

PAPER • OPEN ACCESS

## The Formation of the Urban Barrier-free Environment on the Pattern of Vladivostok

To cite this article: L A Chernyavina *et al* 2018 *IOP Conf. Ser.: Mater. Sci. Eng.* **463** 032013

View the [article online](#) for updates and enhancements.



**IOP | ebooks™**

Bringing you innovative digital publishing with leading voices to create your essential collection of books in STEM research.

Start exploring the collection - download the first chapter of every title for free.

# The Formation of the Urban Barrier-free Environment on the Pattern of Vladivostok

L A Chernyavina<sup>1</sup>, E I Filonenko<sup>1</sup>, M A Schekaleva<sup>1</sup>

<sup>1</sup> Department of Design and Technology, Insight of Service, Fashion and Design, Vladivostok State University of Economics and Services, 41 Gogolya St., Vladivostok 640014, Russia

E-mail: suchan1963@mail.ru

**Abstract.** In this publication, the authors touch the problem of creating a barrier-free area in urban space with a complicated relief on the pattern of the city of Vladivostok. At the request of the President of the Society for the Disabled "The Ark" for the study, was chosen Russian Street from the bus station to the ring of Bagration. In this area, was chosen the Society "Ark" and the Far East Territorial Organization of the All-Russian Society of the Blind; therefore, people with disabilities often attend it. With the help of photo fixation, the main important objects and problems related to their exploitation were identified. The result of the work is the project decision submitted to the city administration.

## 1. Introduction

Vladivostok is unique in its landscape, but it is quite difficult to move around the city even for healthy people because of the city's hilly landscape. For the disabled people movement around the city without help is almost insurmountable. People with disabilities should live and work among healthy people, enjoy all the benefits equally with them, feel full-fledged members of society. It is necessary for them to achieve a normal residence in the environment. [1, page 6]. According to the Federal State Statistics Service, in 2017, 12.6 million citizens with disabilities are registered in Russia. Among them, 121 thousand people live in the Far East of Russia. [2]. On the 01.01.2018, 12.1 million people with disabilities were register in Russia, which is 8.2% of the population.

According to the Convention on the Disabled People's Rights (UN, 2006, ratified by the Russian Federation on 03.05.2012), a set of measures should be implemented to ensure that the disabled, equally with other citizens, have access to the physical environment, transport, information and other facilities and services, to identify and remove the barriers blocking the access to the buildings, roads, transport and other facilities, including electronics and emergency services. [4]

Accessibility for the disabled must be ensured in any design decision and equipped in already existing facilities. The design of any space must be suitable for all the people without the need for adaptation or any additional design. Universal design does not exclude additional devices for specific groups of the disabled people. [5 page 6]

For a person to feel comfortable in any place in the environment, which is a combination of conditions and necessary elements, the environment must be adapted for everyone, including people with disabilities. [6 page.2] Some of them can be unimportant, others are vital for the existence, and others can have a negative influence. Therefore, it is difficult for people who have limited mobility to



live in a modern society, especially if the optimal barrier-free environment is not created. Creating a barrier-free environment for the disabled people is to modernize urban design in accordance with the real needs of the citizens, which will ensure the availability of social infrastructure.

## 2. Method

Eliminating barriers in the arrangement of territories and buildings requires an integrated approach. The methods of observation by using photofixation, survey, research of the current situation and generalization were applied. It is not enough to install a folding ramp or to launch buses with low landings on the route. It is important that the ramp is set in the correct position at all times, or if it is necessary, and that the bus is close to the curbs. [1 page 4]. With this approach to the implementation of the barrier-free program, all the citizens will have access to priority facilities and services. In practice, the modernization of territories and buildings begins with a competent assessment of the existing material and technical base. It is important to identify key areas that need improvement. At the same time, the organization of a barrier-free environment requires consideration of the needs of different categories of the disabled people. In a modern society in which equal opportunities should exist for all users, the most important indicators of the quality are the comfort and convenience of their lives.

## 3. Results

Until recently, in the Russian practice of urban development, the organization of all types of services has not taken into account the special needs of the disabled people. At present, the situation has radically changed; there are a number of resolutions.

The "Accessible Environment" program has been implemented in Vladivostok since 2014 at the expense of the federal and local budget. In 2017, at the expense of the city budget, 11.3 million rubles were planned for the implementation of the program, including 9.6 million rubles to increase the availability of road and transport infrastructure and social infrastructure; 1.7 million rubles - to eliminate the social disconnection of the citizens.

