



## **Domestic Solid Waste Planning Standards**

**Iroda Ruzieva**

Head of the Waste Processing and Disposal Laboratory of the Research Institute of Environment and Nature Conservation Technologies

### **ABSTRACT**

*This study presents the results of the experimental research on the standards of household waste collection generated in Tashkent and transported out of the city.*

**Keywords:** household waste, accumulation standards, size, density, residential facilities, non-residential facilities.

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### **Introduction**

In order to ensure the implementation of the decision of the President of the Republic of Uzbekistan dated April 17, 2019 "On approval of the strategy for the implementation of work related to solid household waste in the Republic of Uzbekistan in the period of 2019-2028" No. The project "Experimental research and timing work on determining the standards of solid household waste collected and actually removed in the territories of the Republic of Uzbekistan" was implemented by Research Institute for Environment and Nature Protection Technologies.

Man changes nature and uses it to meet his daily life needs. Every year, as a result of the rapid growth of the population, the expansion of consumption and types of consumer products, the issue of solid household waste management (hereafter referred to as solid waste) is becoming increasingly important.

At the same time, many organizations, foundations, state bodies and educational institutions are dealing with this issue. In almost all countries of the world, GDP per capita is increasing by 10% every 10 years. Currently, more than 800 types of waste have been identified, and it is possible to predict that their number will increase further in the future. At the same time, as their types increase, their weight and volume increase, while their volume increases, their density decreases (due to the increase of light materials such as packaging, packaging materials, rubber, paper, plastic). The increase in the number of trade networks (supermarkets, hypermarkets, etc.) simultaneously with the growth of GDP per capita leads to an increase in the purchasing power for packaged products, which will ultimately be generated. Urbanization also affects the generation of waste, and the population of urban areas produces more waste than the population of rural areas. Inadequate provision of solid household waste collection and removal services in rural settlements, non-compliance of existing solid household waste landfills with sanitary requirements and environmental standards requires the adoption of complex measures in this area.

Our main task is to prevent the disappearance of valuable substances and materials in the (SHW), to prevent environmental pollution with toxic industrial and medical waste, to collect solid household waste in time, to determine the need for equipment for transportation, and to solve the problems of processing and decontamination.

In any city, the main factor in the implementation of work related to (SHW), is the collection norms of solid household waste. It will be possible to properly plan waste collection, transportation, disposal, procedures only when we have reliable information about the norms of accumulation of household solid waste collected in cities.

Solid household waste (SHW) is the life of individuals and organic and inorganic wastes produced as a result of activities and activities of legal entities, as well as on their territory and waste produced as a result of natural processes in landscaping objects (food and plant waste, textile, wrapping (packaging) materials, glass, rubber, paper, plastic, wood waste, household items that have lost their useful properties, garbage, as well as waste produced as a result of the use of solid fuel household stoves and heating pipes, etc.);

accumulation standards - the amount or volume of production per unit of time (day, year) for the accounting unit (person - for the housing stock, place - in the hotel, 1 m<sup>2</sup> area - store, warehouse, etc.).

If (SHW) collected in cities is not removed in time and correctly, and if it is not neutralized, it can seriously pollute the natural environment. High air temperature leads to rapid decomposition of organic matter, rapid development of microflora and microorganisms. All these require shortening of solid waste storage time. In some regional and district centers, there are cases of dumping of household solid waste in unauthorized places. In addition, there are cases of waste organizations accumulating in some unusual places (polyclinics, hospitals, sanatoriums, sanatoriums, other treatment-prophylactic institutions, etc.).

The experimental research and chronometry work carried out in Tashkent was determined by directly measuring and photographing the weight and volume of solid household waste for 7 consecutive days, and conducting chronometry studies on the seasons of the year.

Proper planning of waste collection, transportation, and disposal procedures will be possible only when solid household waste has reliable information about the norms of accumulation of solid household waste accumulated in cities.

Accumulation criteria for the following factors;

The level of availability of centralized services of the accommodation fund depends on the type and level of gas supply, water supply, sewage and heating systems (centralized, stove, local).

Climatic conditions are also important in terms of accumulation of solid household waste - different duration of the heating period (from 150 days in the south to 300 days in the north), consumption of vegetables and fruits by the population, etc. The norms of solid waste collection for big cities are slightly higher than those of small cities.

