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A Review Paper on - Feasibility Check and Design of Vertical Dumping Yard, for Pune City

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***Abstract*:- The waste material generated from the homes hotels hospitals etc is known as solid waste. In the Pune city there is fast growth of population and urbanization, because of that the rate of generation of solid waste is increasing. The waste material or solid waste generated from city is dumped at various places which is away from the Pune city. The people surrounding of this places facing the problems like various types of pollutions causing diseases etc. As the increase in the rate of generation solid waste there is no more land available for disposal of solid waste. So the Pune Municipal Corporation facing the problems likes less land available for the dumping yard. Pune is developing city. Therefore the rapid development in the various areas also the population is increasing day by day in high rate. And so the land problem occurs in city. The huge amount of solid waste (1100 to 1200 tones) generated by people every day. Therefore there is need to store this solid waste by using vertical dumping yard. The dumping ground around the city is not sufficient for store the waste generated from the city. Therefore the provision of small dumping yard at various regions is the best solutions but due to less land of availability conventional horizontal dumping yard is not applicable. Because the required large area. The vertical dumping yard is best alternative to this project.**

KeyWords: Waste Generation, Waste Disposal, Dumping Yard, Landfill, Vertical Structure, Population Growth.etc

1. INTRODUCTION:

In recent years fast population growth, increase in urbanization, and industrialization in India has created severe problems for solid waste management in cities. The increased level of consumption characteristics of the population of cities leads to the generation of enormous quantities of solid waste material. The impacts of such pollution are felt both at local, also as, at distances from sources. Domestic and industrial discharges lead to contamination of air, neutron phonation with nutrient and toxic materials which in turn lead to degradation of air, land and affect flora and fauna badly. Since olden times municipal bodies remained liable for keeping the roads clean, collecting city garbage, and holding out its safe disposal. Most of the elected bodies of the Indian cities employ the largest Many number of employees to clean the city, but only 50–70% of the waste generated is collected by the staff keeping aside the tendency of nonworking of the employees. Estimates of solid waste generation are available but on the typical, it's projected that under Indian conditions the amount of waste generated per capita will raise at a rate of 1–1.33% annually. So, at present, if we follow this presumption the calculated per capita waste generation on daily basis is 350 to 750 g in 2021. At such a stage solid waste generation will have a significant impact in terms of land required for disposal of waste also as methane emission. Such a large quantity of solid waste requires a well-managed system of collection, transportation, and disposal. It is required that we've proper knowledge about the character of waste, its collection, and disposal alongside recycling and energy generation potential. The traditional routine approach to solid waste management Is normally municipal bodies handle all aspects of the collection, transport, and disposal and this has emerged as a reality of mixed success everywhere on the planet in advanced or developing cities. The look for a more efficient and economical solid waste collection agenda in most of the urban areas has taken shape adopting several directions towards better partnership with communities along with the private sector.

The generated solid waste is collected at the Urali Devachi dumping yard which is 20km away from Pune city. For collection of solid waste is done with different vehicles in which 160 trucks collect waste from door to door which has an average of 198 tons per day. Also, 563 containers and 116 compactor buckets were dispersed around Pune. There are different types of solid waste, the waste generated from construction and demolition of the structure is about 150-180 tons per day (TPD), garden waste generated is up to 50-60, the biomedical waste is collected through 7 vehicles from 400 collection points across the town. The biomedical waste generated up to 5-6 TPD. Plastic products have become an integral part of our daily life encouraging their production 70% of production is converted into waste. The plastic waste is generated up to 170-180 metric tons per day. As Pune is the fastest growing city, therefore there is the rapid development of Pune in other areas. Also, the population is increasing day by day at a high rate. And so the land problem has occurred in cities. A huge amount of solid waste is generated by people every day.

