

IMPROVEMENT OF TRAFFIC SAFETY FOR PERSONS WITH REDUCED MOBILITY IN THE BELGOROD REGION ON THE EXAMPLE OF NGOs ACTIVITIES¹

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Abstract: *This article is dedicated to one of the major problems in many developed and developing countries: how to ensure the road safety for persons with reduced mobility. Nowadays this group of population is under special attention of governments in different countries. For example, in the Russian Federation there is a lot of devoted programmes as well as actions organized by non-government organizations (NGOs) to improve the quality of their life and, especially, their safe movement in the urban area. As an initial step, this research article presents a structural analysis of population with limited mobility and a statistical overview of its distribution in the investigated area. Then the collaborative work of local authorities, NGO and representatives of the target group is described. This work consists of a number of stages including special organized field study of public transport interchanges in the Belgorod Region and propositions of their reconstruction and modernization. The presented example points out the necessity of cooperation between all stakeholders to support sustainable mobility as well as increasing importance of NGOs in this process.*

Key words: *people with reduced mobility, road safety, public transport interchange, social tension, Belgorod Region*

1. Introduction

Today the growth of motorization as well as the development of cities and regions are expected to continue at a fast pace. Number of roads and vehicles in cities increases steadily but in the same time, the problem to adapt the urban environment for people with reduced mobility (PRM) is overlooked. That is why such persons have difficulties to move through the streets and roads, to use public transport as well as individual cars and, in general, to live a normal life.

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To improve road safety for people with reduced mobility, a variety of national and international programmes are developed and applied. These programmes include not only special laws, but also guidelines for example how to adapt the road network to the needs of population with reduced mobility.

On the international level, the United Nations issued the Declaration on the Rights of Disabled Persons in the year 1975 [3]. This contributed with the adoption of several other international documents including the World Programme of Action concerning Disabled Persons (1982) [4] and the Convention on the Rights of Persons with Disabilities (2006) [5].

In European countries as well as in the United States, government programmes are being implemented for a long time. This led to the fact that the urban environment is adapted as much as possible to the needs of people with limited mobility. In the United Kingdom, the current Disability Discrimination Act was passed in the year 1994 [1]. The United States published the standards of buildings accessibility for people with disabilities (The ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities) first time in the year 1961 [2]. This document laid the foundation for regulatory and legal framework to create a barrier-free environment. Hereafter, it was improved and expanded: the last available update of these standards was done in the year 2009 [2].

All these legislative initiatives in developed countries are successfully put into practice. It contributed with the situation that today all wheelchair persons in Europe as well as in the United States feel themselves quite comfortable. This is achieved through the strict adherence to the principle of barrier-free environment continuity.

Nowadays, in the Russian Federation (RF) there are different national programmes as well as certain normative legal documents focused on increase of road safety for people with reduced mobility. For example, according to the Resolution of the Russian Federation Government of March 17, 2011, No 175, a Law on the National Programme "Available environs" for years 2011-2015 was adopted with the aim to create conditions of barrier-free access for the disabled and other people with limited mobility to facilities and services as well as to improve their quality of life. The Ministry of Health and Social Development of the Russian Federation was responsible to realize this programme. The main goal is to assess the state as well as to increase the accessibility of facilities and services in particularly sought-after living environments of persons with limited mobility and thereby to eliminate a social distance between disabled people and other citizens.

Also it must be mentioned that besides typical stakeholders as government and private business in different social issues including problems of people with limited mobility, there is so-called Third Sector – non-government organizations and associations, which started to be on the rise during the last years.

This article work describes an example of collaboration between local government authority in Belgorod, non-government organization to support sustainable mobility and local association, which represents people with reduced mobility. The main goal was to find the most problematic points of the existing transport infra-

structure in the Belgorod Region, to research these objects and to develop their reconstruction plans taking into account all recommendations.

2. Analysis of statistical data in the Russian Federation and in the Belgorod Region

People with reduced mobility are individuals, who has difficulties with self-dependent movements, in receiving services and necessary information as well as in orientating in space. According to the Road industrial methodical document 218.2.007-2011 [7], PRM include not only disabled persons, but also persons with temporary health problems, pregnant women, people with baby carriage or with luggage, seniors etc. Taking into account all above-mentioned facts, demographic analysis was done to illustrate the ratio of PRM amount to overall population.