Solid household waste comes from two different sources:

1. Types of housing (apartment houses and single-family houses)
2. Types of non-residential facilities (public catering establishments, schools, kindergartens, hotels, etc.).

## **MATERIAL AND METHODS**

This study was carried out in accordance with the methodological recommendations for determining the norms of accumulation of solid household waste in the territory of the Republic of Uzbekistan, approved by the Ministry of Natural Resources.

The norms of accumulation of solid domestic waste were carried out and determined by conducting timed experimental research method studies on the seasons of the year.

The chronometer experimental research method allows determining the norms of solid household waste accumulation by directly measuring and photographing the mass and volume of solid household waste for 7 continuous days.

Acceptable periods for determining the rates of accumulation of solid household waste:

In winter - December, January;

In spring - March, April;

In summer - June, July;

Autumn season - September, October.

Experiments have shown that solid household waste increases by 0.3, 0.5% per year by weight, and by volume by 0.6, 1.2% per year.

Foreign and local practice shows that the collection of household waste is determined based on local conditions, the main of which are:

- building density and number of floors;
- level of prosperity of households;
- type of special vehicles used.

When determining the specific norms of solid household waste, it is necessary to divide the housing stock into two: Centralized and decentralized.

In order to determine the norms of accumulation of solid household waste generated from the population (housing fund) according to the population:

- For settlements up to 300,000 people - 2% of the population for each type of housing stock;
- For settlements with 300,000 to 500,000 people - 1% of the population for each type of housing fund;
- For settlements with more than 500,000 inhabitants - areas covering 0.5% of the population for each type of housing fund are determined.

In order to determine the norms of accumulation of solid household waste generated in non-residential places (organizations), research objects were selected based on the accounting unit (2-3 for each accounting unit), taking into account the specific characteristics of these settlements.

Measurements were carried out at the same time of the day (continuously) for 7 days until the solid waste was removed from the container site according to the service schedule. When determining the norms of accumulation of solid household waste, waste should not be compacted.

## RESULTS AND DISCUSSION

The norms of accumulation of solid household waste in the housing fund were determined separately for multi-apartment dwellings and single-family dwellings.

**Table 1** below shows the results of experimental research on determining the norms of accumulation of solid household waste in Tashkent.