The relevance of this work, in addition to the need for creating the environment for low-mobility groups of the population, is based on the fact that Russkaya Street is included in the register of streets subjected to the improvement this year. The group of low-mobility citizens includes not only wheelchair users, but also mothers with wheelchairs and the retired. [5 page 15].

Vladivostok is a prosperous city, where the landscape organization is improved every year. The authors set out to give design proposals for the improvement of the above-mentioned section of the city, ensuring the availability of low-mobility citizens. Based on the conversation with Artem Sergeevich Moiseyenko, the President of the Far Eastern Interregional Public Organization of the Disabled Ark, and Verbitskaya Inna Ivanovna, the head of the project "The School of the White Cane", the following tasks were set:

- To study the current state of the street, by conducting field studies through photographic fixation and measurements:
- to take design decisions on adaptation of objects of a road-transport infrastructure;
- to take the decision of distribution of pedestrian flows of entrance zones of shopping centers;
- to submit design proposals on arrangement of entrances to public buildings (ramps, mobile platforms);
- to submit the design proposal on arrangement of the pedestrian zone (a tactile tile, borders);
- to design recreational areas (the area of the Neptun movie theater, a park zone);
- to plant trees and shrubs in the territory of the pedestrian zone;
- to install the lights.

## 4. Discussion

The proposed territory is located in the address: Vladivostok, Sovetskiy district, the 1st pedestrian zone along Russkaya street from the bus station to the intersection of Russkaya Street and the 100

years of Vladivostok Avenue (Figure 1), the 2-nd pedestrian zone from the crossroads of Russkaya Street and the to the Bagration ring (Figure 2). The relief of the first and second pedestrian zones is even.

Having carried out a study of this territory (to what extent it corresponds to the needs of people with disabilities) it is revealed that:

- pavements and ramps are missing in some parts, other parts are in an emergency condition, which makes it difficult to move;
- at the bus stops, there are high curbs that block the possibility for wheelchair users to approach public transport without hindrance;
- in some places there is no tactile tile for visually impaired and blind people.
- there are no places for rest and little greenery.



**Figure 1.** Territory of the 1st pedestrian zone



**Figure 2.** Territory of the 2nd pedestrian zone

Students-designers of VSUES carried out the research of the projected territory. On the basis of the work done, taking into account normative documents, project proposals were submitted. For adaptation of road infrastructure objects along the whole route the following measures have been developed (Fig. 3):

- install a tactile tile in places of ground crossings, ground crossings at an angle of 90°, in turning points to the left (to the right), underground passages, traffic lights (all kinds of obstacles) [7 page 4.5], observing the necessary norms and rules. The adjoining surfaces of tactile plates should be smooth enough, not interfering with the detection and recognition of the TU. It is necessary to avoid the presence of gaps between connecting plates, or the gap should have a maximum of 10 mm in width and 2 mm in depth. For paving slabs with beveled edges, the gap width should be measured at the level of the pavement slabs [9 page 7].

- Arrange crossings along the entire route in accordance with the standards [8 page 7].

- At the entrances to the buildings call buttons must be set [10 page 18, 19].

- Place the signs of accessibility (special labels, tactile plates or panels with a scrolling line) at the entrance to the buildings, premises and transport. These signs serve as a signal that the object is accessible to people with disabilities of a particular group or all the categories.

People with visual impairments have trouble in orienting themselves on the street and in the premises. Special tactile tiles and sound beacons help to choose the right direction at pedestrian crossings and warn about the presence of doors and steps. For the convenience of movement by means of a cane, it is important to establish borders along the pedestrian zone. For people with hearing impairment, induction panels are used, which are indispensable in places of large concentrations of people. (Fig. 3, 4, 5).

In the park area, it is recommended to arrange a children's playground equipped with special devices that enable disabled children to enjoy the rest and feel their belonging to the rest of the children. [15 all pages]. A carousel (merry-go-round) for children with low mobility has six seats: two of which are for wheelchair children. The carousel is equipped with a ramp and a steering wheel-

holder. The platform plate rotates with assistance. A swing for children with disabilities has an elevating fixing platform on which the wheelchair is located. For safety, the swing is equipped with enclosing elements. The rudder is equipped with ramps and handrails.

