0.20 MT
Nagar Parishad, Amanganj	4 MT/ day
Quantity of waste	14 MT/Day

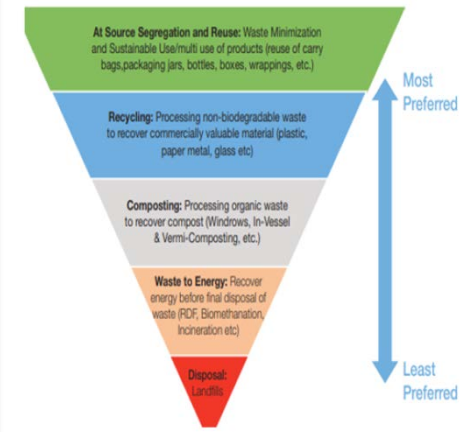

Figure 3: Process Rack for MSW

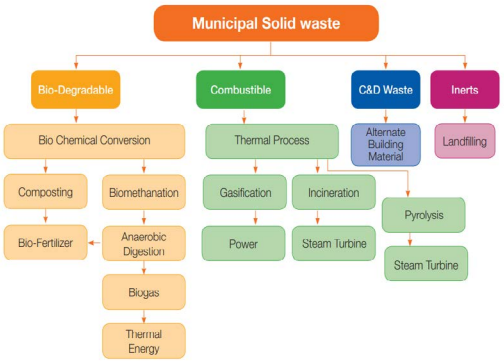

Figure 4: MSW Process

For analysis, groundwater sampling locations within a 1km radius of the dumpsite, leachate at the dumpsite, groundwater samples at the dumpsite and nearby (100ft away from the dumpsite), and soil samples at 4ft deep at the dumpsite were evaluated.

The study's findings demonstrate that the criteria are outside of the standard acceptable limits, indicating that the groundwater in and surrounding the dumpsite is contaminated. As a result, it is recommended that a suitable landfill site be identified for the waste management system.

The landfill sanitary approach focuses on waste sorting and recycling zone.

Two processes on the rack have involved the zones such as composting, maturation, employee shade and equipment shelter. Waste sorting area involves the wastes with unloading and operational measures to meet the objectives. In this integrated approach, it remark organic waste will be placed through screened with the better objectives.

The design of waste management facilities with the points to be taken into consideration through waste quantities generated, design period. The treatment plant for Amanganj has added on the existing waste for land reclamation to create space for it.

Solid waste has a mixture of the measurement through wet processing to around 1,24,000. The collected ways with 85 processing/ treated plants.

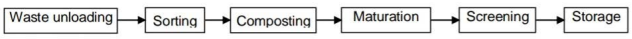

Figure 5: Design Flow of Composting

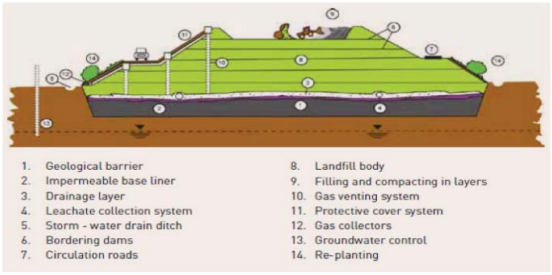

Figure 6: Mapping of Planning and Design of Landfill

Solid waste management have prevented the pollution problem caused by the purchase and sell of bags. It has managed the district administrations to carry out inspections with imposed penalties on violators along with seizers. The waste processors in the collection of fractions with the source of the generation intermediate material recovery.

The process for MSW has been classified with Bio-degradable, combustible, C&D waste and Inerts along with the alternate practices to meet the proper process.

Vermi-Composting and Pit-composting through Landfill design and integration on the approach with the earthworm. Composting has certainly included the waste unloading, sorting and composting as well as maturation and screening of the compost.

