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The "Engineer" publishes the most significant results of scientific and applied research carried out in universities of transport profile, as well as other higher educational institutions, research institutes, and centers of the Republic of Uzbekistan and foreign countries.

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Algorithm for adaptation of sensors for detecting moving units in transport

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Abstract: This article analyzes the shortcomings of enterprises operating in the field of urban road transport, the shortcomings indicated in them and the need to provide high-quality transport services to the population in order to eliminate them, the issues and behavior of drivers are discussed, the management of public transport is analyzed, a positive decision is made on actions. Thus, the purpose of the research is to study the conditions of public transport development. We have studied some of the shortcomings of public transport, identified the main problems that passengers suffer from. The study confirmed the hypothesis that the study of the advantages of foreign public transport is an important and relevant area of modern sustainable transport system research.

Keywords: shortcoming, transport, passenger transport, bus, subway, rolling stock, system

1. Introduction

The development of the public transport system in Tashkent is one of the most important aspects of city life. But in the city of Tashkent, this field is currently lagging behind [1]. In particular, many residences have been built in recent years, the population has increased, and the city area has expanded. Currently, 1,300,000 passengers use public transport in our capital. It is required to analyze the movement of passenger transport vehicles in the city of Tashkent. Many authors have talked about tariffs while improving passenger transportation. Some of them have changed their fares based on distance. Other authors have focused on the accessibility, condition, automation, and equipment of public transport.

2. Research Methodology

The unusual race of public transport seriously affects the dissatisfaction and safety of passengers. There are several main reasons why buses pass each other on city streets [2]. One of these is on the financial side, that is, raising more money. Because the monthly salaries of drivers in all business entities are set at the level of the minimum wage. Their main income is surplus money from the “set plan” by the business entity. Therefore, drivers try to carry as many passengers as possible. On the other hand, there are many overlapping routes in the traffic of city passenger buses. To eliminate this situation, it is necessary to revise the city bus routes [3], [7], [8], [9], [10], [11].

Currently, a number of practical works have been started in order to find a solution to this problem [4], [12], [13], [14], [15]. As a result of the bus driver's smoking, his smoke spread into the bus cabin, causing dissatisfaction among the passengers, but the thought goes, “I have a little bit left to my stop, what am I going to do to spoil my mood by explaining to the driver that smoking is not allowed?”.

The introduction of voice announcements or advertisements in the intercity bus salon should be implemented only after a public consultation [5], [16], [17]. The sound advertisements in the salon at the same time as the information about the arrival at the stations are given, the parallel sound makes the passengers even more confused [6].

The sanitary conditions in the bus cabin sometimes make the passengers angry. As shown in Figure 2, we can see that the interior of the salon has not been cleaned for almost several months. Newly introduced buses are excluded, as they have just been put into operation (Figure 2).

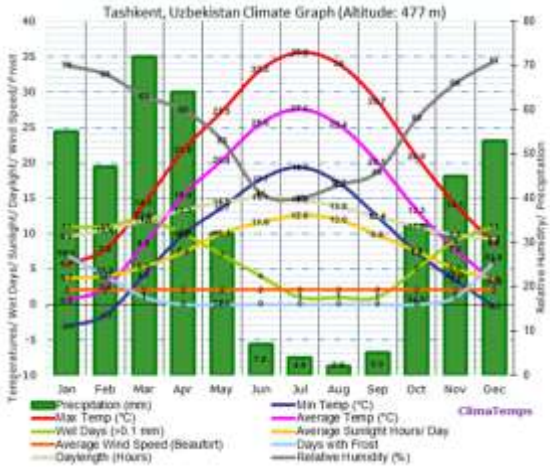

Fig. 1. Tashkent city annual climate index

As of August 1, 2021, there are a total of 1,179 city passenger buses at the disposal of the enterprises of the “Toshshahartranskhizmat” joint-stock company, of which 560 or 47.5% are large-capacity buses and 619 or 52.5% are medium- and small-capacity buses. In this case, the average period of disposal of buses is 7.3 years, and the number of buses that have been disposed of for more than 10 years is 323 or 27.4% of the total number of buses.

