Research on Resource Utilization of Municipal Solid Waste Landfill

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Abstract. Due to the advantages of simple landfill treatment process and low treatment cost, it is widely used at home and abroad. At present, many large cities are surrounded by landfills, which severely hinders urban development. This article starts from the existing problems of municipal waste landfills and discusses the realization of municipal waste landfill disposal and resource utilization.

1. Introduction
In recent years, with the acceleration of urbanization and the improvement of people’s living standards, the amount of garbage generated by people has become larger and larger, while the storage capacity of landfills has become smaller and smaller. Some landfills produce odor, Leachate has caused safety hazards to the human settlement environment, and it also occupies a large amount of high-value land at the junction of urban and rural areas [1]. After a period of decay and fermentation, the physical and chemical properties of landfill waste have changed, and most of them can be recycled. Therefore, how to safely dispose of some landfills and use the materials in the landfill to free up landfills. The large area of land occupied by the buried site is of great significance.

2. Conditions for landfill waste disposal and resource utilization

2.1. Problems in landfill waste
Landfill waste will produce a large amount of leachate in the process of degradation and transformation. This leachate is likely to form surface runoff during the rainy season and pollute the surrounding surface water. It will also cause potential pollution to the groundwater environment, especially for non-seepage prevention measures. Regular landfills will pollute groundwater under the action of infiltration, which in turn will cause regional soil pollution, and regular landfills will face the same threat as the seepage prevention measures are damaged [2].

Landfill waste will produce biogas during the anaerobic fermentation process, and the accumulation of this biogas over time also poses certain safety risks. In addition, the process of garbage degradation will also produce foul smell, which affects people's living environment and health. In addition to environmental issues, landfills also occupy a large amount of land. Especially with the development of cities, a large number of landfills have been surrounded by cities, which restricts the high-quality development of areas adjacent to the landfill.
2.2. Composition of landfill waste
The landfill waste studied in this article refers to domestic waste. The main components of domestic waste include kitchen waste, plastic, waste paper, waste metal, textiles, waste glass, bricks and tiles, firewood and lime soil. Among them, food waste is the main category, accounting for about 60%, followed by plastic and paper, accounting for 20% and 10% respectively, and other substances account for a relatively small proportion. These kitchen wastes, textiles, etc. often corrode and degrade for a long time and gradually undergo mineralization and decomposition. The material composition is similar to humus [3], and the hard-to-degrade parts such as plastics and metals can be recycled, such as plastic granulation, Metal recycling, etc.

3. Technical methods for landfill waste disposal and resource utilization
Landfill waste recycling can be divided into the following parts: landfill waste stabilization and leachate drainage; excavation and screening of waste piles; recycling of various components of waste; inspection, acceptance and leveling of the site; Shed construction and mechanical sorting and drying site construction; garbage mechanical sorting equipment installation, debugging, leachate and odor control facilities and other work content.

3.1. Landfill stability index
Based on the research of Wang et al. and Wan [4, 5], an indicator system for the degree of stabilization of urban waste landfills was formulated.

| Index                              | Completely stable | Relatively stable  | Basically stable  | Unstable                      |
|------------------------------------|-------------------|--------------------|-------------------|-------------------------------|
| Exterior                           | Dark brown, odorless, loose structure | Dark brown, slight smell, loose structure, some agglomerates | Brown, smelly, loose structure part and agglomerated | Light brown, with obvious odor, large particles, and obvious agglomeration |
| Garbage pile age                   | >10               | 5-10               | 3-5               | <3                            |
| COD of leachate (mg/L)             | <100              | 100-300            | 300-1000          | >1000                         |
| TKN of leachate (mg/L)             | <15               | 15-30              | 30-100            | >100                          |
| Degradable organic substance BDM (%)| <2                | 2-7                | 7-12              | >12                           |
| Soil organic matter content (%)    | <12               | 12-15              | 15-25             | >25                           |

3.2. Recycling of obsolete garbage

![Figure 1. Process flow chart of landfill waste screening and recycling](image_url)
3.2.1. **Stale garbage screening.** The components of the stabilized stale garbage can be basically divided into three categories, one is combustible materials, mainly cloth strips, plastics, wood blocks, etc. The first category is recyclable materials, mainly rubber, iron and other metal objects. The first category is non-combustible substances, mainly bricks, glass, and fine-grained soil solids. Depending on the recycling process, some plastics can also be classified as recyclable materials.

3.2.2. **Landfill site levelling.** If the landfill site is to continue to be used as a fresh waste resource utilization site, the site must be backfilled to the elevation of the utilization site. The large particles of heavy objects or small particles of muck and humus soil after screening of obsolete garbage in the landfill can be used as backfill materials to be backfilled and compacted and leveled. It not only saves the cost of purchased soil, but also effectively recycles incombustible materials.

**4. Conclusion**

Garbage is a resource that is misplaced, and landfills not only occupy a lot of land, waste recyclable resources, but also pose a risk of environmental pollution. Using scientific methods to dispose and recycle landfill waste can eliminate environmental risks, ensure the safety of human settlements, and restore the development and use value of land. The secondary mining and resource utilization of closed or abandoned waste landfills is a solution to the siege of existing waste. It is an effective way to solve the problem of difficulty in site selection for new landfills, and the resource utilization of landfills can alleviate the scarcity of land resources to a certain extent, and bring huge economic and social benefits.

**References**

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