According to the Russian Federal State Statistics Service (Rosstat) [8], the overall population of the Russian Federation was 146,3 million people in the year 2015. People older than working age amount to 35,2 million people, which are around 24% of total population. The Table 1 shows demographic situation in the Russian Federation during the period 2010-2015.

Table 1. Population of the Russian Federation for period 2010-2015

Year	2010	2011	2012	2013	2014	2015
Overall population (in million)	142,8	142,9	143	143,3	143,7	146,3
People older than working age (in million)	31,9	32,1	32,4	33	33,8	35,1

Source: own work based on [8]

Also according to the official statistics [8], there were around 1,94 millions of pregnant women at the end of 2015. This amount corresponds to 1,33% as a proportion of the overall population in the same year.

Besides that, the group of persons with limited mobility includes also disabled people. According to the Article 1 of the Convention on the Rights of Persons with Disabilities, they are individuals with long-term mental, physical, intellectual and sensory disorders, which in interaction with different barriers can hinder full and efficient participation of these people in the public life on equal terms with other society members [7]. Taking into account the data from Rosstat, the average number of disabled people is around 13 million persons between 2010 and 2015 [8]. It is 1 % of the total population in the Russian Federation. The Table 2 includes more detailed data concerning this group of citizens including the division into disability categories. These categories have been confirmed in the law [9] and depend on the degree of identified persistent functional disturbance in the human

body: I group –significantly expressed, II group – expressed, III group – moderately expressed.

Table 2. The amount of disabled people in the Russian Federation for period 2010-2015

<i>Year</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>
Total amount of disabled people (in thousand)	13134	13209	13189	13082	12946	12924
I group	1920	1540	1515	1496	1451	1355
II group	7086	7306	7076	6833	6595	6472
III group	3609	3822	4038	4185	4320	4492

Source: own work based on [8]

To get the total number of people with reduced mobility, it is necessary to sum up 3 above-described categories of persons with limited mobility: seniors, pregnant women and disabled people. Also it must be mentioned that only amounts of these categories are known and could be quantified according to the official statistic data. Thus, the total number of persons with reduced mobility in the year 2015 is around 50 million people, which is equal to 34,2% of the overall population in the Russian Federation.

The same approach must be applied to assess the amount of persons with limited mobility in the Belgorod Region for the year 2015.

The overall population of the Belgorod Region in the year 2015 was 1,55 million people which was 1,1% of the total population in the Russian Federation. People older than working age were 403,7 thousand persons, which corresponds to 25,8% from the total population in the considered territory. The Table 3 presents demographic data for period from 2010 till 2015.

Table 3 – Population of Belgorod Region for period 2010-2015 (source: own work based on [8])

<i>Year</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>
Overall population (in thousand)	1532,0	1534,6	1536,1	1541,0	1544,1	1547,9
People older than working age (in thousand)	365,9	368,4	376,6	385,3	393,9	403,7

Source: own work based on [8]

The amount of pregnant women in the Belgorod Region for the year 2015 was 17,773 thousand persons or 1,15% of the overall territory population [8]. The number of RF citizens, which live in the considered area and have one of disability categories, were 2,666 thousand persons in the same year.

Therefore, according to all above-mentioned data for the year 2015, the amount of people with limited mobility living in the Belgorod Region was 424,138 thousand persons. It means that 27,36% of the total population in this area – more than quarter – required a special attention in the context of mobility.

Summing up the overview of demographic data in the Russian Federation as a whole and separately in the Belgorod Region, some facts must be pointed out. First of all, it must be mentioned that situation with PRM is quite critical generally in the country: people with limited mobility cover around one third of the overall population. Secondly, population structure of the Belgorod Region does not look catastrophic in comparison to the average number, however, ratio of PRM of 27,36% of the overall population is still high. It is strongly necessary not only to fulfill all existing normative legal documents and instructions as well as national programmes, but also not to ignore such an important social problem of persons with limited mobility.

3. Non-government organization in the Belgorod Region: the first step to improve the mobility of PRM

There is a lot of non-governmental organizations (NGOs) all over the world aimed to support sustainable mobility, especially in urban areas. Those organizations exist also in Belgorod. It was founded in the year 2008 at the initiative of the Belgorod State Technological University together with the State Traffic Safety Inspectorate of the Belgorod Region. This NGO is created as a voluntary youth team and consists mainly of students and young people. The main aim is to promote and to support actions concerning sustainable mobility and, with a special respect to the traffic road safety. Some actions of NGO are presented on the Figure 1.



