Actual proposals for improving the transport and road network of the Kyrgyz Republic

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Abstract. The main problems of improving the operation of road transport in the Kyrgyz Republic are considered, the problems of the road network affecting road safety. The intensity of traffic and the environmental safety of the cities of our country are noted not only as a result of the impact of measures to ensure road safety, but also reconstruction of highways. Measures have been developed to solve these problems.

Keywords: public transport, road safety, environmental safety, road transport infrastructure

1. Introduction
For several years, Kyrgyzstan has been trying hard to solve the acute problem of improving the operation of road transport. Considering that the entire road network was designed and built back in the seventies and eighties of the last century, it practically did not change and was not unified. For the Soviet republic, the street capacity developed at that time was sufficient in the field. There is small motorization, the road network of the city of Frunze, and now Bishkek, fully ensured normal operation not only during the day, but also during peak hours in the evening and in the morning.

Despite the fact that these years have been actively discussing these problems at all levels, not only in the media, but also in all possible information resources, the solution to this problem is progressing very hard. All road, design and other services involved in ensuring safety and improving traffic capacity try to find a way out of this situation, but for some reasons the solution to the problem does not move off the ground.

2. Statement of the research problem
In many cities and countries this problem is perfectly solved by public transport. In our city, all passenger traffic is carried out by 95 % using fixed-route taxis. A small number of regular buses do not actually affect street unloading. So, at present, Bishkek’s public transport fleet has about 900 buses and trolleybuses. But if you take into account real data on the number of rolling stock, then we can draw the following conclusion. Bishkek City Municipal Passenger Motor Transport Company has more than 700 buses. But of these, about 130 buses are in operation, of which 50 % are new buses, and 50 % are old buses that have been repaired but are in a decadent state. More than 700 units are in a destroyed and malfunctioning state, although they are on the balance sheet of a car enterprise. The Bishkek trolleybus department sends more than 160 trolleybuses daily to the city streets. In addition, there are two bus routes in the city, which are provided by buses by a Chinese company. So, on bus route No. 35, passengers are transported by 18 buses, and on route No. 5 there are 12 buses.
The main transportation of passengers is carried out by private minibuses and private transportation companies. If several years ago there were more than 3,000 minibuses, now, for certain reasons, daily from 1,600 to 1,800 minibuses take to the streets of the city via 120 approved routes. The lack of buses in the morning and evening hours is now palpable.

Based on information from the State Registration Service under the Government of the Kyrgyz Republic, in 2014 about 1,050,000 units of motor vehicles were registered in our republic. World Bank (WB) experts involved in and developing the draft National Road Safety Strategy of the Kyrgyz Republic “Road Safety” indicate that “with statistics of 2190 deaths per million cars, the problem with road safety in Kyrgyzstan is one of the worst in the world” [1]. According to various estimates, the number of victims and disabled after an accident is unacceptably high. So, in 2017, 907 people died in road traffic accidents in the Kyrgyz Republic, 104 of them were children, and 938 people died in 2016. 1,622 children were injured in accidents. In 2015, there were 1,432 accidents [2].

According to the World Health Organization (WHO), at present, Kyrgyzstan is in second place among the countries of the WHO European Region in mortality per 100,000 population – 19.3 people. (2012), 19.2 hours (2010)” [1]. Injury is one of the causes of death in the age group of 5 to 29 years, and this indicates that we are losing the most efficient and promising population. Every year, mortality among children is 3–4.5 thousand children up to 14 years old – 30 %. More than 1,200 people die in traffic accidents each year, and up to 10,000 people are injured. Each year, these indicators reflect a certain increase in casualties, which has a very negative impact on the state of security not only in Bishkek, but throughout the republic. Despite this, Kyrgyzstan does not actually use the scientific data of the results of the analysis of road accidents, which are not only studied by scientists of the Kyrgyz-Russian Slavic University and KSTU named after I. Razzakova, but they also carry out monitoring, count and develop a certain measure leading to a decrease in road accidents. The Unified database on offenses is still underdeveloped, the installation and operation of technical means of monitoring offenses and traffic regulation have just begun.

