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ТРАНСПОРТ И ЭНЕРГЕТИКА

Подсекция 12.1 Организация перевозок, движения и эксплуатация транспорта

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THE PROBLEM OF TRAFFIC CONGESTION IN ASTANA CITY

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Nowadays, one of the most actual problems of Astana city is the congestion of the street-road network by car flows, the number of which increases from year to year. The high rate of growth in the number of motor vehicles adversely affects the development of the city's transport infrastructure and can lead to automobile collapse. Overloading of the city road network leads to a decrease in the average speed of vehicles and the reliability of the delivery of passengers and cargo, an increase in the cost of road transport, a growth in the number of road accidents, a complication of the environmental situation.

An important task of improving the transport system of major cities is to create a comfortable environment for living, business and travel. It should be noted that increasing the capacity of the roads of Astana, improving traffic conditions requires the implementation of measures for: the reconstruction of the busiest transport hubs; raise the efficiency of traffic management; rationalization of the existing parking system; local optimization of planning characteristics of the street-road network.

In the framework of the research, the world experience of unloading the street-road network of major cities was studied and the most effective methods were proposed for the conditions of Astana city.

An important mission of improving the transport system of large cities is creating a comfortable environment for living, business activities and movement of residents of major cities.

Nowadays about one million people live in Astana, while a third of the residents have personal cars – it is more than 350,000 vehicles.

At the same time, the raise in the level of motorization led to an increase in the population mobility and a decline in the volume of urban public transportation.

The high rate of growth in the number of motor vehicles negatively affects the development of the city's transport infrastructure and can lead to automobile collapse.

To find effective strategies for managing traffic flows, optimal solutions for designing a street-road network and organizing traffic, it is necessary to consider a wide range of characteristics of the traffic flow, the patterns of influence of external and internal factors on the dynamic characteristics of the mixed transport stream.

The basic physical aspects of traffic are simple enough. When there are not too many cars on the road, they can more freely rebuild from one band to another, accelerate or slow down the traffic without creating problems [1]. Each machine can keep at a safe distance from the neighboring and move at the desired speed. This is considered a "free flow". However, gradually, as the number of cars on the road increases or when ahead of the cars slow down traffic to get off the highway, you have to brake behind the going to keep a safe distance. And instead of free flow, cars line up in an unstable structure, where they move at the same speed, but are slower than before. From this moment, the traffic begins to jerk, which subsequently leads to a traffic jam.

Today there is no generally accepted definition of congestion. Most often used: road congestion (traffic jam) - congestion on the road vehicles moving at an average speed, much less than the normal speed for a given section of the road.

Having considered methods of solving the congestion problem of the street-road network in European countries, we will determine which of them will be effective for the conditions of Astana city.

In European countries, transport problems practically do not differ from Kazakhstan ones: the same congestion, traffic accidents and environmental pollution. The generally recognized criteria for the quality of road traffic: preventing the formation and spread of traffic congestion, minimizing fuel consumption, reducing pollution and excessive noise - are applicable to both Western and Kazakhstan's highways.

The situation on the roads of London is one of the most difficult in the world. Since recently, the authorities have introduced a system of payment for entry to the city center, which significantly improved the transport problem in this place. For non-payment of tax, a significant amount of a fine is levied, which, like the entry tax to the city center, is directed to the improvement of public transport. The so-called "traffic tax" was also adopted. It is the charging of a fare for a certain section of the road at a certain time of the day. Since the introduction of this system, the time spent by drivers in "traffic jams" has decreased by 20-30%.

In Germany, almost at every intersection where there may be traffic difficulties, sensors and video cameras are installed that analyze the number of cars before the intersection and, based on this information, regulate the duration of the traffic signal switching [2].

In Berlin and other cities in Western Europe, a system of road traffic has been introduced, which consists in continuously transmitting traffic reports on certain areas to vehicle reception devices (radios, GPS-navigators). Based on this information, the driver can choose another route, or it will make the navigator for it. This system is in many respects similar to the popular service "Yandex-congestion" with one difference: it is supported at the level of state organizations, and information is received from emergency services, automatic traffic control systems and from CCTV cameras.

Singapore experienced significant difficulties with the transport flow in the 90s of last century. To reduce traffic congestion, administrative measures such as increasing taxes and fines were applied [3]. For example, the purchase of a Ford Focus car cost the owner $ 60,000, plus the same amount needed to be paid for the registration, which lasted 10 years. This is comparable to the content of the elite Mercedes S-Class in Kazakhstan. To compensate for this injustice the authorities have made all public transport one of the best in the world, so citizens simply do not feel the need for a car.

An effective tool for managing the traffic density in Singapore is the use of an electronic payment system for roads: once the car crosses the electronic rack, sensors are set up specially in the car and the required amount is automatically written off from the driver's prepaid card. The system showed its effectiveness: on high-speed roads, the speed range was maintained at 45-65 km/h, in the city and on other roads - at 30 km/h. The density of the transport stream is reduced by 13%, the average speed of the flow increases by 20% [4].

Despite the fact that in Astana the number of cars is much smaller than in large European cities, traffic congestion here is the same. There are several reasons for this.

1. In Europe it is customary to make intracity trips on public transport, even if there is a private car. Of course, this unloads the street-road network of the city.

2. Most car enthusiasts in Kazakhstan believe that you can leave the car anywhere in the city. Quite often you can see the car left on the pedestrian road. This habit needs to be changed. Citizens should understand that they create inconvenience to other people and detain the urban movement as a whole.

In areas of mass residential development, it is necessary to increase the network of residential streets through the disaggregation of micro-districts, improving not only the transport services of

residential areas, but also greatly alleviating the problem of car parking for the permanent urban population.

3. The problem is also that the city today is being built up in the Soviet times - without taking into account the fact that many people have cars. Obviously, the roads of Astana are not designed for the number of vehicles that are currently available in the city. In the solution of this issue, the main role is played by planning. Without competent planning it is impossible to get a territory on which it is convenient to live.

In modern conditions the transport situation in major cities, including Astana, can be improved by introducing various measures limiting the use of motor transport, at the same time developing public passenger transport.

The above measures can be different: from an administrative ban to charging for departure on the road, but their focus is one - reducing the number of cars to a level that does not exceed the capacity of the street-road network. The main object of restrictions in the implementation of this approach should be own cars of citizens, because they make the greatest contribution to the congestion of the city's street-road network [5].

The development of public transport means the improvement of the conditions of travel in it, starting with the uninterrupted traffic movement according to the timetable and ending with their comfort. To do this, it is necessary to increase the number of vehicles and introduce new types of public transport that meet the requirements of Astana city. It is necessary to create conditions under which the using of public transport would be more advantageousthan a car.

For the development of the street-road network, it is also necessary to upgrade the taxi service: to systematize private transportation, check vehicles for technical failures, make it safe for passengers. Taxis should be cheaper and more affordable than using personal transport. It is necessary to identify special places outside the road for taxi parking. It is desirable near the stops of route transport [6].

It is also necessary to build “interception” parking where the motorist could leave his car and continue the way by public transport or taxi.

Another one measure of unloading urban roads is the development of Internet technologies, such as websites of various state institutions, through which residents of Astana will be able to receive any certificates and other documents online, instead of going there.

The development of the street-road network is an important and expensive measure. The project contains some ways to reduce the transport load, but in fact, there are many. With a competent approach to solving this problem, they can be supplemented with other valuable suggestions.

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