Figure 1. Actions organized by a voluntary youth team in Belgorod and its Region

In the perspective of the PRM mobility and its problems, there was a project realized in the years 2014-2015 in the Belgorod Region. All works were carried out in close cooperation of voluntary youth team, local authorities and representative of people with reduced mobility.

During the year 2014, regular meetings with the Veterans' Council were organized and the Russian Association of the Disabled, where the main problems of transportation in the Belgorod Region have been discussed. The main outcome was the conclusion that problems of people with reduced mobility concern mainly the road environment which is not adopted for safe movement. For example, the large number of persons with reduced mobility uses public transport services. Unfortunately, public transport stops in cities are not designed respectively for comfortable and safe usage by people with limited mobility. Thus, the main aim was to improve the quality of movement on the public transport interchanges for persons with restricted mobility.

In this regard, during 2015 the extensive research on public transport interchanges in the Belgorod Region was carried out in order to determine their main geometrical and transport parameters as well as characteristics of passenger flows including persons with reduced mobility.

4. Research study on public transport interchanges in the Belgorod Region

The experience of the European Union countries and, in particular, of Germany, Poland and Lithuania, shows that measures to improve the safety for people with reduced mobility should be comprehensive and systematical [10,11].

Planning features and geometrical parameters of road network have a significant influence on the characteristics of vehicular and pedestrian flows as well as on the overall state of the road traffic in the whole city. There are different plan schemes of the road network, such as radial, radial-circular, rectangular, rectangular-diagonal, mixed etc. [12] For example, the network of streets and roads in Belgorod has a mixed scheme, which includes well-defined rectangular, triangular as well as free schemes (Figure 2).

Public transport interchanges (or also called "stopping complexes") play nowadays an important role in the modern road infrastructure. Their optimal locations influence road capacity, passenger traffic, comfort in operation for all road users etc.

The main centers of gravitation for people with reduced mobility are public institutions, such as clinics, hospitals, pension funds as well as fairs, which work on a permanent basis. Referring to this fact, the voluntary youth team distinguished 5 stopping complexes in the Belgorod Region, which serve a large amount of persons with reduced mobility, because they are situated near the object of gravitation.

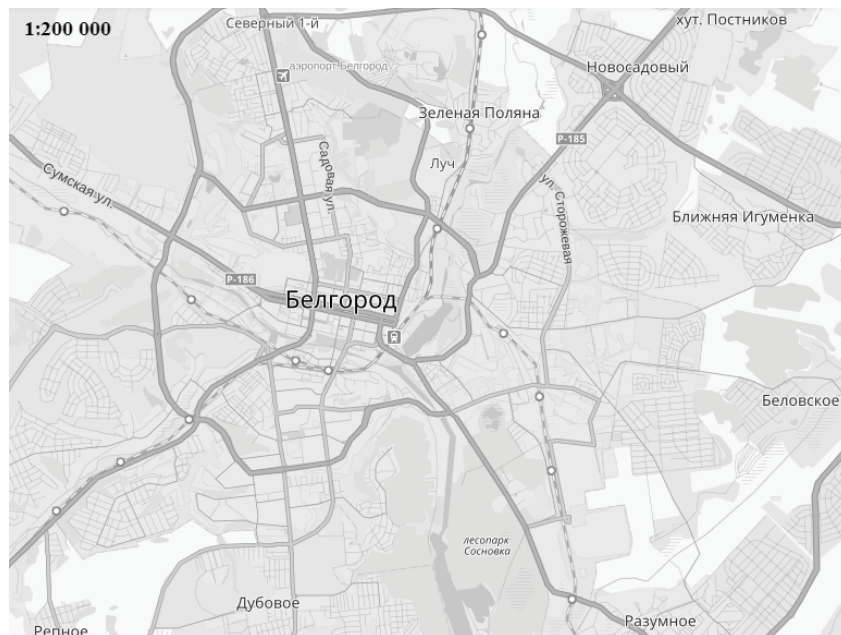


Figure 2. Plan scheme of Belgorod and its Region

Based on monitoring of the traffic situation on stopping complexes, it was concluded that the busiest one is the interchange “Central market” in Belgorod (Figure 3). The total number of passengers here exceeds all other investigated objects. It also has higher percentage of people with reduced mobility in relation to the total passenger flow. This results from the fact that near “Central market” there are the large traffic generators such as a permanent market, polyclinic №1, children’s polyclinic №3, dermatology and venereology dispensary, city hospital №1, maternity hospital, injury care center, central park. The Figure 4 shows a diagram of passenger flows, which pass through the considered public transport interchange during the week.