According to the National Institute for Strategic Studies of the Kyrgyz Republic: “... to date, technical regulations for the construction, reconstruction and repair of roads have not been developed. Until now, regulation has been carried out on the basis of post-Soviet Construction Norms and Regulations and GOST, which, according to the conclusion of the Ministry of Justice of the Kyrgyz Republic, have only a recommendatory character” [1]. The studies carried out claim that there are no safety standards on roads at the legislative level, there are no methods for assessing the risks of road accidents, no regulations have been established for monitoring road safety, and this leads to a low level of safety. In addition, it is necessary to take into account the secondary costs of reconstruction and repair of roads, corruption in this area has not yet been eliminated. All the work on the creation of parking spaces, road fences, the installation of billboards is performed in the absence of technical regulations, not observing the land use requirements of the Kyrgyz Republic.

As a result of the calculations of the National Institute for Strategic Studies, the following conclusion was made. It is necessary to develop standards that meet modern requirements, taking into account the development of the leading countries of the world, so that in all structures associated with this problem, transport, infrastructure, law enforcement, technical, educational institutions need to have and implement targeted road safety programs.

The materials of these studies, regulatory and technical and legal acts, road transport, engineering infrastructure, culture on the roads, compliance with traffic rules remain at the level of unsolved problems. Our country needs urgent solutions to this problem and the adoption of priority measures by government bodies. Lack of solutions to road safety problems leads not only to economic damage but also to social disaster.

3. Proposed recommendations and urgent measures
Based on our analysis, it is necessary not only to recommend but also to seek the adoption of the following urgent measures:
1. At the legislative level, assess the situation, develop and adopt safety standards, develop modern risk assessment methods, and technical regulations for monitoring road safety. Since SNiP was approved in Soviet times, and it was difficult to reaffirm it, they made it a recommendation. But now I have to get a mandatory legal status. In addition, in the "Code of Administrative Responsibility of the Kyrgyz Republic" dated July 15, 2016 No. 117, there are a sufficient number of articles that specify the requirements for the operation of vehicles and emissions, for example, Article 173. Operation of vehicles and other mobile vehicles in excess of content standards pollutants in emissions [3].

2. Continue to introduce and install on the roads technical means of traffic regulation, video and photo-fixing equipment to all relevant organizations, including large Business facilities located along the roads.

3. To monitor traffic accidents not only in the city of Bishkek, but also throughout the Kyrgyz Republic. Introduce training programs and subjects in educational institutions.

In addition, it is necessary to pay attention that the inefficient development of urban transport leads not only to a decrease in the capacity of the road network, but also to major environmental problems in the capital, constantly poisoning the townspeople. For the purposes of Sustainable Development, ensuring mobility of the population, safe movement and a favorable, safe environmental environment in cities, it is additionally necessary to hold public hearings and take the following measures that must be taken into account, including in the spatial and planning regulation and in the general plan of the city:

1. To improve road safety in Bishkek and other large cities, increase the number of one-way streets that reduce traffic accidents by up to 50% in accordance with SniP.

2. To increase the number of buses and trolleybuses of urban public transport, reducing the number of minibuses accordingly.

3. During the construction of large supermarkets, shopping centers and other facilities where there is a large concentration of people in the estimated radius from each other, to take into account and enter, underground parking only where the road network allows pedestrian streets.

4. To reduce the number of high-rise buildings with public and commercial functions on the ground floors in the city center.

5. To increase the construction of preschool and school facilities evenly distributing the quality of education throughout the city and with equal access in order to reduce the forced movement of citizens in the city in search of the best schools and kindergartens.

6. To ensure continuous monitoring of the level of air pollution on all major highways of the city.

7. To carry out a strict policy to reduce the MPC of atmospheric air in Bishkek, where more than 82 % of emissions come from transport. Take drastic measures and pursue a tough policy that ensures an annual reduction of 15 %, which is quite realistic.

At present, atmospheric air quality, measured in various parts of Bishkek city, shows threatening indicators of maximum permissible concentration (MPC) of air, which are above regulatory requirements from 10 to 100 or more times in different areas of the capital. Especially difficult is aeration from the city center, where the MPC is always 8 times higher than that of other parts of the city, since the city is located in a foundation pit, in a bowl-shaped relief. In connection with the growth of the population of the capital from 500,000 to 970,000 people, without taking into account the unregistered population, the territory of the city itself increased by only 20–25 %, the standard level of landscaping fell sharply.