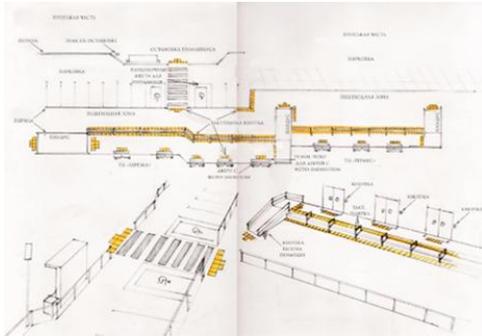


Figure 3. The design offer around a stop «Bus station»

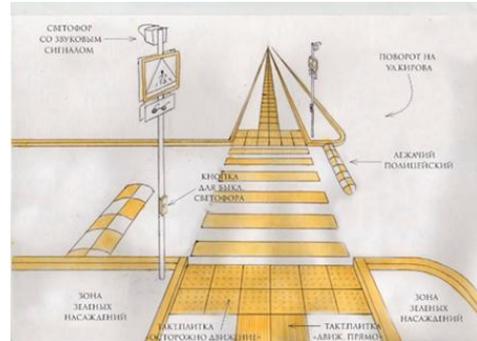


Figure 4. Transition arrangement

Pedestrian way down the street the Russian rather extended therefore around the bus stop "Supermarket" the design offer on arrangement of a recreation area (Fig. 6) is developed.



Figure 5. Arrangement of the pedestrian zone



Figure 6. Scheme of zoning of a recreation area

- In a recreational area, the following things are designed:
- a special toilet for people with disabilities [12page 12]
  - car parks for the disabled people’s cars are allocated;
  - ramps;
  - vacation spots

It is proposed: To expand the entrance to shopping center "Universam", having cleaned the spontaneous parking as two protected work with a row along the carriageway; to broaden the pedestrian zone; to establish the directing tactile tile and an antiskid covering; to establish ramps and the protecting handrail. (Fig. 7) to expand the passage to the shopping center "Supermarket", removing the roadway to the parking lot, as two close-guarded work;

to equip it with a guiding tactile tile and anti-slip coating. Install ramps and guard rails. (Fig. 7)

Equipping the adjacent territories with ramps or lifts for the low-mobility population helps to make buildings and structures available for the low-mobile groups of the population. Stationary ramp is a versatile and easy-to-use design. Such ramps are suitable for both prams and wheelchairs. There are two main categories of this equipment - metal ramps and reinforced concrete ramps. The choice of the option depends on the configuration and features of the installation site. In this proposal, a concrete ramp that provides accessible movement of all categories of the population has been designed. Stationary ramps for low-mobility groups must be installed at the entrance to various buildings, including houses, shops, cinemas, hospitals, stations, etc.

Modern technology of ramp production allows to choose the most optimal type of equipment and the variant of its installation in each case.

The width of the ramp is 1 meter.

Dimensions of the platform for the stroller at the end of the ramp are designed 1,5m x 1,5m.

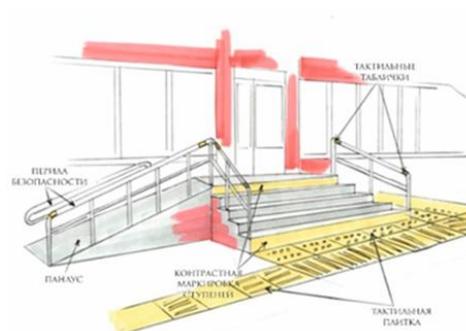
On the perimeter of the ramp there is a ledge with a height of 5 cm - this is necessary for additional safety and the prevention of slipping of a leg or a walking stick.

On both sides of the ramp fences with handrails must be installed. The height of the installation of handrails is 70 and 90 cm.

The rail handrail is continuous and 30 cm longer than the sloping part of the ramp. [10 page 20-22]



**Figure 7.** The organization of an entrance to Shopping Center Universam



**Figure 8.** The Organization of an entrance to Shopping Center Zarya (a ramp a bias of 5%, a tactile tile)

Lifting platforms for vertical and sloping displacement have long become an integral part of the complex adaptation of the buildings for MGN. Moreover, mobile stair lifts are successfully used where classical lifts for disabled people simply do not fit.

These tasks allow solving lifts - reliable and safe devices that disabled people can use on their own and feel more confident.

At the entrance to «Primsotsbank» it is necessary to establish a mobile platform on the existing front staircase. The only possible solution while arranging the entrance to the building, is a large difference in altitude (more than 3 meters) [11 pages 7-9]. In front of the entrance to the shopping center «Zarya», a hairdressing salon, a bank, it is possible to install ramps with fences and safety rails, lay a tactile tile, (Fig. 9).