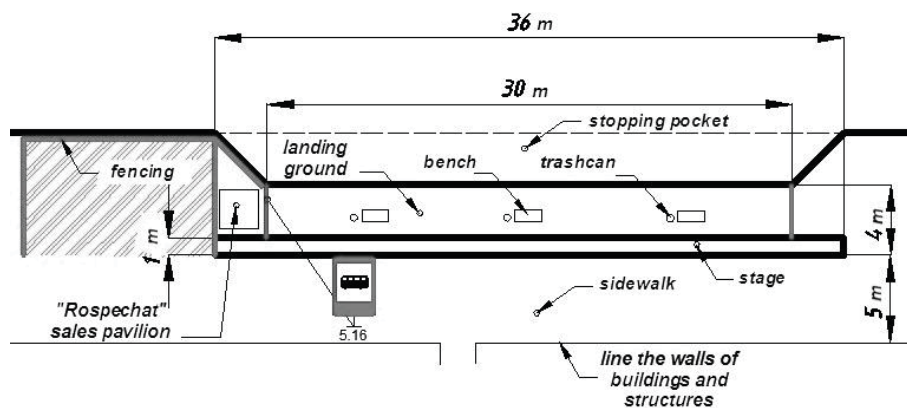


Figure 3. Geometrical scheme of public transport interchange “Central market” before reconstruction

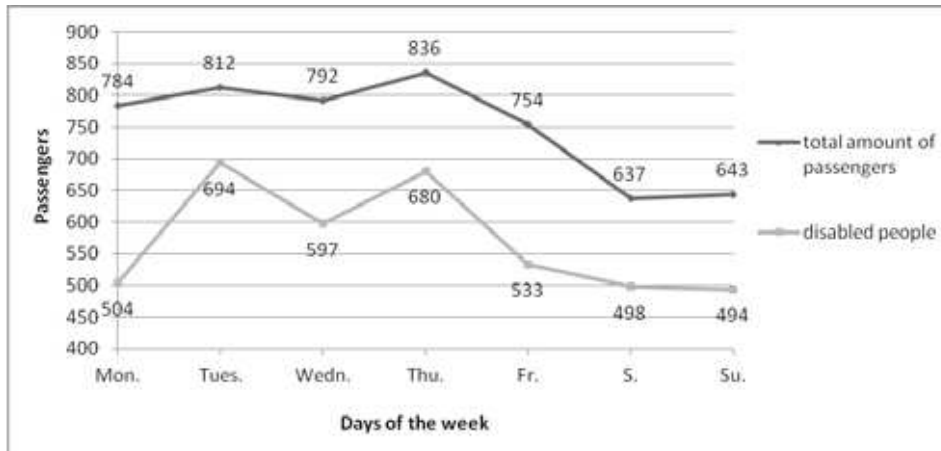


Figure 4. Passenger flows on the public transport interchange "Central market"

To get more detailed view of passenger flows, the passenger traffic diagram hour starting from 8 a.m. till 8 p.m., which is presented on the Figure 5. This diagram was based also on the monitoring data collected by the NGO and was calculated for Thursday as the busiest day of the week.

According to the information collected during the studies organized by the voluntary youth team, the percentage of people with reduced mobility to the total road users of the public transport interchange was calculated. It was about 81.27%. The resulting value is large enough to conclude that it is necessary to reconstruct considered stopping complex to improve the quality of public transport services for people with reduced mobility.

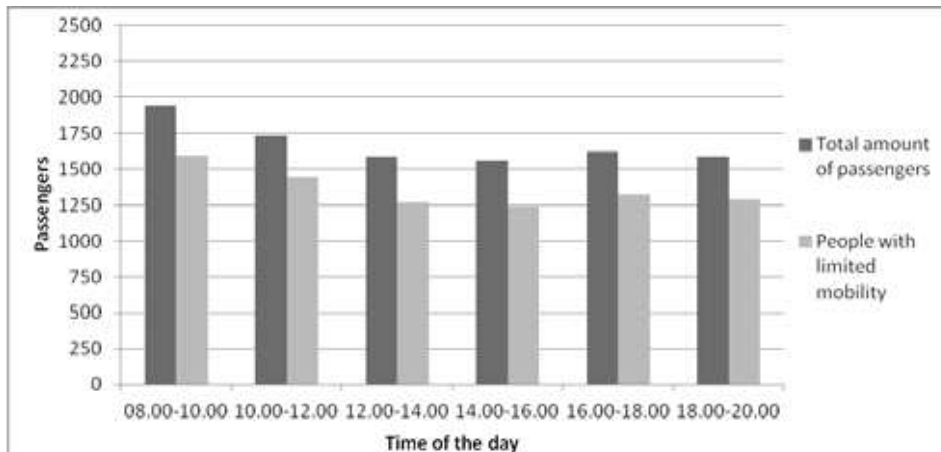


Figure 5. Diagram hour of passenger traffic on the interchange "Central market"

