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METHODOLOGY OF DEVELOPMENT OF THE REGIONAL ROAD NETWORK

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Annotation
In the existing methods of designing and developing road networks, the prospective traffic intensity and road transport costs in the study area are taken as the main indicators. This approach is aimed at solving the problems of designing and developing the main networks of economically developed regions. This article describes a methodology for the development of remote areas of the region using socio-economic indicators of the development of the road network.

Keywords: transport, logistics, security, car, road, network, development, road scheme, optimality, criterion, cost, priority, correlation-regression, freight traffic.

Introduction

Today, the reduction of transport costs is achieved by increasing the capacity of the Palace of Motor Vehicles (carrying capacity). The main focus is on the technical condition of vehicles, as well as the development of transport logistics. However, the reduction in transportation costs will also depend on improved road networks.
Research on the transport supply of the region [1] used the indicator of "integrated transport supply", which more fully characterizes the transport supply.
A highly developed and efficient transport system is seen as a key factor in creating logistics centers and attracting investment.
[2] The author of the article notes that the province of Silesia differs in the provision of transport between the regions of Poland as a result of further development and constant updating of its high-speed road network. It was noted that the high level of transport supply in the region is determined not only by the presence of major highways, but also by the density of road infrastructure.
Particular attention is paid to the development of transport infrastructure, primarily roads and railways [3]. To this end, a lot of work is being done in the country to develop transport communications.
The following criteria characterizing the implementation of projects on the favorable development of the road network have been studied and recommended by domestic and foreign scientists and practitioners: the schedule of future action; freight and

passenger transportation costs; road repair and maintenance costs; road construction costs; the distance between points; time of movement between points; traffic safety of the car; vehicle speed; technical and operational performance of the highway [8, 9].
Despite the widespread use of existing methods in practice, the rational use of these methods within the region is insufficient [10].
The criterion of optimality is obtained for each individual case, based on the goals and objectives of solving problems related to the study of the optimal variant road network. Since the search for a solution involves a variety of conflicting factors, it is important to establish boundary conditions and constraints for appropriate goals and objectives.
The optimal solution in the development of the road network is to ensure safe movement at sufficient speed and convenience throughout the year. Therefore, it is expedient to take into account socio-economic factors in the development of the road network in the region. The efficiency of socio-economic growth of the region is associated with an increase in the speed of road transport on the sections between the points, the following system of indicators is proposed: the volume index of industrial production; Gross Domestic Product (GDP) of Surkhandarya region; the indicator of investments in fixed capital per capita; employment indicator.
Correlation-regression modeling is presented to establish the relationship between the quality of the road network condition and the growth of socio-economic efficiency. In the correlation-regression modeling for the study, the density of the public hard-surfaced road network was taken as a factor in the condition of the road network.
The calculations in determining the correlation Student, Fisher, and determination coefficients were performed in Excel software.
Based on the determined correlation coefficient, a qualitative and quantitative assessment of the existing relationship between the indicators under study can be made. The Cheddock scale was used for this purpose.
When considering the modeling of the relationship between the selected factor and the resulting quality, it is necessary to make a choice of the corresponding type of equation. In this case, the relationship studied is fully and reliably expressed. Linear and nonlinear functions were chosen to represent the form of dependence [6].
Transportation is an economic category that applies not only to the transport complex, but to all socio-economic structures of the country.
The distance between settlements was taken on the basis of the map of the studied area, as well as on the basis of materials of the unitary enterprise of highways.
Improvement of the local road network will be carried out in the following order:

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1) Preparation of initial data:
- Map of the district road network and settlements under study;
- Traffic flow between the regional center and settlements;
- Type of road surface on automobile roads.

2) An initial graph was constructed showing the road network of the study area (Figure 1). The initial graph was obtained on the basis of the analysis of the results obtained on the optimal distribution of future freight flows in the transport network of the Surkhandarya region and the development of the land transport system [3, 4, 5].

