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Abstract. The problem of solid waste management is acute for modern society. The article studied the existing landfill for municipal solid waste in the city of Uralsk. The city is growing every year, and the amount of solid household waste is increasing accordingly. Municipal solid waste is usually generated from various sources associated with various human activities. As a rule, in the main, they come from households, markets or commercial organizations. Another of the problems of household waste is the heterogeneity of garbage in nature, which creates a certain difficulty in sorting and using it as a material. Local authorities are trying to solve the problem with a number of measures. For this, a waste sorting shop has been launched on the territory of the landfill, which unloads the landfill a little. It is also planned to create a new landfill, but this is only under consideration. Therefore, the problem of disposal of municipal solid waste remains relevant today. Thus, in our studies, alternative solutions for the disposal of municipal solid waste using recycling were proposed.

1. Introduction

The problems of collecting, extracting and processing municipal solid waste consume a huge amount of resources and are a real threat to the environment. The waste management system consists of many activities, which include different methods of municipal solid waste management. Therefore, the correct organization of waste collection can save significant funds and reduce the negative impact on the environment.

Before placing municipal solid waste in specially constructed landfills for storage, they must be sorted and separated. Sorting and fractionating waste is one of the important and traditional methods in solid waste management for any potential use. It also allows to reduce the volume of imported material, removes water for some time, which helps to stabilize the state of the waste, since the moisture contained in the compressed material is not enough for the active activity of microorganisms. The access of oxygen to the dense mass is also difficult, and if conditions are created for the "inflow" of moisture from the outside, the stabilization of the landfill can be significantly extended. Of course, hazardous waste must be sorted and buried in a special landfill for toxic waste.

Waste production per person is estimated at 1.5 to 1.8 kg per day per person. About 75% of the population is concentrated in urban areas, so it is necessary that the government take steps to accelerate the implementation of the recycling and waste management program in the country [1]. Unscientific monitoring and disposal of MSW is the cause of numerous complications associated with environmental pollution and problems of public health and well-being [2]. For the professional and efficient management of MSW for improved and safe lifestyles and sustainable development, it is important that the characteristics and proper collection and storage schemes, waste transportation systems and final disposal are defined [3]. Several researchers have identified factors affecting the

components of a waste management system [4]. The amount of waste generated is determined by the size of the household, their level of education, and their monthly income [5]. Most of the world's plastics are made up of carbon-carbon based polymers, whose environmental persistence and low cost have resulted in a huge reservoir of plastic waste that is found in landfills and in the environment [6-9]. Due to anthropogenic climate change and the environmental impacts of global plastic pollution, the need to realize scale economies of materials based on biological materials is critical [10-13].

Currently, waste disposal is one of the necessary processes to reduce the volume of municipal solid waste, this is especially true for urban areas due to the process of urbanization. Along with waste processing, there is a need to return waste to the processes of technogenesis. One of such elements of waste disposal is recycling. Waste recycling is carried out by reusing waste for the same purpose or returning waste after appropriate safe processing to the production cycle.

2. Materials and methods

Objects. Analyzes of the study of garbage containers in the city of Uralsk were carried out to determine the morphological composition of MSW and the rate of waste generation. For this, the following objects were selected:

- 7 microdistrict 30 house - the modern part of the city.
- St. Asana Taimanova - the old part of the city.
- St. Brusilovsky - the outskirts of the city, the private sector.

Methods. The container capacity, occupancy and transportation of garbage to the container were studied. ST RK 1231-2004 “Mobile garbage containers. General technical conditions".

3. Results

An important indicator of the physical properties of MSW is density. The density of MSW in the well-maintained housing stock in the spring-summer season (in containers) is 0.18 - 0.22 t/m^3, in the autumn-winter season - 0.20 - 0.25 t/m^3. It is also important to correctly place garbage containers in a residential part of the city and take into account the capacity of the containers.

To this end, we examined the garbage containers, made a separate collection of garbage. This resulted in the following data presented in table 1 [14].

Table 1. The rate of formation and composition of MSW in Uralsk.