Based on field observations presented in this chapter, it is possible to make general statement that the number of passenger is currently very high, but many of the public transport interchanges are not equipped with technical facilities pro-

viding comfortable and safe movement of people with reduced mobility and whole population [13,14,15,16,17]. Therefore, it is necessary to implement appropriate measures, which can ensure a road traffic safety. It must be done also taking into account the fact that the city Belgorod and its Region develop very rapidly in terms of motorization and urbanization. It would lead to the situation that persons with limited mobility are left out of account from the both sides – the side of government as well as the side of society. Taking into account all results of field observations and their conclusions, the most loaded public transport interchange “Central market” was determined as an object for modernization.

5. Development of the project to reconstruct the selected public transport interchange for the needs of PRM

The final step of collaboration work between all above-mentioned stakeholders was to create a reconstruction project of selected stopping complex taking into account the requirements of normative legal documents as well as preferences of target groups.

In order to ensure the safety movement of the disabled people as well as other people with reduced mobility at a public transport interchange „Central Market”, it was necessary to introduce some elements of the road infrastructure. If the transportation of wheelchair users and people with prams is realized by vehicles not equipped for these purposes, ramps for access to the bus pocket must be applied [18]. Ramps are installed normally at the edges of the bus platform, which creates an easy access from the sidewalk. The length of their horizontal surface must not exceed 1.8 m, so the handrails are not required. The width of the ramp is assumed to be 1.5 m for comfortable movement. In addition, the device provides drainage to avoid the ice formation during the cold seasons.

Besides that, an essential element of road infrastructure, which must be included in the interchange is an enclosed bus stop [19]. This aspect is based on the fact that the passenger flow in the considered facility is quite large, so it is necessary to protect the passengers waiting for public transport vehicles from adverse climatic conditions. Pavilion area is selected taking into account its use by passengers in the rush hour: for disabled people the standard rate is 4 m²/person. Pavilion is used by 6 persons on average. It means that area should be 24 m²: width will be equal to 2 m, length – 12 m. In the considered case, the enclosed bus stop must be an open type: its side walls do not reach the upper floor. This is due to the fact that there are buildings behind the stopping complex and, therefore, to use the closed type is not appropriate.

Another element of reconstruction was an information board [20,21,22]. This is due to the fact that the street where the stopping complex is located, is one of the central city interchanges and many routes of both urban and suburban transport pass through it. This object of information support must be located on the

left side wall of the enclosed bus stop. Another opportunity to provide information to passengers about routes and schedules is the information plate. The data presented on it must be available for all passengers as well as for people with visual impairment [23,24].

The final scheme of stopping complex after the introduction of all measures to improve road safety and accessibility for people with reduced mobility is shown on the Figure 6.

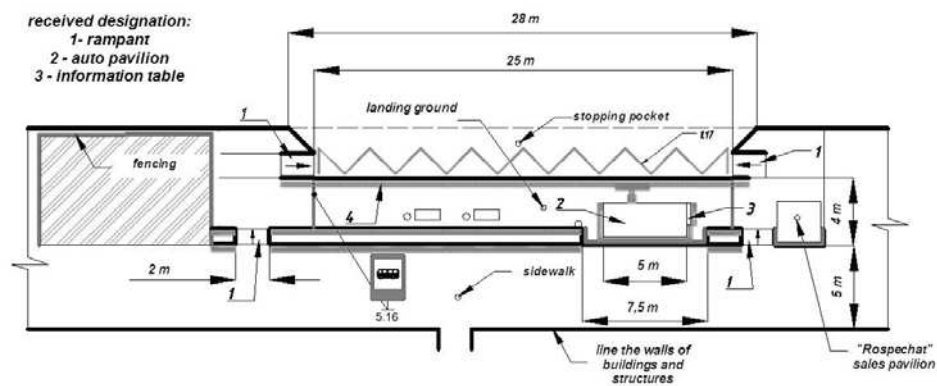


Figure 6. Scheme of public transport interchange "Central market" after reconstruction

The implementation of all above-mentioned tools allowed to improve road traffic safety for people with reduced mobility as well as for all road users of transfer points. Such measures improve conditions of interchange usage by persons with limited mobility: they increase comfort and convenience during the getting on public transport vehicles as well during waiting for public transport vehicles.