A total of 350 buses, of which 130 were large-capacity and 220 small- and medium-capacity buses, were purchased for the movement of enterprises in the system of the “Toshshahartranskhizmat” joint-stock company in 2017-2021.

Currently, there are 264 subway cars on the balance sheet of the unitary enterprise “Tashkent Metropoliten”, of

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Fig. 2. Tashkent city bus salon

which 152 were purchased in 1980-1990, 24 in 1991-2000, 20 in 2001, 8 in 2020, and 60 in 2021. 60% of the existing rolling stock has been disposed of for more than 30 years.

Figure 2 shows the problems of visibility by passengers and drivers of road transport that occur in the autumn-winter period, passengers can get out of the stop without seeing the car. Parking of cars at bus stops creates enough problems for buses. Buses are forced to stop and drop off passengers in the middle of the road when they stop and leave the bus stop due to the impact of cars parked around the bus stop. This again creates traffic jams (Figure 3).

Fig. 3. Cars parked at bus stops

The concept of the development of Tashkent city transport and transport infrastructure until 2025 has been developed, which includes plans to prevent traffic jams on highways in Tashkent city, methods of public transport development, stages of improving the tariff policy in urban passenger transport, the formation of the organization of the system of roadside parking places for cars, cargo transportation the development of traffic regulation criteria, the strategic goals of the introduction of digital technologies in the transport system and the priorities of the state policy are defined. The implementation of the concept allows for the creation of a convenient and efficient transport system in the city of Tashkent. The purpose of this study is to increase and analyze the influence of passenger transport in Tashkent.

As a result of the research, the following questions will be answered:

1. Should priority directions for the development of public transport be established?
2. What criteria can be used to organize mobile public transport?
3. Will promise innovative bus service and innovative national passenger connections?

The program for the introduction of a new route network of Tashkent city surface passenger transport in 2022-2025 has been approved today (Figure 4).

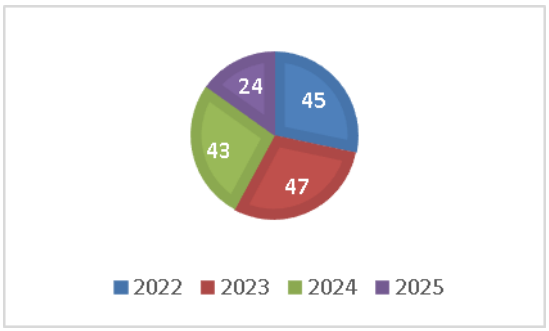

Fig. 4. The indicator of the introduction of new routes of surface passenger transport in Tashkent city

The indicator of the introduction of new routes of surface passenger transport of Tashkent city is set to be introduced in 2022-2025. New routes of surface passenger transport - 45 in 2022, 47 in 2023, 43 in 2024, and the remaining 24 in 2025 are planned. (Figure 4).

Here are the numbers of "highway, ring, binder and provider" roads planned to be built in 2021-2023. The most planned connecting roads are listed. In 2021, 30 connecting roads were built, and in 2022, 5 were built. Highways are the least built roads. 11 were established in 4 years (Figure 5).

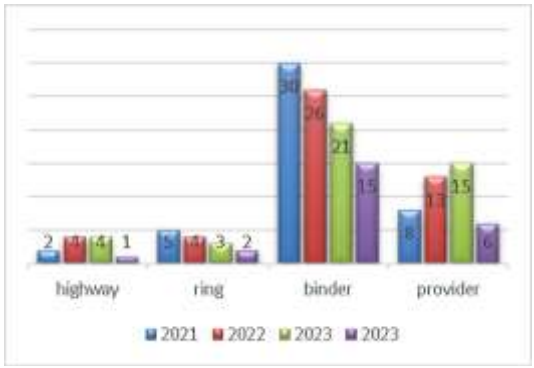

Fig. 5. The indicator of the introduction of new routes of surface passenger transport in the city of Tashkent

The general structure of bus traffic of the city passenger transport will be updated in the period of 2021-2025. The most recent update will be in 2022. 2021 is not planned (Figure 6).

