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MANAGEMENT OF PUBLIC TRANSPORT IN THE CITY OF ANDIJAN

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Annotation
It is considered very important to maintain and optimize the technical condition of the rolling stock, to improve the technology of efficient use of the rolling stock in order to increase the efficiency of the work of passenger-carrying ATK in the Andijan region, and in the organization of these works, to organize the work of the TXK and T, as well as the control departments of the ATK with high quality, concrete proposals for modernization and improvement of the technical base of the general enterprise are given.

Key words

motor vehicle, rolling stock, regulation, competence, qualification, passenger transportation, cargo transportation, technical parameter, technical base, technical service**.**

Passenger transportation and passenger turnover in Andijan region by road transport in January-June 2023, 347.8 million people were transported by all types of road transport, this figure is 103.5% compared to the same period last year. formed During this period, the growth rate of passenger traffic reached 107.0% and made 6,390.5 million passenger-km.

In large cities around the world, the quality indicators of public transportation services, including the issues of getting passengers to their destinations on time and in comfort, modern solutions to existing problems, and improving the quality of service, are becoming important. . In this regard, special attention is paid to the development of new scientific and technical solutions for improving the quality of city bus services in developed foreign countries, including the USA, England, Germany, France, Singapore, Japan, and South Korea. Motor transport network enterprises are involved in the process of passenger transportation as the main subject.[1]

In our republic, large-scale work is being carried out to develop motor transport network enterprises, to raise the quality of the provided service to the level of world standards, and to increase work efficiency. In particular, as a result of passengers staying on the roads for a long time, great material damage is caused to the economy of our country.[2]

Resolution of the President of the Republic of Uzbekistan dated January 10, 2017 "On measures to provide public transport services and further improve the system of passenger transportation by buses in cities and villages" (PQ2724) and the President of the Republic of Uzbekistan Pursuant to the decision of March 6, 2019 PQ-4230 "On measures to radically improve the cargo and passenger transportation system", further improvement of the system of organization of transport services, for carriers of all forms of ownership many goals and tasks have been defined in terms of creating a competitive environment and favorable conditions and increasing the transport and transit potential of the Republic[3].

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Based on the decision, the "Roadmap" on "Further development of passenger and cargo transportation" was approved, and on the basis of this, effective work is being carried out on the development of the sector. The problem of providing urban residents with transport becomes especially important in the conditions of our republic's economic growth. It is impossible to increase the production of goods and services without the appropriate development of passenger transport in industrial centers.

In addition, the stabilization of economic development leads to an increase in the well-being of the working population, which in turn determines the demands of passengers for the quality of transport[4].

Here, in 2019, if we analyze the data provided by the statistics committee on the circulation of goods and passengers in various types of transport in our Republic, the total number of transported passengers is 5951.5 million passengers. 5,852.8 passengers or 98%, the total volume of transported cargo is 1,243.0 tons, of which 1,102.2 million tons or 88% is accounted for by road transport. determines how important the economy is. The largest share of transport services corresponds to the services of transportation of goods and passengers in road transport [5].

In January-March 2021, the share of passenger transportation services in road transport reached 67.7%. Compared to other types of transport, this type of transport is in high demand due to its flexibility and relatively low cost of the services provided. It is very important for motor transport enterprises (ATK) engaged in passenger transportation to organize their services efficiently, qualitatively and conveniently. This is mainly ensured by the careful and reliable organization of the main departments of the ATK [6].

Many researches and literatures have been conducted in our republic and foreign literature in order to increase the work efficiency of passenger transportation ATKs and optimize work processes. In particular, M.Z. Musajonov, M.A. Abduvaliyev, Q. M. Siddiqnazarov, M.A. Ikramov and others, the need to ensure the technical readiness of existing vehicles for the timely transportation of cargo and passengers at automobile enterprises at a high level, with the least expenditure and meeting environmental requirements, for this they are regularly it is emphasized that it is necessary to carry out maintenance and repair works (TCK and T), provide them with storage places, spare parts and materials related to auto operation, and perform a set of other services [7].

Foreign scientists G.V. Kramarenko, N.Ya. Govorushchenko have shown that the efficiency of motor transport enterprises depends on the level of organization of its technical service and current repair department, and how it is achieved through various theoretical and practical ways of improving engineering activities in this work. , B. S. Kleiner, E. S. Kuznetsova, N. P. Pankratova, I. Primakov, V. Chepurniy, and others. They discussed issues of improving the activities of engineering and technical workers with the participation of scientific research institutes and other production

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organizations. In order to provide high-quality and convenient service to customers, passenger transport companies first of all need to effectively improve their performance, fundamentally re-equip the material and technical base, increase the rolling stock, update its composition and constantly improve its technical condition. It is necessary to emphasize two main strategic directions in improving the work efficiency of all cargo and passenger transport ATKs [8].