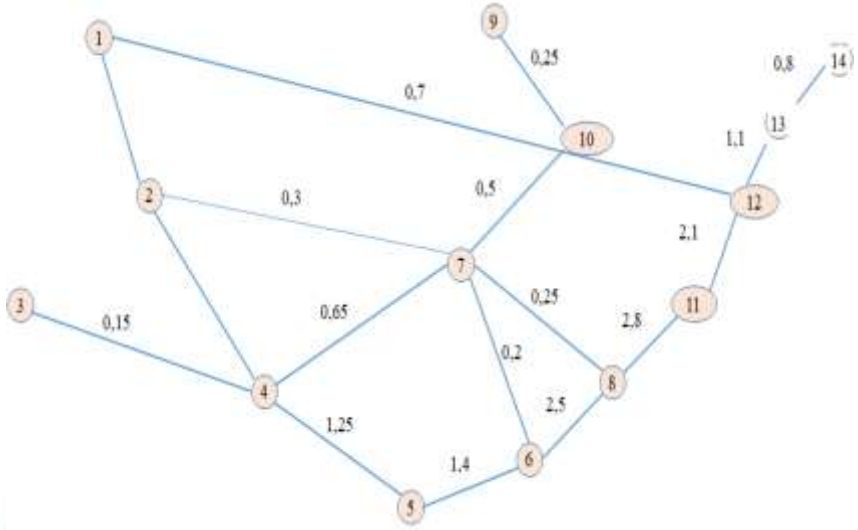

Figure 1. Scheme of location of the road network and settlements of the region.

All settlements are marked with numbers in the order of their distance from the center of the territory. Based on the results of the obtained distribution, the arcs with the least loaded transport connections are identified and they are selected. Hence, 3-4, 9-10, 2-7, 7-6, 10-7 transport links in the graph had the lowest loads. Selection is required to improve these isolated minimum-load transport links. The selected minimum-load transport links should be as relevant as possible to the socio-economic development of the study area [7].

Advantages of drawing the road network

Transport networks 3-4, 9-10, 2-7, 7-6, 10-7 are not directly connected to the regional center (Figure 1). However, 7-6 transport networks connect the three districts with the regional center. 9-10, 3-4 transport links do not connect any district with the regional center. 7-6 and 3-4 are connected to the study area center by a single transport but 7-6 transport links connect the three districts with the regional center. Therefore, it is preferred -1. On this basis, priority was given to 2-7 and 10-7 transport links - 2 and 3-4 and 9-10 transport links - 3 (Table 1).

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Table 1 Advantage in road network design

The order of transport communications	Advantage in road network design
3-4	3
9-10	3
2-7	2
7-6	1
10-7	2

Population priority is determined on the basis of the number of people moving in the study area of transport links (Table 2).

Table 2 Population dominance

The order of transport communications	Population in settlements, thousand people	Population dominance
3-4	136	3
9-10	168,4	2
2-7	186	1
7-6	130,5	4
10-7	35	5

In order to calculate the priority in terms of socio-economic efficiency, the load characteristics of all transport links considered are improved by stratification (calculation procedure p. 5.1). Including the replacement of a low pavement with a paved road. As a result of improving all transport links, the length and density of the improved paved road network will increase. After improving 3-4 transport links in the region, the density of the paved road network is 2.13 km / 1000 km², 9-10 transport links - 3.48 km / 1000 km², 2-7 transport links - 12.8 km / 1000 km², 7-6 transport links - 5.9 km / 1000 km², and 10-7 transport links - 5.2 km / 1000 km² (Table 3).

Table 3 Priority in terms of socio-economic efficiency

Mode of transport connection	Population of the district, thousand people	Improved paved transport communication distance, km	Transport communication distance, km	Prospective density of paved road network, km / 1000 sq.km.
3-4	136	158	28,1	2,13
9-10	168,4	195	55,7	3,48
2-7	186	351	28,8	12,8
7-6	130,5	119	39,2	5,9
10-7	35	78	25,9	5,2

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Based on the correlation-regression model performed above, the regression equations for each indicator are given.

The values of the density of the paved road network obtained after the improvement of the established road sections (transport communication) are set in the above equations. The results of socio-economic efficiency for each transport link are presented in Table 4 for all indicators.