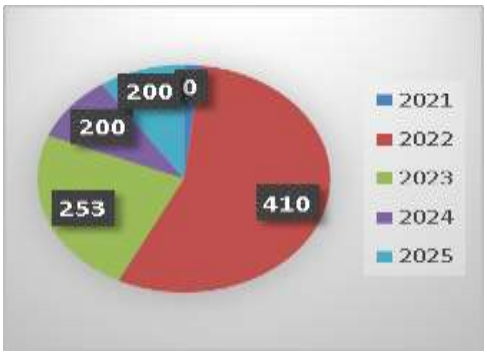

Fig. 6. Update the total bus traffic structure of the city's passenger transport

Also, one of the main goals should be the development of the city's public transport infrastructure, including the creation of a network of new routes, the renewal of traffic with modern "green" types, the reconstruction of intermediate stations based on a new design, the creation of a system of transport links, and the introduction of differentiated tariffs.

Including the most recent update, 20 electric buses, 190 buses running on compressed natural gas, and 200 buses running on diesel fuel are planned to be delivered in 2022. (Figure 7).

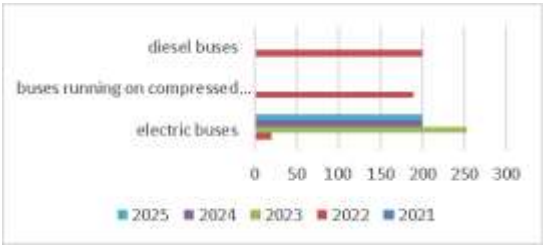

Fig. 7. Update of the traffic structure of bus types of city passenger transport

In the process of optimization of the network of Tashkent city routes, it is planned to organize convenient transport links at intersection points of 4 types of routes and metro lines.

3. Results and discussion

In 2022, it is necessary to establish 16 transport links in the city of Tashkent at the intersection of public transport and metropolitan routes, connecting with the city center, densely populated residential areas and densely populated points.

It is necessary to create equal conditions for all categories of passengers, to ensure passenger safety, to create differentiated tariffs, and to create rest areas for passengers and drivers in the newly established transport links.

In 2022, in the development of public transport infrastructure, 10 "construction of transport links" are included in the plan (Figure 8).

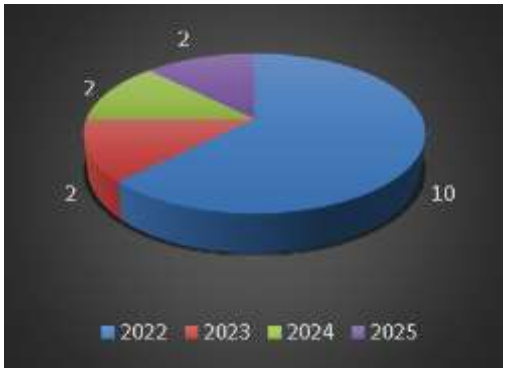

Fig. 8. Organization of transport links

In 2025, in the development of public transport infrastructure, 320 "reconstruction of intermediate bus stops" are included in the plan (Figure 9).

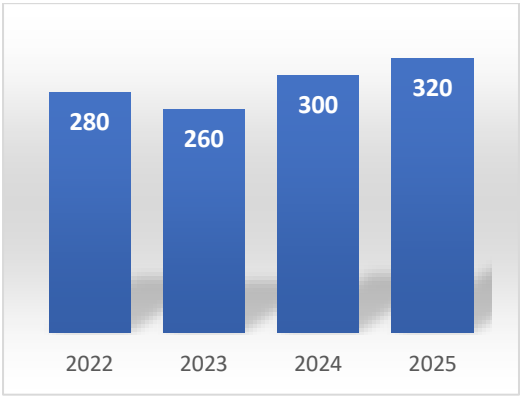

Fig. 9. Reconstruction and modernization of intermediate bus stops based on a single design

An intermediate bus stop is a public place located on the streets of city public transport routes, equipped for passengers to get off and get off and wait for a vehicle moving in the desired direction.

There are 2,306 intermediate bus stops in Tashkent, 788 of which operate as shopping malls. In 2022-2025, 11 "separate lanes for buses" are included in the plan for the development of public transport infrastructure (Figure 10).