Kutuzov square should be equipped for the less mobile population group, having conducted the following activities:

- expand pedestrian paths and change their location,
- lay a tactile tile,
- add benches for rest MGN.

## 5. Conclusions

In conclusion, it should be noted that the article presents just the basic project proposals for the arrangement of the Russian street in the framework of the "Barrier-free environment".

The overall picture is given about tackling social isolation of the disabled and ordinary citizens, in order to adjust the pedestrian zones of Russkaya Street, to make the environment more accessible.

[16].

It is just only the first contribution to the transformation of the city into the «city for everyone». [18].

On 20th December 2017 in Vladivostok in the scope of the "Underground forum" the urban environment in the framework of the section "the Capacity of educational institutions in the development of urban spaces" where students of VSUES presented their proposals about transformation of the city into a "City for everyone" [18].

In the future, according to Artem Moiseenko, now a Deputy of The city government, such work is planned to be carried out throughout the city [19].

Citizens take an active part in it, as a rule, on a voluntary basis.

The city authorities should be more involved and listen to the recommendations of the people for whom the policy is being implemented.

The third-year students of the specialty "Design "within the disciplines:" fundamentals of ergonomics in environment design "and" designing in environment design in-depth course» did a lot of work, the results were evaluated by the administration of the city of Vladivostok and accepted for consideration for the implementation.

## 6. References

- [1] Kalmet H Yu 1990 *The inhabited environment for the disabled person* (Stroyizdat) p 147
- [2] Official statistics. Position of disabled people [An electronic resource]//Federal State Statistics Service: official site. – Access mode: [http://www.gks.ru/wps/wcm/connect/rosstat\\_main/rosstat/ru/statistics/population/disabilities#](http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/population/disabilities#)
- [3] Newspaper "Businessman, <https://www.kommersant.ru/doc/3622/20>
- [4] The convention on the rights of disabled people Is adopted by the Resolution of the United Nations General Assembly of December 13, 2006 N 61/106 ratified by the Federal law from 5/3/2012 N 46-FZ
- [5] Shevko E S 2010 *The available environment for disabled people: handbook* (MMOOO of "RAIK") pp 1-37
- [6] Romanov P V 2005 *Politics of disability. Problems of the available environment and possibility of employment: sociological research* p. 55.
- [7] GOST P 52875-2007. Indexes tactile land for visually impaired persons. Technical requirements. Introduction 1/1/2009.
- [8] GOST P 56305-2014. Technical means of the help to blind and visually impaired people. Tactile indexes on a pedestrian surface». Introduction 1/1/2016. It is suspended.
- [9] ODM 218.2.007-2011. 2013 Methodical recommendations about design of actions on to ensuring access of disabled people to objects of road economy. M. p. 96 villages of Introduction 6/17/2013.
- [10] MDS 35-1.2000 "Recommendations about design of the environment, buildings and constructions taking into account needs of disabled people and other handicapped groups of the population. Release 1. General provisions". Introduction 1/1/1996.
- [11] GOST P 56305-2015. Braille's font. Requirements and sizes. Introduction 1/1/2017
- [12] The joint venture 59.13330.2016 Availability of buildings and constructions for handicapped groups of the population. The stabilized editorial office Construction Norms and Regulations 35-01-2001. (With changes No. 1) [Electronic resource]//Technical expert: Electronic fund legal and specifications and technical documentation. – Access mode: <http://docs.cntd.ru/document/1200089976>
- [13] Technical requirements to lifting platforms for GOST 55555 - 2013 (instead of outdated GOST P 51630-2000), regulates disabled people "*Platforms lifting with vertical and inclined movement for disabled people. Technical requirements of availability*".
- [14] Magazine Modern high technologies 2017 vol. 5 Page 78-82 19.06.2017 has undressed Technical science (05.02.00, 05.13.00, 05.17.00, 05.23.00) UDK69:643. 01:314.44 the page 78-82 Development of Model of Premises for disabled people with violations by function of the musculoskeletal device. Terskaya L.A. 1 Davydenko L.I. 2 Chernyavin L.A. 1 Vladivostok state university of economy and service
- [15] Arrangement of the playground for children with limited opportunities <https://www.sgorod.net/news/obustroystvo-igrovoy-ploshchadki-dlya-detey-s-ogranichennymi-vozmozhnostyami/>