The city of Bishkek needs to be provided with a sufficient quantity of comfortable and high-quality public transport, into which citizens will transfer. In the city center, it is advisable to run electric or trolleybus lines, that is, green transport [4]. Such a project has been developed and is available to the authors of the project. Restore pedestrian walkways on all city streets and return them within the boundaries of the red lines, which are municipal lands.

In the city of Bishkek, urgently and tightly regulate the emission standards for cars on the roads and introduce large fines into the plans before banning the import of vehicles, since they are the main sources of air pollution, and when the climate changes that have already occurred create a level of environmental disaster for the health of citizens. Among the diseases in the city in the first place there
is bronchopulmonary, which overtook cardiovascular highly dependent on the climate, natural and landscape conditions of the country.

In the cities of the Kyrgyz Republic, it is advisable to propagate the concept of “pedestrian city” accepted around the world. Pedestrian cities appeared in many European countries when the population deliberately abandons cars, except for special vehicles. This is a huge cost savings and the organization of eco-cities in the mountainous environment. Currently, in small and medium-sized cities of the republic there is no intra-urban transport, which needs to be supported. Alternative transport can be offered, from live transport to bicycles. It is necessary to use the experience of Tajikistan, where in villages police officers, district doctors, medical sisters give out bicycles as a transport.

### Table 1. An approximate plan and assessment of reduction of harmful emissions with the following measures for the city of Bishkek

| No. | Activity                                                                 | Consumption Control | Accounting | Quality | Reduction of harmful emissions by years |
|-----|---------------------------------------------------------------------------|---------------------|------------|---------|----------------------------------------|
|     |                                                                          | 2019                | 2022       | 2022–2025 |
| 1   | Raise the duty on fuel and lubricants consumption by cars                | Purchased and imported | +          | +       | 15 %                                   |
|     |                                                                          |                      |            |         | 30 %                                   |
|     |                                                                          |                      |            |         | 45 %                                   |
| 2   | Gasoline quality, alternative fuel sources                               | Purchased and imported | +          | +       | 15 %                                   |
|     |                                                                          |                      |            |         | 30 %                                   |
|     |                                                                          |                      |            |         | 45 %                                   |
| 3   | Determination of emission standards, Technical regulation, SNiP, regulations, etc. | Emission standards | +          | +       | Rate entry                             |
|     |                                                                          |                      |            |         | Regulatory requirements                |
|     |                                                                          |                      |            |         | Regulatory requirements                |
| 4   | Penalties                                                                | Visual fixation, Video Photo Capture | +          | +       | Budget replenishment                   |
|     |                                                                          |                      |            |         | Budget replenishment                   |
|     |                                                                          |                      |            |         | Budget replenishment                   |
| 5   | Incentive measures                                                       | Price tax support    | Price tax support | Price tax support | Price tax support |
|     |                                                                          |                      |            |         | Price tax support                       |
|     |                                                                          |                      |            |         | Price tax support                       |

### Table 2. Transport in the cities of the Kyrgyz Republic

| No. | Activity                                                                 | Control | Accounting | Quality | Taxes                                      |
|-----|---------------------------------------------------------------------------|---------|------------|---------|--------------------------------------------|
|     |                                                                          | 2018–2022 | 2022–2025 |
| 1   | Private transport                                                        | +       | +          | +       | Introduce a check-in tax to the city center |
|     |                                                                          |          |            |         | Paid parking                               |
|     |                                                                          |          |            |         | Reduced parking                            |
| 2   | Any public transportation                                                | +       | +          | +       | Tax free                                  |
|     |                                                                          |          |            |         | Free parking                              |
| 3   | The buses                                                                | +       | +          | +       | Tax free                                  |
|     |                                                                          |          |            |         | Free parking                              |
| 4   | Trolleybuses According to the project proposal in the center of Bishkek  | +       | +          | +       | Tax free                                  |
|     |                                                                          |          |            |         | Free parking                              |
| 5   | Alternative transport                                                    | +       | +          | +       | Tax free                                  |
|     |                                                                          |          |            |         | Free parking                              |
| 6   | Green transport                                                          | +       | +          | +       | Tax free                                  |
|     |                                                                          |          |            |         | Free parking                              |
| 7   | Incentive measures                                                       | Price tax support | Price tax support | Price tax support | Price tax support |
|     |                                                                          |          |            |         | Price tax support                         |
|     |                                                                          |          |            |         | Price tax support                         |

It is necessary to analyze and evaluate several parameters of the road transport infrastructure at the Institute of Road Transport or to invite experts at city halls. In this article, we offer a specific solution to the problems and an approximate plan of activities, which will depend on full-scale research by
specialists. Monitoring, accounting, quality of consumption are the main for any tasks, the implementation of which will give tangible results in the coming years.

