



# Humanization of the Urban Environment: Mobility of Citizens with Strollers

O.A. Kazachkova, O.A. Zybneva, E.A. Stepanova

**Abstract:** *The humanistic characteristics of the urban environment depend on the mobility of citizens of all categories, including people with limited mobility, such as citizens with babies and children. In the given paper the problem of the mobility of citizens with strollers is studied, in particular, providing access by means of ramps to various objects of the city. It is pointed out that the mobility of citizens with strollers depends on a number of factors: the types of ramps, the types of chassis, the size of the wheels, the location of the wheels and the distance between them, the weight of the stroller and the possibility of folding. A special attention is paid to the problem of the discrepancy between the parameters of the stroller chassis and ramps. The practical study of the Russian market of baby strollers was conducted to analyze the size of the wheels of baby strollers and the distance at which they are located. The comparison of stroller measurements with ramp dimensions was made.*

**Keywords:** *universal design, humanization of the urban environment, accessibility, stroller, ramp.*

## I. INTRODUCTION

Humanization of the urban environment means an environment in which all conditions are created for maximum access of all members of society to goods and services responding their basic needs [1]. Access to the basic needs of the population cannot be fully implemented without the use of ramps, as they are the only alternative to stairs that are not convenient in using by low-mobility groups. However, during the operation of ramps, there are cases when their use is impossible. This problem is considered on the example of non-compliance the parameters of strollers and ramps.

## II. METHODOLOGY

The dimensions of ramps are specified in regulatory documents, in particular in SNiP 35-012001 and SP 59.13330.2016 [2], [3]. In this case, the width of the ramp is of interest. The regulations specify that ramps must be at least 1 meter wide, and in some cases more. If the installation standards and norms are observed, their operation does not

cause problems, but this applies only to those ramps that are a single inclined track. Problems in using ramps happen mainly during the operation of a two-track ramps. Parameters for two-track ramps, namely the size of the track and the distance between them, are not regulated and may have a width of the track from 200 mm to 410 mm, and the distance between tracks left for the accompanying person may be in the range of 300 – 400 mm [4]. The mobility of citizens with strollers depends on a number of factors: the types of ramps, the types of chassis, the size of the wheels, the location of the wheels and the distance between them, the weight of the stroller and the possibility of folding. According to GOST 19245-93 the basic dimensions are specified for strollers. In this case, the width of different types of strollers should be considered [5]. In the GOST it is specified no more than 600 mm for single strollers and no more than 800 for double strollers. The dimensions of the wheels and the distance at which they should be located are not specified.

## III. RESULTS AND ANALYSES

When exploring the accessibility of the urban environment, the first thing to consider is the device, location and the model of the stroller wheels. The analysis of the stroller wheels can be performed according to two positions: the types of stroller wheels and the location of the wheels. Wheels in a baby stroller can be placed in 3 ways:

- 1) strollers with 4 wheels, the wheels on the front and rear axles are located at the same distance;
- 2) strollers with 4 wheels, the distance between the front wheels is narrower than between the rear wheels;
- 3) strollers with 3 wheels, one in front, 2 wheels in the back.

Stroller wheels are different and, depending on the appearance, are divided into the following types: single and double. The practical study of the baby stroller market was conducted to analyze the size of the wheels of baby strollers and the distance at which they are located. Fig. 1 shows the wheel dimensions considered in this paper.

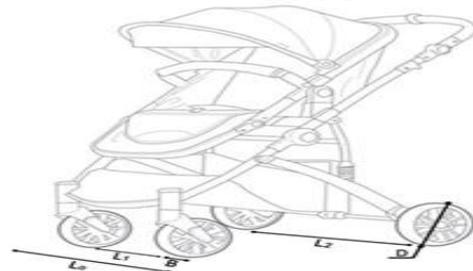


Fig. 1. The dimensions and the distances

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The following parameters of the strollers have been considered: D, Lo, L<sub>1</sub>, L<sub>2</sub>, where D is the wheel diameter, Lo – overall width, L<sub>1</sub> – distance between the front wheels, L<sub>2</sub> – distance between the rear wheels, B – wheel width. Table I shows the data on these parameters.

The measurements of strollers were compared with the dimensions of the ramp: the width of the narrow and wide track. (*l*<sub>1</sub> and *l*<sub>2</sub>), as well as the size of the distance between the tracks for the accompanying person (*l*<sub>3</sub>).

According to the numerical values specified in Table I the chassis dimensions of most strollers, including the distance between the wheels L<sub>1</sub>, L<sub>2</sub> are less than 300 mm and do not

respond to the size of ramps (SNiP 35-012001 and SP 59.13330.2016).

Some strollers presented in the table under numbers 1 and 2 are not possible to use because the distance between the wheels is less than 300 mm and the strollers with the front chassis narrower than the rear ones (numbers 4-8) can be exploited if the citizen holds the stroller on the rear wheels. When using them, you have to lift the strollers personally or fold them and transport them along the track. During such transportation, it is recommended to remove the child from the stroller in order to avoid injury that makes it difficult to move around the city.

**Table- I. Comparison of stroller measurements with ramp dimensions**

№	Stroller parameters									Parameters of the ramps		
	Stroller, model	Folding	Weight, кг	Lo, мм	Types of wheels	B, мм	D, мм	L <sub>1</sub> , мм	L <sub>2</sub> , мм	l <sub>1</sub> , мм	l <sub>2</sub> , мм	l <sub>3</sub> , мм
1	BabytonSport, strollers with 4 wheels	+	7	490	Double	110	140	270	270	200	410	300-400
2	BabytonST-001, strollers with 4 wheels	+	5	450	Double	100	120	250	250	200	410	300-400
3	MarselClassic, strollers with 4 wheels	-	23,5	550	Single	40	340	470	470	200	410	300-400
4	BabytonRapid, strollers with 3 wheels	+	8,8	510	Double front wheel, single rear wheels	Front wheel 115, Rear wheel 40	160	0	430	200	410	300-400
5	CAMFlipMet, strollers with 3 wheels	+	7	585	Double front wheel, single rear wheels	Front wheel 140, Rear wheel 45	200	0	495	200	410	300-400
6	BabytonActive, strollers with 4 wheels	+	8,2	490	Single	30	165	210	430	200	410	300-400
7	BabytonPilloOXstrollers with 4 wheels	+	15,3	560	Single	50	290	360	460	200	410	300-400
8	UPPAbabyCruzstrollers with 4 wheels	+	9,5	550	Single	30	205	250	490	200	410	300-400

### IV. CONCLUSION

Most of the objects in the urban environment are available conditionally (marked in the Manual of the Ministry of labor and social protection of the Russian Federation), and citizens with strollers are not able to use basic needs, including the metro and MCC (the Moscow Central Circle), as well as to move from one street to another, using pedestrian crossings, thus remaining isolated from clinics, shops and single-window services [6]-[10].

Despite the active introduction of various devices in the urban environment for the convenience of moving the entire population, the mobility of citizens with strollers is difficult. It is necessary to reflect the parameters of ramps in the regulatory documents concerning the distance between the

tracks and their width in order to increase the capacity of ramps, thus significantly increasing the mobility of citizens with baby strollers and heavy suitcases, and therefore, increasing the humanistic characteristics of the environment.

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