Name	Formation rate, kg/day	Average density, t/m^2	Quantity	
			%	t/year
Paper, cardboard	4.7	0.06-0.09	35	40700
Food waste	3.1	0.31-0.5	28	26400
Tree, branches, wooden packaging	0.6	0.17-0.19	6.9	5390
Metals	0.5	0.18-0.39	2.4	4830
Leather, rubber	0.2	0.18-0.23	1.5	1650
Textile	0.7	0.17-0.22	5.5	6050
glass break	0.7	0.37-0.52	6.5	6050
Polymer materials	0.7	0.01-0.1	5.3	5830

There are no plastic products in the composition of MSW, as special metal containers have been installed to collect this waste. The largest percentage of MSW is paper and food waste.

In the course of the study, we analyzed the morphological composition and the rate of waste generation depending on residential areas.

Every year the city grows, the population increases, new large microdistricts with high multi-storey comfortable houses appear, the city's infrastructure changes, new administrative centers with modern

buildings appear. Therefore, in our studies, we tried to cover microdistricts of the city with different infrastructure.

Object 1 - 7 microdistrict is considered a new part of the city, located in the northern part of the city, with modern infrastructure, there are entertainment and shopping centers, restaurant complexes. Garbage containers are four-wheeled, meet the established standards, are placed in specially designated places, garbage is taken out every day. Garbage containers are available in the yard complex, a separate capacious iron mesh is installed for collecting PET bottles, four-wheeled, metal containers for solid waste, a volume of 0.75 cubic meters (figure 1).

Figure 1. Garbage containers in the 7th microdistrict, no. 30, Uralsk.

Object 2 - Asana Taimanov Street is located in the central part of the city, this microdistrict is considered the old part of the city. There are mainly five-story comfortable houses here, there are also private sectors, there are large grocery stores, but there are no large restaurant complexes (figure 2). Waste is taken out every other day by special garbage trucks, the fullness of garbage in containers is maximum, especially on holidays and weekends.

Object 3 - Brusilovsky Street, located in the eastern part of the city, on the outskirts, is characterized by a private sector area, since this part of the city is a new building, therefore there is an insufficient number of garbage containers, garbage collection is irregular, so there is a possibility of spontaneous dumps (figure 3).

Household or consumer waste is usually generated from various sources associated with various human activities, in most cases it is the household, then markets and commercial structures. As a rule, solid wastes are heterogeneous in nature and have different physical and chemical characteristics depending on their original sources.

The following diagrams show how the city's infrastructure affects the morphological composition and rate of waste generation.

Microdistrict 7 has modern buildings, entertainment and shopping centers, nine-story, and above, comfortable houses. The amount and composition of waste is directly dependent on the residential complex of urban infrastructure and averages in this microdistrict the following content: food waste 31%, paper, cardboard 28%, textiles 9%, other types of waste have an insignificant content (figure 4).

Figure 2. Garbage containers on Asana Taimanov street, Uralsk.

Figure 3. Garbage containers on Brusilovsky street, Uralsk.

At the investigated object 2, the largest percentage is paper, cardboard 31%, food waste 30%, textiles 7%. This object under study is located in the central part, there are five-story residential buildings, the presence of the main administrative buildings (figure 5).

On Brusilovsky Street, the morphological composition of waste is paper, cardboard 42%, food waste 19%, wood, branches 14%, broken glass 6%, other waste that is not applicable for sorting 11% (figure 6). Since the facility is located in the private sector, there are an often additional residential building, which affects the morphological composition of the waste.