Vermicompost (or vermin-compost) is the product of the composting process using various species of worms, usually, red wigglers, white worms, and other earthworms, which feed in a mixture of decomposing vegetable or food waste, and release droppings called vermi cast (also called worm castings, worm humus or worm manure) is the end-product of the breakdown of organic matter by an earthworm.

Design Flow of Composting with the advantages and disadvantages of Solid waste management approach.

It has added on leachate management system, landfill gas management with the financial return of solid waste. It has achieved on selling by sellable and recyclable fertilizers and soil conditioners proposed with the designs that are integrated on the economic and beneficial way for Amanganj municipality.

On contrary, vermi-composting has set out some standards to meet the requirement. The waste is placed in vermi pits made from Granite Stone slabs or bricks and cement. The beds are 1 metre wide, 0.75 metre high and 10 metre long. Two beds are placed next to each other and in between each set of two beds there is a passage way of about 0.6 metre. The beds are covered.

Sanitary Landfill has four acceptable wastes in a biodegradable manner. The pre-treatment and preventive measures are added on the MSW landfill.

10-20% of waste is used for landfill. A liner system might provide preventive measures to prevent leachate passing on to the soil. It has set out the collection of the treatment

Table 2: Vermi-composting standards

Vermi-Composting Standards	*Availability*
Earth worms (Vermi-composting species)	50 Rs. per Kg
Processing Capacity	20 TPD
Location	Panna (M.P)

Table 3: Parameters for msw

S.No.	Place	Minimum siting distance
1	Coastal areas and flood plains	Sanitary not permitted
2	Rivers	150 M away
3	Ponds areas	250 M away
4	Non-meandering channels (Drainages)	32 M
5	Habitation	550 M around all landfill facilities
6	Highway or railway line supply	550 M from centre line
7	Earthquake zone	Faulty line structure at 500 m
8.	Flood prone area	Sanitary landfill not permitted
9.	Water table	Above 2 m from highest water table

facilities and making the base of the sanitary landfill with the optional landfill activities. The extracts and recovery can be attained with the final cover system. The surface water drainage system might remove the runoff of the sanitary landfill site. The closure and post-closure plan requires before surface water drainage system and later on an environmental monitoring system to meet the requirement of the samples with the sanitary landfill with the functional activities.

Helpful Hints

Planning and Design of Landfill

Steps involved in the sanitary landfill operations are as follows

- Site Selection
- Sanitary landfill design
- Construction of sanitary landfill
- Landfill operation
- Closure and Post-Closure plan

Conclusion

Solid wastes management systems have designed on the Amanganj municipality for Panna District under Chhatarpur Cluster. It has also formed the existing information and standard methods with the basis of the results and attaining the field investigation as follows:

Waste have been collected by gathering the house-to-house wastes collection system in the integrated approach.

Total waste generation is around 4 MT per day of the solid waste from 13,886 population through 15 wards and 2777 households

It has added organic waste in the biodegradable waste to around 68% for composting on the fertilizer

Total reusable waste to be around 24% to meet the sales directly after sorting

To attaint he inorganic yet qualified approach for the integration of the site. Total manpower and waste collection van would cover the waste management from the city with the produced way to composed way. The analysis have performed on the present study to lead on the conclusion for designing the solid waste management system developed with the Amanganj as a clean area through proper solid waste management.

Acknowledgment

I would like to express my heartfelt gratitude and sincere thanks to Professor. Devendra Dohare, Civil Engineering, for his valuable guidance, suggestions, views, continuous and constant support and encouragement. I have expressed my thanks to the Principal for the comments and suggestions during the meetings. I would like to express my thanks to the Engineers of Amanganj Municipal Corporation for providing necessary details throughout the period.

I am very much grateful to _____ Principal, ____ HOD, Department of Civil engineering of S.G.S.I.T.S. for extending the available facilities to carry out my research work with more affection and modelling studies.

I owe gratitude to my friends and families also for their co-operation and encouragement throughout my research work.

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