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Therefore the need to store this solid waste in minimum areas with high quantities. The horizontal dumping yard required maximum area to store this solid waste. Therefore the provision of vertical dumping yards at various regions is a good solution. But due to land problems in cities i.e, the unavailability of land the conventional horizontal dumping yard is not applicable because they required a large area. The vertical dumping yard is the best alternative to this project.[**1]**

1.1 Types of landfill:

A landfill site also referred to as a tip, dump, dump, dump, or dumping ground may be a site for the disposal of waste materials. A landfill is that the oldest and commonest sort of waste disposal, although the systematic burial of the waste with daily, intermediate, and final covers only began within the 1940s. In the past, refuse was simply left in piles or thrown into pits; in archaeology, this is known as a midden

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Municipal Solid Waste Landfills:

Municipal Solid Waste (MSW more commonly referred to as trash or garbage consists of everyday items we use then throw away, like product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint, and batteries

.(Source: - U.S Environmental Protection Agency)

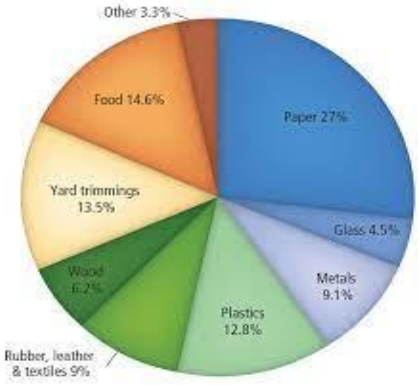

Fig: Municipal Solid Waste (Source:-U.S Environmental Protection Agency)

Industrial Waste Landfills:

Industrial waste is that the waste produced by industrial activity which incorporates any material that's rendered useless during a producing process like that of factories, mills, and mining operations. Types of industrial waste include dirt and gravel, masonry and concrete, rubbish, oil, solvents, chemicals, scrap lumber, even substance from restaurants.

(Source:-https://en.wikipedia.org/wiki/Main_Page)

Fig: Industrial Waste (Source:-Yicai Global)

Hazardous Waste Landfills:

Hazardous waste is waste that has substantial or potential threats to public health or the environment. Characteristic hazardous wastes are materials that are known or tested to exhibit one or more of the following hazardous traits:

- Ignitability
- Reactivity
- Corrosively
- Toxicity

Listed hazardous wastes are materials specifically listed by regulatory authorities as hazardous wastes which are from non-specific sources, specific sources, or discarded chemical products.

(Source:-https://en.wikipedia.org/wiki/Main_Page)

Fig: Hazardous Waste (Source:-Axil Integrated Services)

Hazardous wastes could also be found in several physical states like gaseous, liquids, or solids. Hazardous waste is a special type of waste because it cannot be disposed of by common means like other by-products of our everyday lives. Depending on the physical state of the waste, treatment and solidification processes could be required.

(Source:-https://en.wikipedia.org/wiki/Main_Page)

Green Waste Landfills:

Green waste also referred to as biological waste is any organic waste that will be composted. It is most typically composed of refuse from gardens like grass clippings or leaves, and domestic or industrial kitchen wastes. Green waste doesn't include things like dried

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leaves, pine straw, or hay. Such materials are rich in carbon and thought of as "brown wastes.

Fig: Green Waste Landfills (Source: - 4 Waste Removal)

While green wastes contain high concentrations of nitrogen. Green waste is often wont to increase the efficiency of the many composting operations and may be added to soil to sustain local nutrient cycling.

(Source:-https://en.wikipedia.org/wiki/Main_Page)

1.2 Problem Definition:

- In recent years, one of the primary and global environmental problems of landfill disposal.
- The problems are more acute in the urban areas, where rapidly growing populations generate increasingly larger quantities of solid waste that urban local bodies (ULBs) are unable to manage effectively.

1.3 Aims and Objectives:

To Study vertical dumping yard system for minimizing the area of landfill and pollution caused due to waste materials.

1.4 Objectives:

"The broad objective of the study is to examine various issues related to the disposal of waste material."

More specifically, the objectives are:

- To check the feasibility of vertical dumping yard.
- To design the vertical dumping yard.
- To provide a detailed estimate and cost comparison with conventional dumping yard.

