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Environmental Features and the Accessibility of the Population in Different Regions of the Russian Federation

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***Abstract*—Ecological features and problems of transport accessibility of the population in different regions of Russia are considered. The data of natural and climatic features of regions of Russia are given and the state policy in the field of territorial planning is analyzed.**

***Keywords*—transport system; transport accessibility; territorial planning; regional transport systems**

I. INTRODUCTION

The existence of modern and efficient transport infrastructure in the region of any country is an important condition for improving the competitiveness of the region and the quality of life of the population [1]. One of the strategic directions of development of transport infrastructure, declared in the Concept of socio-economic development of the Russian Federation, is to increase the availability and quality of transport services for the population [2].

The increase in the level of transport accessibility for the population of Russia with its vast territories, a significant part of which is difficult to access, plays an important role in the socio-economic development of the regions. Efficient and affordable transport contributes to the creation of a single socio-economic space by ensuring sustainable links between individual regions of the country, as well as between the constituent entities of the Russian Federation settlements [3]. Transport accessibility for the population can be defined as

the ability to take advantage of transport infrastructure and transport services for different groups of the population. Transport accessibility in most countries is determined by the following characteristics:

1) The total time spent on the movement for any purpose. Through the time spent on moving from the place of residence, the transport accessibility of places of work, study, rest, medical and other social institutions is estimated, as well as General accessibility, which involves determining the frequency of public transport and the proportion of the population able to reach specific places or a certain area of the city for a certain standard of time. Expenses of time for movement of the population from the residence to the place of work in the Russian Federation shall not exceed the Standards established by the Construction Norms and Rules operating since 1990 (CNR 2.07.01-89*: Town planning. Planning and Development of Urban and Rural Settlements) [3,4].

In accordance with the data of CNR for residents of other settlements, daily coming to work in the city center, it is allowed to increase the standard time costs up to two times. Residents of rural settlements on labor movement (pedestrian or using transport) within the agricultural enterprise should not spend more than 30 minutes. In addition, CNR 2.07.01-89* set the availability of public transport stops – no more than 5 minutes.

2) The possibility of obtaining transport services for people with disabilities (those are considered disabled and other people with limited mobility), which are determined by the presence of specially equipped public transport and social taxis, as well as roads, sidewalks, specially equipped Parking spaces, ramps and other devices that allow them to travel by different modes of transport;

3) Economic or price availability of transport services, characterizes the ability of the population to pay for travel in public transport. In this case, transport accessibility can be assessed by comparing public transport tariffs with the cost of equivalent trips by private car or taxi. In addition, as an indicator of transport accessibility for the population, it is possible to use the share of costs for transport services in the total consumer spending of the population.

The problem of transport accessibility in modern Russia has several aspects, which can be divided into climatic and socio-economic conditions of the regions.

II. The Climatic Conditions of Russia

The territory of Russia is located in the Arctic, subarctic, temperate, subtropical climatic zones.

In Russia, adverse climatic phenomena include droughts, dry winds, frosts, heavy rains, severe frosts, hurricanes and dust storms. The reason for them is the lack or abundance of precipitation, sudden pressure changes, rapid temperature changes or severe climatic conditions.

This zoning is significantly reflected in the level of residence of Russians, which is clearly shown on the map (Fig.1).

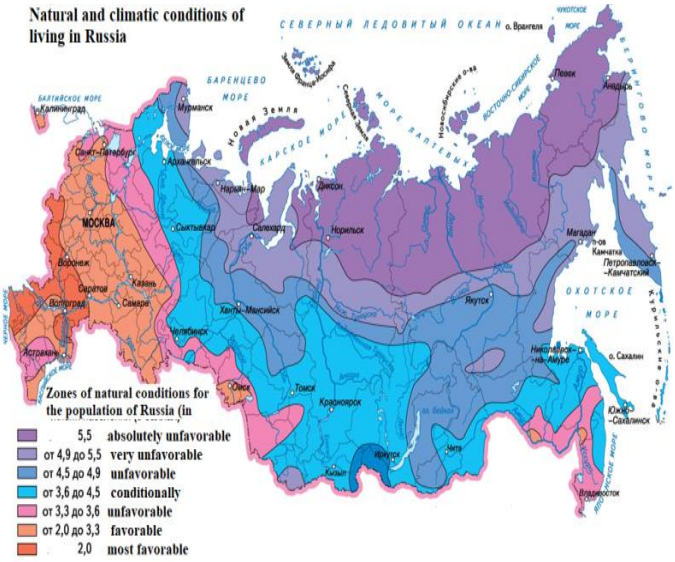

Fig 1. Zoning of the territory of Russia according to natural and climatic conditions [1]

The figure shows that conditionally favorable and most favorable zones are located in the European part of Russia.

III. Socio-Economic Conditions of Regions of Russia

One of the problems of the modern construction of the Federal state in the Russian Federation is manifested in the transport infrastructure of the regions of the country. Currently, in Russia there are unequal financial and economic opportunities of the subjects of the Federation in the implementation of transport policy at the regional level [5].

Due to the complex environmental factors mentioned above, they play a significant role in the economic development of the country's regions. This whole complex is reflected in the rating of the quality of life of the population of the regions of Russia (Fig.2).

Fig 2. Rating of quality of life of the population in the regions of Russia

With this in mind, the local socio-economic, natural and geographical and other specifics of the regions in the field of long-term development should be taken into account in the regional urban planning standards.

The main requirements of socio-economic nature to the documents of territorial planning of transport in Russia at the regional level are contained in the Regional Standards of Urban Design (RSUD). In RSUD, as a rule, laid down rules time limit the transport accessibility of settlements (settlements of different population size) to the locations of important socio-economic facilities and institutions in the service sector (orphanages, schools, major medical centers, emergency medical stations) , etc. [5].