Table 1: Average annual results of experimental research and timing work on determining the norms of accumulation of solid household waste in the regions of Tashkent city							
№	Solid waste collection facilities	Account unit	Standards of generation of solid household waste				Density, kg/m <sup>3</sup>
			Annual average		Average daily		kg/ m <sup>3</sup>
			kg	m <sup>3</sup>	kg	m <sup>3</sup>	
1	2	3	4	5	6	7	8
<b>Housing fund object</b>							
1	Housing stock (apartment houses and single-family houses)	inhabitant	328,5	1,6	<b>0,900</b>	0,0044	205
<b>Non-residential facilities</b>							
2	Cottage plot	1 plot	<b>372,3</b>	1,8	<b>1,02</b>	0,0050	205,1
3	Administrative and other institutions (organizations, offices, agencies, banks, etc.)	1 employee	<b>73</b>	0,6	<b>0,2</b>	0,0016	122,2
4	Hotels, dormitories, resorts, etc.	1 rating	<b>187</b>	0,8	<b>0,512</b>	0,0022	235,6
5	Boarding schools, orphanages, nursing homes, etc.	1 rating	<b>317</b>	1,5	<b>0,870</b>	0,0041	210,0
6	Catering establishments (cafes, restaurants, kitchens, bars, etc.)	1 rating	<b>241</b>	0,84	<b>0,66</b>	0,0023	286,6
7	Kindergartens, nurseries, etc.	1 rating	<b>121</b>	0,34	<b>0,33</b>	0,0009	356,0
8	Schools, colleges, higher education institutions and other educational institutions.	1 student	<b>22</b>	0,12	<b>0,06</b>	0,0003	176,4
9	Polyclinics	1 visitor	<b>29</b>	0,2	<b>0,08</b>	0,0005	144,4
10	Hospitals, sanatoriums, sanatoriums, other treatment and prevention institutions, etc.	1 bed place	<b>376</b>	1,67	<b>1,03</b>	0,0045	225
11	Theaters, cinemas, concert halls, libraries, clubs, arcades, etc.	1 rating	<b>44</b>	0,22	<b>0,12</b>	0,0006	192,5
12	Hairdressers, beauty salons, etc.	1 rating	<b>131</b>	-	<b>0,36</b>	-	-
13	Stadiums, sports arenas, sports grounds, etc.	1 place on the project	<b>11</b>	0,04	<b>0,03</b>	0,00012	255,0
14	Markets, supermarkets, hypermarkets, grocery stores, industrial goods stores, fairs, household goods stores, trade pavilions, kiosks, stalls, etc.	1 m <sup>2</sup> of commercial space	<b>29</b>	0,13	<b>0,08</b>	0,0003	223,0
15	Pharmacies	1 m <sup>2</sup> of commercial space	<b>13</b>	0,1	<b>0,035</b>	0,0003	110,0
16	Car, retail desk, etc. places of sale	1 trading post	<b>3942</b>	20,4	<b>10,8</b>	0,056	193,2
17	Museums, exhibitions, etc.	1 m <sup>2</sup> total area	<b>1,5</b>	0,011	<b>0,004</b>	0,00003	132,0
18	Sports, dance, arcades, etc.	1 m <sup>2</sup> total area	<b>5,5</b>	0,02	<b>0,015</b>	0,00005	294,0
19	Wholesale bases, food warehouses, etc.	1 m <sup>2</sup> total area	<b>1,8</b>	0,008	<b>0,005</b>	0,00002	223
20	Wholesale bases, warehouses of industrial goods, etc.	1 m <sup>2</sup> total area	<b>2,20</b>	0,016	<b>0,006</b>	0,00004	134,3
21	Train stations, bus stations, airports, etc.	1 m <sup>2</sup> total area	<b>0,73</b>	0,007	<b>0,002</b>	0,00002	107,5
22	Beaches	1 m <sup>2</sup> total area	<b>1,5</b>	0,015	<b>0,004</b>	0,00004	100,4
23	Providing service to residents of household service houses	1 m <sup>2</sup> total area	<b>27</b>	0,13	<b>0,073</b>	0,0004	201,3
24	Laundries (laundries), dry cleaners, sewing and repair shops, shoe repair shops, etc.	1 m <sup>2</sup> total area	<b>12</b>	0,06	<b>0,032</b>	0,0002	197
25	Baths, saunas, etc.	1 m <sup>2</sup> total area	<b>1,5</b>	0,015	<b>0,004</b>	0,00004	100,4
26	Household and electronic equipment repair shops, etc.	1 job	<b>161</b>	0,8	<b>0,44</b>	0,002	206,2
27	Car shelters, car washes, car repair shops, gas stations, garages, etc.	1 car-relay	<b>1252</b>	4,2	<b>3,43</b>	0,0115	299,0
28	Legal entities holding public gathering events.	1000 participants	<b>23</b>	0,13	<b>0,063</b>	0,0003	178,2

Proper planning of waste collection, transportation, and disposal procedures will be possible only when there is reliable information about the standards of accumulation of solid household waste collected in cities.

**Standards of solid household waste to be collected and removed in practice:**

- ✓ advance planning of activities of sanitation enterprises;
- ✓ calculation of requirements and needs for waste transportation techniques, mechanisms and equipment;
- ✓ concluding contracts with legal entities and individuals for the provision of services of sanitary cleaning organizations for collection of household waste and removal from settlements;
- ✓ disposal of household waste is used for the purposes of determining the methods and methods of neutralization, processing sectors and ultimately reducing the negative effects of waste on the environment.

During the research period, the weight (quantity), volume, average density, and daily accumulation indicators of solid household waste were studied.

This research was approved based on the decision of the Tashkent city hokimiyati, with the participation of working groups involving representatives of the city ecology and environmental protection department, "Makhsustrans" IChB DUK, the city hokimiyati, the regional sanitary-epidemiological peace center, community gatherings, and representatives of the non-residential sector and other interested organizations. done. The results of the research have been approved by Tashkent city administrations and are being used in planning the activities of sanitation enterprises in advance.

The volume of solid household waste to be removed is determined according to the approved norms of solid household waste. Proper organization of waste and garbage collection benefits society and nature.

Accumulation standards should be revised from time to time, at least once every five years, in cases related to changing size and socio-economic conditions, demographic characteristics of the serviced objects and changes in the level of prosperity.

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