2. LITERATURE REVIEW

Solid Waste Management on Dumping Ground in Mumbai Region – A Study (1)M.P.Joshi P.G. Student Datta Meghe College of Engineering, Airoli, Navi Mumbai-400708.(2) S.B.Patil Research Scholar Datta Meghe College of Engineering, Airoli, Navi Mumbai-400708.(3) K. Mourya U.G. Student Datta Meghe College of Engineering, Airoli, Navi Mumbai-400708:-

The paper presents an overview of research work to be done regarding the environmental issues, municipal solid waste environmental standards, development of landscaped landfills using organic waste, environmental assessment of landfill based on stakeholder, treatment of leachate from municipal solid waste landfill, the impact of a landfill fire on ambient air quality, etc.of landfill based on stakeholder, treatment of leachate from municipal solid waste landfill, the impact of a landfill fire on ambient air quality, etc.**[2]**

Shilpa P. Chowti, G.N. Kulkarni and Manjunatha, M.V. 2018. Impact of Dumping of Municipal Solid Waste on Households Near Dumping Yard in Karnataka, India. Int.J.Curr.Microbiol.App.Sci.7(08): -933. DOI: https://doi.org/10.20546/ijcmas.2018.708.105:-

We get primary data on health impacts of households was collected from 60 selected respondents residing near dumping and secondary data on the method of disposal of solid waste was collected from municipal corporations. Out of the entire solid waste generated in Hubballi-Dharwad(400 t/day), about 390 t of waste was dumped in two open dumping yards located in Hubballi and Dharwad while the remaining 10 t was processed through vermicomposting. In Bangalore, around 3,200 t of municipal solid waste per day was a landfill in three land filling sites. The major health problems noticed in respondents residing near the dumping yard were asthma, nose irritation, and respiratory problems in adults and just in the case of youngsters, frequent omitting, fever and malaria. In 18 households (60.00 %), the adults had health impacts like asthma, nose irritation, and respiratory problems, and the number of persons suffering from these health problems was 22 (47.83 %) in Hubballi-Dharwad. While in Bangalore, the number of adults and children affected by health problems was more compared to Hubballi-Dharwad. A total of 27 adults (51.92 %) from 21 households (70.00%) and 25 children (48.08 %) from 20 households (66.67%) had health problems.[**3]**

"A Literature Review on Solid Waste Management: Characteristics, Techniques, Environmental Impacts and Health Effects in Aligarh City", Uttar Pradesh, India"(1) Harit Priyadarshi1(&), Sarv Priya2, Ashish Jain1, and Shadab Khursheed3(2) Department of Civil Engineering, Mangalayatan University, Beswan, Aligarh 202145, Uttar Pradesh, India:

This paper emphasizes the waste Characteristics, techniques, adverse environmental impacts, Health risks, poor waste management practices, and also problems associated with the solid waste management system at the municipal level. The findings from this study indicate failure of the prevailing facilities thanks to lack of concern, high volume of waste generation, deficient collection space, delayed sanctioning of latest landfill sites and a number of open-dump sites which generate In recent years fast population growth, increase in urbanization and Industrialization in India has created severe problems for solid waste management in cities. The increased level of consumption characteristics of the population of cities

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leads to the generation of enormous quantities of solid waste material. The impacts of such pollution are felt both at local, as well as, at distances from sources. Domestic and industrial discharges lead to contamination of air, eutrophication with nutrients, and toxic materials which in turn lead to degradation of air, land and affect flora and fauna badly.

Environmental impacts of improper solid waste management in developing countries: a case study of Rawalpindi City(1) N. Ejaz, N. Akhtar, H. Nisar & U. Ali Naeem University of Engineering & Technology, Taxila, Pakistan:-

Solid waste damps are seriously spoiling the environmental conditions in developing countries. Negative environmental impacts from improper solid waste dumping can be easily observed everywhere in the developing world. In Pakistan, due to a lack of proper planning and funding, the solid waste management scenario is becoming worse day by day. To highlight the main causes of improper solid waste management in developing countries, Rawalpindi city is selected as a case study. This city is facing miserable solid waste management crises due to rapid industrialization, urbanization, and insufficient funding. Improper solid waste dumps are spreading different diseases in the study area. It is investigated during the research that due to rapid growth in population, increments in solid waste generation rate, management deficiencies, lack of legislative implementation and funding, the solid waste management systems of Rawalpindi are not working effectively. The major causes for the inefficient municipal solid waste management systems in Rawalpindi are the unintended invasion of the city, severe weather conditions, lack of social awareness/community involvement, improper resources including improper equipment, and lack of funds. An inefficient municipal solid waste management system may create serious negative environmental impacts like infectious diseases, land and water pollution, obstruction of drains, and loss of biodiversity.**[4]**