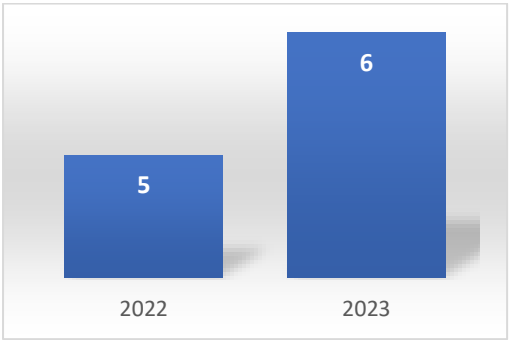

Fig. 10. Organization of separate corridors for city passenger transport

In terms of bicycle transport infrastructure, 77 km long bicycle lanes have been built on 12 streets of the city for bicycle transport users in 2018-2021.

In order to create the necessary infrastructure for bicycles, it is planned to build 250 bicycle lanes and establish bicycle shelters in front of 480 enterprises, organizations and offices (Figure 11).

Fig. 11. Bicycle infrastructure development plan

Currently, the number of passenger cars licensed to provide taxi service to passengers through non-directed taxi activity in Tashkent is more than 11,000, and the average term of ownership of taxi cars is 15 years.

Payments for the taxi service provided by entrepreneurs and organizations engaged in the activity of a taxi without direction are mainly made in cash.

The increase of non-directed taxi companies will greatly contribute to the development of urban transport (Figure 12).

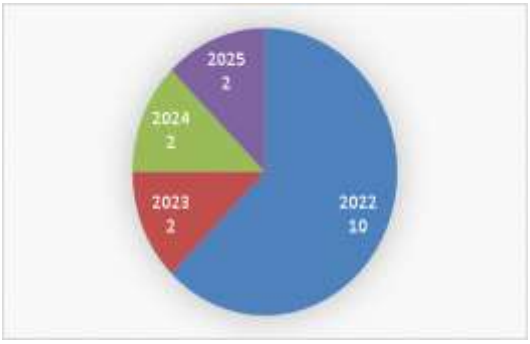

Fig. 12. Plan to increase the number of taxis without directions

In the public transport system of Tashkent city, the rate of use of information and communication technologies is on average 35-37 percent.

Today, the Automated Fare Payment (ATTO) and Automated Dispatch Management (ASDUM) systems have been introduced to automate the business processes of public transport operations.

In order to expand the capabilities of the automated payment system in public transport, the sale of transport cards has been established at special transport card sales points, metro ticket offices and self-service bank terminals (info-kiosks) located in the city, as well as mobile applications of the main electronic payment system (ATTO, Raume, Click, Uzcard, Apelsin, etc.) made it possible to top up transport cards with funds.

Through the automated dispatching management (ASDUM) system, monitoring of buses in public transport, allocation of buses to routes, control of stopping time at intermediate stops, control of violations of traffic rules, control of compliance with the bus timetable, control of the intermediate distance (interval) of buses has been established. Also, in order to create convenience for passengers, the mobile application "Tashkent Transport" has been developed, through this application: real-time monitoring of the city's public transport traffic, information about public transport intermediate stops and metro stations near the user's location, traffic location, directions as well as saving movement history, route planning (finding the fastest and easiest way to plan movement in city public transport), quickly finding points (geolocations) of electronic transport card sales points and determining the bus route to this destination, route guide (without using a private vehicle provides a clear guide on how to get from point A to point B).

4. Conclusion

As a result of this research, it clearly shows the relevance of re-evaluating the existing types of transport in the city of Tashkent. The existing transport system is reason enough to attract the majority of people who can afford a car to use bus

transport for mobility. Driver behavior is influenced by many factors, including personal characteristics, environment, and vehicle characteristics. Bus drivers are generally required to have a high level of training and experience, and an attitude that promotes safe driving in accordance with their profession. Also important are the vehicle's characteristics, and the need to adhere to the work schedule for the comfort/safety of the passengers. Also, equipping public transport for persons with disabilities, continuing to introduce special mobile programs to improve the work of public transport, introducing the use of navigation boards, route tables and voice warnings at stations, separate to separate directions of action, it is necessary to introduce strict restrictions on passenger capacity in public transport.

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