6. Conclusions

The study of regulatory sources around the world and, especially, from the USA, Australia and the UK, has shown that the method of urban environment continuity for vulnerable road user groups is implemented in these developed countries for a long time. For example, the reconstruction of the public transport stops for people with reduced mobility in Australia is made strictly according to the plan specified by government authorities. Road, transport and urban environments are adapted to the needs of people with limited mobility in the context of convenience, comfort and safety. That is why these groups and specially disabled people feel the attention to them from the side of government, which make them more open and adapted to be a part of the public life.

The analysis of statistics from Rosstat shows that the amount of people with reduced mobility in the Russian Federation and especially in the Belgorod Region is quite big. Unfortunately, measures to improve and to ensure road traffic safety

for them have been initiated only recently. For example, new national programmes, such as the social programme “Available environs” are created to improve the situation for people with reduced mobility. One of the main questions here concerns the adaptation of road infrastructure for these groups and it is still open.

Besides official governmental programmes and actions, the work of the NGOs in cooperation with other stakeholders is a good solution to support people with reduced mobility. This fact has been proved in the framework of experiences in the Belgorod Region.

The NGO – a voluntary youth team – organized several meetings with people with reduced mobility to understand their problems and needs. It has been noticed that the large public transport interchanges in the Belgorod Region have a lot of gaps from the viewpoint of this target group. Analysis of organization of these transfer points resulted with ascertainment that only a few of them are partly well equipped for persons with limited mobility and allow them to use public transport on the sufficient level of quality. Due to the fact that the number of people with reduced mobility is quite high in the city and in the region and they often go to hospitals, clinics and institutions responsible for management of pension funds, the plan of reconstruction for the selected public transport interchanges has been developed on the basis of collaborative work between NGOs and other stakeholders. It has allowed not only to take into account all requirements of normative legal documents, but also direct preferences of persons with reduced mobility. All implemented measures have been quite simple and evident, but at the same time they were very efficient and economically beneficial.

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POPRAWA BEZPIECZEŃSTWA W RUCHU DROGOWYM DLA GRUPY LUDNOŚCI O OGRANICZONEJ MOBILNOŚCI NA PRZYKŁADZIE DZIAŁALNOŚCI ORGANIZACJI POZARZĄDOWYCH W OBWODZIE BIEŁGORODZKIM

Streszczenie: Niniejszy artykuł poświęcony jest jednemu z głównych problemów wielu krajów rozwiniętych i rozwijających się: jak zapewnić bezpieczeństwo w ruchu drogowym dla osób o ograniczonej mobilności. Obecnie władze różnych krajów zwracają szczególną uwagę na tą grupę ludności. Na przykład, w Federacji Rosyjskiej istnieje wiele rządowych programów celowych, jak i organizacji pozarządowych (NGO), które organizują działania w celu poprawy jakości życia osób o ograniczonej mobilności, a przede wszystkim zapewnienia im bezpiecznego poruszania się w obszarze miejskim. W pierwszej części artykułu przedstawiono analizę strukturalną populacji ludności o ograniczonej mobilności, a także statystyczny przegląd tej grupy w badanym obszarze. Następnie została opisana współpraca władz lokalnych, organizacji pozarządowych oraz przedstawicieli grupy docelowej. Praca ta składa się z kilku etapów, a jednym z nich są specjalne badania terenowe węzłów przesiadkowych transportu publicznego w Obwodzie Białgorodzkiem oraz propozycje ich rekonstrukcji i modernizacji. Przedstawiony przykład wskazuje na konieczność współpracy

pomiędzy wszystkimi zainteresowanymi stronami w celu wspierania zrównoważonej mobilności, a także na coraz większe znaczenie organizacji pozarządowych w tym procesie.

Słowa kluczowe: *osoby o ograniczonej mobilności, bezpieczeństwo ruchu drogowego, węzły przesiadkowe komunikacji miejskiej, napięcia społeczne, Obwód Białgorodzki*