At the same time, it should be noted that in the Russian Federation there are currently no uniform norms of transport accessibility of socially important objects, as it was in the Soviet period. Now any of the regions of the country can adopt such rules at its discretion.

Therefore, relatively poorer regions of Russia often save their budget on objects transport infrastructure. This leads to the fact that such regions are revising their RSUD in the direction of deterioration of the maximum permissible standards of transport accessibility.

As a result, the standard of transport accessibility (both personal and public transport) in socially significant objects in them increases, and the need for these socially significant objects decreases.

At the same time, the "rich" regions of the country set less stringent standards, with more favorable project indicators for the population of the availability of socially significant facilities. Based on RSUD created and implemented local (Municipal) Urban Design Regulations (MUDR). In addition to the RSUD at the municipal level, in some constituent entities of the Russian Federation, the overall performance indicators of municipal entities, including those related to the transport

infrastructure, have been preserved. These include, for example, the proportion of settlements that do not have access to paved roads or the proportion of settlements that are not served by public external transport. The achievement of these indicators can complement, but not replace, regional urban planning standards.

The set of such indicators differs significantly between the regions of Russia. A complex and unresolved problem of territorial planning of transport and transport infrastructure in Russia is the creation of project documents for urban complexes that are part of certain subjects of the country. In Russia today there are no clear requirements for the actual territorial planning of urban agglomerations at the present level, and the requirements for the approval of such design and planning works.

As specific examples of the existing problem, below are examples of the analysis of RSUD in a number of regions of Russia.

IV. Regional Urban Design Regulations of Some Regions of Russia

A. RSUD of the Republic Of Dagestan

In the field of transport accessibility of socially important objects, density of the street and road network and provision of territories of settlements with Parking spaces in RSUD of Dagestan there is a division into mountain and flat (valleys) road networks (Fig. 3)

Fig 3. Transport network of the North Caucasus region

Taking into account the natural and landscape conditions in the Republic of Dagestan, the most developed is road transport, which is associated with the peculiarities of mountain roads. The road infrastructure complex plays an important role in the development of the mountainous regions of Dagestan.

Priority development of transport in the Republic contributes to the existing network of highways of Federal and Republican significance [6]: Avto – Magistral' 29 "Caucasus" (AM-29 "Caucasus"), having the direction of "Baku-Makhachkala-Moscow"; Auto Road (AR) in the direction of "Kochubey – Neftekumsk - Mineralnye Vody", AR-153 "Astrakhan' – Caspian - Kochubey – Kizlyar – Makhachkala" and forty-three roads of Republican and local significance.

The total length of roads in the Republic of Dagestan is currently 8159.8 km, including Federal value - 643.3 km, national value – 2478.2 km, local value – 5038.3 km. Roads in the Republic occupied 22.6 thousand hectares of land area. Of the total length of the maintained territorial network of paved roads, which is 7647.8 km, only 2365.2 km (31%) are paved. The share of high-category roads in the Republic of Dagestan is 0.5%, and 80% are roads of the lowest technical category [6,7].

B. Road and infrastructure complex of Primorsky Krai

In the East of Russia, in Primorsky Krai RSUD contain such standards as the time limits of transport and pedestrian accessibility of civil defense shelters. The region remains underdeveloped. Many standards in this region are presented separately for the most isolated and remote territory of Primorsky Krai – terneysky district [8].

Primorsky Krai has a long length (Fig.4).

Fig 4. Transport links in Primorsky Krai

Many settlements located in rural areas have poor transport links. In contrast to the RSUD of Dagestan in Primorsky Krai introduced a number of terms used such as pedestrian accessibility. It is defined as "the standard set time in which the pedestrian movement of a person from the house reaches the object of service at an average speed of 3 km/h. [8].

C. Road and infrastructure complex of the Republic of Altai

In the South of Russia, in the Republic of Altai RSUD provide a large number of standards of transport accessibility in relation to people with disabilities. In the Republic of Altai, more attention is paid not only to the transport accessibility of socially important objects, but also to the approximate area of allotment of sites for the construction of enterprises and car

service facilities (including bus stations, gas stations, campsites, etc.).

Much is being done to improve the roadway in the mountainous part of the Altai Republic (Fig.5).

Fig 5. Expansion of the roadway

The reform of administrative-territorial division at the municipal level carried out in the Republic of Altai, aggravated the issue of criteria of transport accessibility of the population [9].

V. Federal Regulation

At the Federal level, the main regulatory document is the Federal law No. 131 (06.10.2003 No. 131-FZ, as amended on 29.12.2017), which prescribes the "General principles of the organization of local self-government" and prescribes the boundaries of the rural settlement. As a rule, such a settlement consists of two or more settlements. They establish communication features of rural and urban settlements [10].

The normative legal documents of the Ministry of transport of Russia also recently consider the problem of transport services for the population (Order of the Ministry of transport of the Russian Federation of 31.01.2017 № NA-19-R "On approval of the social standard of transport services for the population in the transport of passengers and luggage by road and urban land electric transport") [10,11].

VI. Conclusion

Thus, in different regions of the Russian Federation there are different rules and problems with transport accessibility. These problems are related to a complex of environmental factors. First of all, such factors include different weather and climatic conditions of different parts of the country. Most areas of Russia are in unfavorable living conditions of the territories.

Other significant factors include socio-economic living conditions. So in the country most of the North-Eastern and mountainous regions of the South is not sufficient. In addition, there are regional features that are associated with low demographic level of the population, the level of investment and industrial development of the regions.

This has a huge impact on overall transport accessibility, transport accessibility for people with limited mobility, comfort of movement and reliability of transport services, as well as environmental friendliness, transport capacity, etc.

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