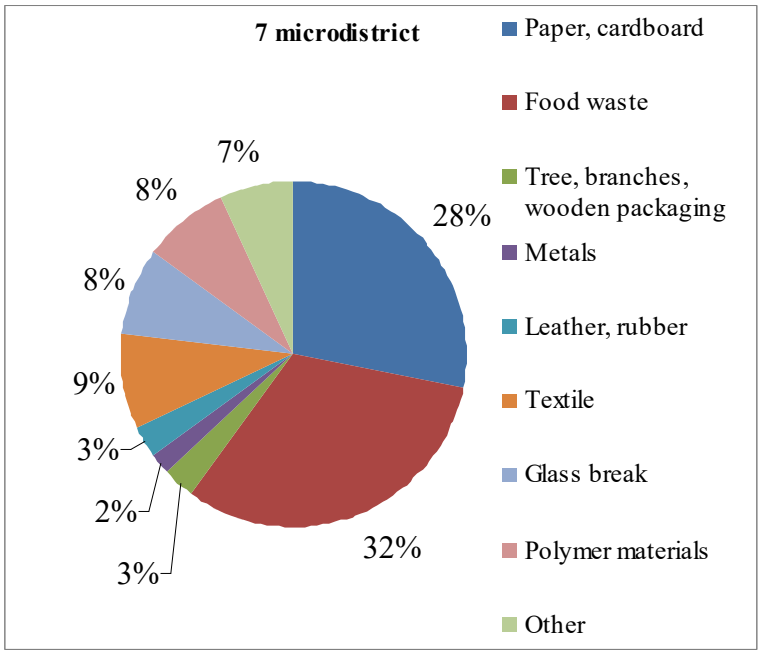

Figure 4. Morphological composition of waste at 1 object of study.

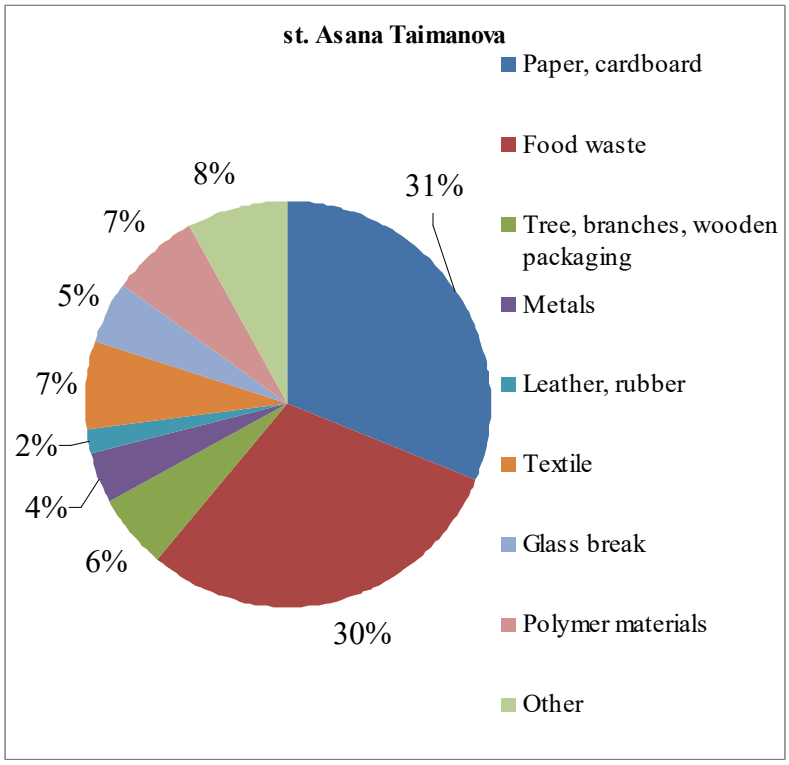

Figure 5. Morphological composition of waste at the 2 object of study.

At all research sites, a common problem is the heterogeneity of the generated solid waste. Plastic bottles are collected separately, but in everyday life waste are taken out in plastic garbage bags, which creates inconvenience when sorting at landfills and generates garbage in the form of polymeric

materials, their weight and percentage are small, but they bring a very large negative impact on the environment harm.