Solid Waste Management SWM. Mazzanti & Zoboli, 2008. Kathiravale & Mohd Yunus, 2008 . Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, 2009):-

The management of waste becomes complex and therefore the facilities provided cannot deal with the increasing demand and needs. Therefore, the best approach needs to be implemented immediately while considering environmental, social, and economic aspects (Aye &Widjaya, 2006). The drivers of sustainable waste management were clarified by Agamuthu et al. (2009), which include human, economic, institutional, and environmental aspects. The study suggests that each driving group should be considered in a local context as managing solid waste for a specific society may differ from the others.

Literature Review on Landfill Emission and Impact on the EnvironmentProf. A. B. Vawhale Assistant Professor, SYCET Aurangabad. avawhale@yahoo.in Mr. Asif Khan UG Student,SYCETAurangabad.asifkhan7661@gmail.com Mr. Rameez Hashmi UG Student, SYCETAurangabad. hashmisyedrameez@gmail.com Mr. Tushar Nabariya UGStudent,SYCETAurangabad.tushar.nabriya5@gmail.com:

The paper presents an overview of research work to be done regarding the environmental issues, municipal solid waste environmental standards, development of landscaped landfills using organic waste, environmental assessment of landfill based on stakeholder, treatment of leachate from municipal solid waste landfill, the impact of a landfill fire on ambient air quality, etc.**[5]**

Solid Waste Management on Dumping Ground in Mumbai Region – A StudyM.P.Joshi P.G. Student Datta Meghe College of Engineering, Airoli, Navi Mumbai-400708. S.B.Patil Research Scholar Datta Meghe College of Engineering, Airoli, Navi Mumbai-400708. K. Mourya U.G. Student Datta Meghe College of Engineering, Airoli, Navi Mumbai-400708.

From the reference of this paper we get the information regarding the management of waste generated daily. This waste includes solid waste from industrial zone, commercial zone, and residential zone. Among all these waste management from residential zone requires first priority because if this waste is not properly disposed of daily, then it will create problems for public health, affects aesthetics. This paper gives the present status of solid waste management on dumping ground in the Mumbai region and also suggests some methods to control the same. Urgent steps in this direction will reduce the water, air, soil pollutions, and health hazards.[2]

Landfill Emissions and Their Impact on the Environment Purnima Mishra1, Nandani Singh1, Chandan Shrama2, Ashish Kumar Pathak3 1 UG Student, Dept. of Civil Engineering, NSIT Bihta, Patna (India) 2Assistant Professor, Dept. of Civil Engineering, NSIT Bihta, Patna (India) 3 Project Engineer, Ujjain Engicon India Private limited Ltd, Patna (India):

On the basis of the above discussion, landfill offers a great solution for waste that can be composted and not eligible for recycling. Landfill remains a dominant method of municipal waste management. Landfill continues to be one of the main methods of waste disposal despite their relatively high potential to pollute the environment. Therefore regular landfill maintenance is required to identify and define landfill hazards for the environment. This research shows the necessity of identifying knowledge gaps and establishing bases for developing a more holistic framework of landfill risk analysis. It is evident that even if high levels of waste avoidance reuse and recycling are achieved. Some waste materials are always needed to be forwarded for disposal. Therefore the concept of

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sustainable landfill should be implemented. A truly sustainable landfill is one in which the waste materials are safely assimilated into the surrounding environment.**[6]**

R. M. A. Sallam, "Landfill emissions and their impact on the environment," *Int. J. Chem. Stud.*, vol. 8, no. 2, pp. 1567–1574, 2020, doi: 10.22271/chemi.2020.v8.i2x.8985: -