Table 4 Values obtained on socio-economic indicators

Site	K_1	K_2	K_3	K_4	Final evaluation
3-4	-56701,16	317470,98	-67217,66	-7757,84	5
9-10	-37133,87	356465,54	-6903,34	-5610,93	4
2-7	**138500**	**514384,06**	**2660,99**	**1689,18**	**1**
7-6	1662,38	416156,83	-5370,9	-2453,44	2
10-7	-10050,59	400238,14	-5882,76	-3275,9	3

According to the results of the report, 2-7 indicators of the volume of transport industry, GDP of Surkhandarya region, indicators of per capita investment in fixed assets, employment indicators have good results, followed by 7-6 transport, 9-10 transport industry have better performance than 3-4 transport links in terms of product volume and employment.

In the assessment of socio-economic efficiency, the results of the calculations showed that 2-7 transport links predominate (Table 4).

The results of the priority obtained on the three indicators performed to identify road sections for the development of the road network are presented in the following table (Table 5).

Table 5 Dominance results on three indicators

Site	Superiority			
	According to the road network diagram	In terms of population	Socio-economic indicators	All
3-4	3	3	5	11
9-10	3	2	4	9
2-7	2	1	1	4
7-6	1	4	2	7
10-7	2	5	3	10

The results of the calculations presented in Table 5 showed that 2-7 transport links predominated.

Conclusion

As a result of applying the recommendations on improving the operational quality of transport on the identified sections of the regional highway, the economic efficiency of increasing the speed of cars on 1 km of the road for a year amounted to 658,350 soums.

The annual efficiency of the road transport on the Sariosiya-Termez route by the trucking company of the Surkhan Sanoat Qurilish company amounted to 117,186,000 soums.

Improving the condition of the road network will increase the level of transport availability in the region and the quality of the existing road network, as well as prevent a number of negative social consequences.

Thus, the improvement of the road network will reduce the socio-economic stress of the region, help to improve the living standards of the population by reducing the cost of transportation of goods and services that meet daily needs.

References

1. Ульджабоев К.У.Экономическая реформа на железнодорожном транспорте.- Ташкент, Мехнат, 1999. – 262 с.
2. Macioszek E., Staniek M., Sierpinski G. Analysis of trends in development of freight transport logistics using the example of Silesian Province (Poland) - a case study/ https://www.sciencedirect.com/science/article/pii/S2352146517309237
3. Kuziev A.O., Komilov A.L. Modeling and optimization of flows in the supply chain. –Termiz, “Surkhan polygraph-edition”, 2019. –195 pages.
4. Кузиев А.У., Аликулов С.Р.Развитие и эффективное использование региональных сетей мультимодальных перевозок.- ВЕСТНИК НАУКИ И ОБРАЗОВАНИЯ № 10(88). Часть 2. 2020. С. –40-45. https://cyberleninka.ru/article/n/razvitie-i-effektivnoe-ispolzovanie-regionalnyh-setey-multimodalnyh-perevozok
5. Butaev Sh.A., Sidiknazarov Q.M., Murodov A.S., Kuziev A.U. Logistics.-Tashkent: “Extremum-Press”, 2012. 577 pages.
6. Чернова Т.В. Экономическая статистика/ учеб.пособие. Таганрог: ТРТУ, 1999. –367 с.
7. Kuziev A.U., Urokov A.A. Development of Multimodal Transport Network in the Region. International Journal of Innovative Analyses and Emerging Technology. Volume: 1, Issue: 7. –42-46 pp.
8. Kuziev A.U., Muratov A.Kh. Improving the method of delivery of construction cargo in autotransport. ACADEMICIA: An International Multidisciplinary

Research Journal Vol. 11, Issue 8, August 2021. 207-216 pp. https://indianjournals.com/ijor.aspx?target=ijor:aca&volume=11&issue=8&article=038

9. Muratov A.X. Statement and Mathematical Model of the Problem of General Service in the Transportation of Cargo by Motor Vehicle. European Multidisciplinary Journal of Modern Science. 6, (May 2022), 288–291. https://emjms.academicjournal.io/index.php/emjms/article/view/392
10. Muratov A.Kh., Kurbanov A.T. Improving the process of delivering scattering loads to the construction objects by using automobile transport. Harvard Educational and Scientific Review. – 2021. – T. 1. – №.1. Pages 107-117. https://zenodo.org/record/5670145#.YoSIqvjP3IV.