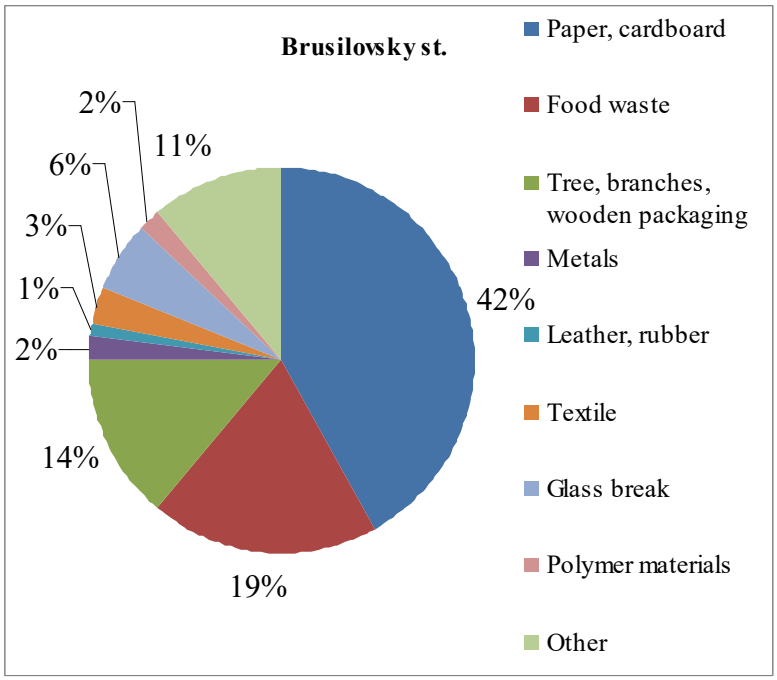

Figure 6. Morphological composition of waste at the 3rd object of study.

4. Discussion

Recycling is one of the best ways to solve the problem with waste, but its implementation is complicated in our country by the lack of separate waste collection. The collection methods, collection system and transportation into containers are of great importance for the characterization of waste.

On the territory of the Uralsk landfill there is a waste sorting shop, which is in private hands. Although this is a small, but noticeable unloading for the landfill, since the shop receives about 60 cars per day. But there are restrictions on the entry of cars here, the cars must comply with the European standard, otherwise, the car without stopping at the workshop immediately passes to the landfill without dismantling the solid waste.

Quite a few components of MSW can be recycled and processed into useful products. Glassware is categorized as garbage and a growing body of research on the subject confirms its impact on environmental quality. Therefore, it is a complex problem, especially in urban areas [15]. It is forbidden to import glass containers to the landfill, but broken glass still ends up in the landfill and causes great harm. For bottled glass products, glass containers for recycling are opened around the city. There are enterprises for laundering and reusing glassware. Poor quality glass cullet after grinding is used as a filler for building materials (eg glass wool).

A significant part of the waste, getting to the landfill, is converted into recyclable materials with a lower cost. In the city of Uralsk, there are private entrepreneurs who collect waste paper and polymers, such as IP Kuksova, Usenova, Glukhova, Borisova, VTS Uralsk, who process paper into toilet paper and other materials. But here the problem is that paper and cardboard, which, when transported to the landfill, lose their production qualities and cannot always be used as raw materials. Recycling is also used by large construction companies in the region, such as BGS-Aksai LLP, Altair LLP, Areal LLP, Zhaikselstroy LLP, use construction waste instead of clean soil to backfill slopes and irregularities at construction sites. Such large production enterprises as LLP "Kubley", LLP "POSH RUNO" process the skins of cattle, small cattle. But for these enterprises, high-quality raw materials are important. Therefore, it is very important to encourage citizens to collect waste in separate containers, without

bringing it to the landfill. This is necessary to simplify its further processing and use in recycling, and it will also help solve environmental problems associated with the decomposition of waste. Currently, many public organizations offer to use containers of different colors for sorting waste leaving the household, without bringing it to the landfill, with its removal to the places of their disposal. These methods would make it possible to preserve the quality of the waste and its suitability for recycling.

5. Conclusion

1. Thus, we believe that it is necessary to promote the separate collection of garbage. We don't have any signs or billboards anywhere that you can't throw, for example, batteries or mercury lamps into the general trash. Although it is very dangerous.

2. We also concluded that it is necessary to provide state support to private entrepreneurs in the recycling of solid waste. Recycling of MSW will help to solve many problems in the field of ecology.

3. The results of the study showed that the amount and characteristics of waste varied from region to region within the city of Uralsk, including the usage habits of people. Different regions of the city can and should use their own methods of MSW disposal. This is due to the type of development, the level of income of the population, and other socio-economic factors.

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