The objective of this study were to update information on Open waste storage sites and other unhygienic street bins should not be allowed.. The placement of waste receptacles should be correct.. Door-to-door collection of waste must be made mandatory that will allow a minimum of waste on roads and streets.. Land filling must be done properly after consideration of all the aspects of the present and future of the city and its health. Alternative and better options for proper waste disposal methods must be adopted regularly based on the needs and situation of the area,. There must be a total ban on stray animals who wander on the roads which include cows, bulls, dogs, goats, etc. and these animals must be regularly trapped without any political or community influence.. egregation of household waste at the source would reduce the burden of solid waste significantly while at the same time improving the supply of composite serving the nutrient-poor farmer near Delhi.. Proper maintenance of vehicles and other equipment.. Government should adopt the 4R's (Reduce, Reuse, Recycle, and Resource Recovery) principle. Government should increase the number of composting and energy generation plant.**[7]**

Neha Gupta, Krishna Kumar Yadav, Vinit Kumar Institute of Environment and Development Studies, Bundelkhand University, Jhansi 284128, India. E-mail: nhgupta83@gmail.com:

In this paper, an attempt has been made to study the changing trends of quantity and characteristics of MSW. The changing pattern of waste composition emphasizes the importance of segregation for successful operation of waste management facilities. Municipal authorities should maintain the storage facilities in such a manner that they do not create unhygienic and unsanitary conditions. A new survey should be carried out on the generation and characterization of MSW in India. Since the MSW is heterogeneous in nature, a large number of samples have to be collected and analyzed to obtain statistically reliable results. Municipal solid waste management is a major environmental issue in India. Due to rapid increase in urbanization, industrialization and population, the generation rate of municipal solid waste in Indian cities and towns is also increased. Mismanagement of municipal solid waste can cause adverse environmental impacts, public health risk and other socio-economic problem. This paper presents an overview of current status of solid waste management in India which can help the competent authorities responsible for municipal solid waste management and researchers to prepare more efficient plans.**[1]**

3. METHODOLOGY:

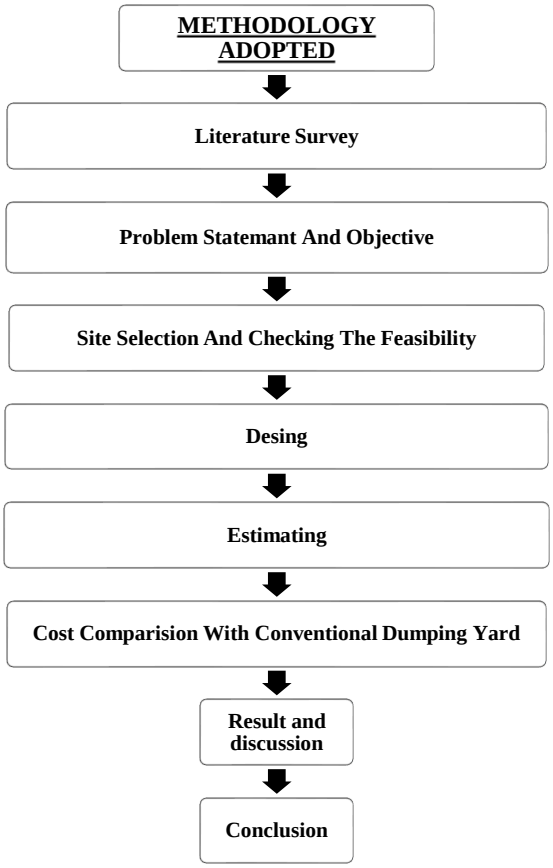

Fig: Methodology chart

4. CONCLUSIONS

During the course of project study, following conclusion were derived**: -**

- Area required for horizontal dumping yard is large comparatively vertical dumping yard therefore land cost required for the dumping yard is also more.
- In city area the land cost is much high and increasing day by day. So to solve this problem vertical dumping yard is perfect.
- It is beneficial in the area where the less land is available for dumping yard in city.
- Where solid waste directly disposed into vertical dumping yard.

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