### Table 3. Roads in the cities of the Kyrgyz Republic

| No. | Activity | Monitoring | Control | Accounting | Quality | Necessary measures | 2018–2022 | 2022–2025 |
|-----|----------|------------|---------|------------|---------|--------------------|-----------|-----------|
| Task 3: Roads |
| 1 | Main streets. The highest category | + | + | + | Toll roads |
| 2 | For the city of Bishkek, increase the number of one-way traffic on the streets, which reduces accidents by 50% | + | + | + | - |
| 3 | Restore pedestrian sidewalks on the streets and return municipal lands within the boundaries of red lines | + | + | + | Penalties |
| 4 | Bike paths | + | + | + | - |
| 5 | Pedestrian streets | + | + | + | - |
| 6 | Parking | + | + | + | Environmental Duty |
| 7 | Regulatory indicators | + | + | + | Calculation of passenger traffic tax |
| 8 | Schedule. Route | + | + | + | Price tax support |
| 9 | Incentive measures for the installation of video-photo fixing equipment | + | + | + | Price tax support |
| 10 | Penalties | + | + | + | |

### Table 4. Road Safety in the Kyrgyz Republic

| No. | Activity | Control | Accounting | Quality | Taxes | 2018–2022 | 2022–2025 |
|-----|----------|---------|------------|---------|-------|-----------|-----------|
| Task 4: Security. Reducing the number of accidents |
| 2 | One way streets | + | + | + | - | 50 % reduction in accidents | 50 % reduction in accidents |
| 3 | Traffic lights | + | + | + | - | increased security | increased security |
| 4 | Traffic violation | + | + | + | - | |
| 5 | Underpasses | + | + | + | - | Price tax support | Price tax support |
| Penalties | + | + | + | + | + | + |

### Task 5: Mobility.

a. Ticketing.

b. Uniform Route Distribution.

c. Incentive Measures and Penalties.

### Task 6: PWD.

a. In all objects of new construction and the organization of improvement, introduce the mandatory requirements noted in the acts of acceptance of work taking into account PWD.

b. Organization of special vehicles.
c. Public transport equipment for people with disabilities.

d. Incentive Measures and Penalties

Task 7: Create a project on the Concept for the Development of Public Spaces for Road Transport Infrastructure, which should take into account all the above tasks and the green frame.

a. Public spaces.

b. The types and protective measures of public spaces along the roads, I agree to SNiP, GOST, those regulations and the design of the urban environment.

c. Capitalization of facilities for self-sufficiency. Capitalization of facilities for self-sufficiency.

d. Incentive Measures and Penalties.

Hence, the following recommendations can be made:

1. The Ministry of Transport and Roads of the Kyrgyz Republic needs to develop a technical regulation that sets the basic development strategy. To decide who should research and monitor on an ongoing basis about urban transport for cities.

2. In this paper, the proposed activities, which include the basic requirements and measures to improve the transport and road facilities with tasks and an approximate plan of activities, will depend on full-scale research by specialists.

References

[1] National Institute for Strategic Studies of the Kyrgyz Republic Scope, consequences and preventive measures of road traffic accidents in the Kyrgyz Republic (Date of treatment 08.15.2018)

[2] Sputnik news agency. Retrieved from: https://ru.sputnik.kg/incidents/20180119/1037326719/skolko-chelovek-pogibli-v-dtp-v-2017-godu.html/ (Date of treatment 08.15.18.)

[3] The Code of Administrative Responsibility of the Kyrgyz Republic dated July 15, 2016 No. 117. Retrieved from: http://www.ecology.gov.kg/page/view/id/112 (Date of treatment 1.08.18)

[4] From the archive of the company “Mark Audit” 2015 The project was developed by the Czech company for green transport for the city of Bishkek. Unpublished material