Improving the efficiency and optimization of the technical parameters of the traffic structure; - Improving the technology of efficient use of rolling stock in ATKs. In increasing and optimizing the technical parameters of the traffic structure, their technical maintenance and repair, technical control and diagnostics, at the same time, it is very important to have the professional competence of the person performing these works[9].

Time of day partition of bus operating hours is a prerequisite of bus schedule design. Reasonable partition plan is essential to improve the punctuality and level of service. In most mega cities, bus vehicles have been equipped with global positioning system (GPS) devices, which is convenient for transit agency to monitor bus operations. In this paper, a new algorithm is developed based on GPS data to partition bus operating hours into time of day intervals. Firstly, the impacts of passenger demand and network traffic state on bus operational performance are analyzed. Then bus dwell time at stops and inter-stop travel time, which can be attained based on GPS data, are selected as partition indexes. For buses clustered in the same time-of-day interval, threshold values of differences in dwell time at stops and inter-stop travel time are determined. The buses in the same time-of-day interval should have adjacent dispatching numbers, which is set as a constraint. Consequently, a partition algorithm with three steps is developed. Finally, a bus route in Suzhou China is taken as an example to validate the algorithm. Three partition schemes are given by setting different threshold values for the two partition indexes. The present scheme in practice is compared with the three proposed schemes. To balance the number of ToD intervals and partition precision, a Benefit Evaluation Index is proposed, for a better time-of-day interval plan.[10].

Promoting public transportation development is deemed as an effective way to alleviate traffic congestion and reduce traffic pollutions in the metropolitan areas. A large number of methods have been adopted by the transit agency to improve the bus serviceability, which could increase the mode share of public transport (Wang and Yang, 2005, Tian et al., 2007, Bie et al., 2012, Yan et al., 2013, Szeto and Jiang, 2014, Qu et al., 2014, Zhang et al., 2014; among many others). Among these methods, bus schedule design is essential to improve the level of punctuality, and reduce average passenger waiting time and bus operation cost. It has been widely implemented in practice to increase the attractiveness of the bus mode.

The schedule design of a given bus route is an operational level problem and it includes the following fundamental decisions (Yan et al., 2012): (i) determine bus dispatching frequencies or headways; (ii) select some bus stops as time control points; (iii) determine the timetable at control points for the bus route. Current studies on bus schedule mainly focus on the above three aspects, especially the first and third ones (Zhao et al., 2006, Liu et al., 2013, Zhao et al., 2013, Wang and Qu, 2014, Herbon and Hadas, 2015). However, during the operating hours (e.g., 6:00–22:00) of a bus line, its passenger demand would largely fluctuate. The optimal schedule plans should better serve the expected passenger demand of particular time intervals. Considering the daily passenger demand fluctuations, it is necessary to partition the operating hours into several time-of-day (ToD) intervals. Within each interval, the optimal schedule plan (e.g., bus headway and timetable) can then be implemented. Hence, ToD interval partition is critical for a precise bus schedule plan, and further helps transit agency to deploy bus vehicles, balance passenger demand and bus route capacity, and maintain the

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passenger load factor at a reasonable level (Guo and Zhang, 2014). When developing optimization algorithms for the bus schedule design, many researchers assume that the ToD interval plan is given, and merely optimize the bus headway and timetable for a given interval. To the best of the authors' knowledge, there are only few studies on the topic of ToD interval partition of a bus schedule. Matias et al. (2010) studied the optimum number of schedules in one year and the days covered by each schedule using AVL (Automatic Vehicle Location) data. Dynamic time warping was used to calculate the distances between trip time profiles of different days and the K-means algorithm was used to create clusters with different days. Mendes-Moreira et al. (2015) extended the above work to multiple routes and two novel steps were achieved. The first step is that the consensual day coverage for the schedule network is developed from distinct routes based on consensual clustering technique. Then, the rules are extracted from the consensual clusters obtained and compared to the existing plan. These two works aimed to group the days of one year with similar travel time profiles into the same categories (e.g., holiday, normal, non-working day or weekend holiday), and the days in the same coverage would execute the same schedule plan. However, the aim of this paper is to partition a day into several intervals, such as morning peak hour, morning off-peak hour and evening peak hour. Thus, these two works are quite different from the study in this paper.

Lampkin and Saalmans (1967) used the passenger demand matrices in different periods of the day for bus schedule. Demand patterns for week-days were summarized in four demand matrices, which were morning peak period, evening peak period, morning/afternoon period and evening period. Demand in each period was assumed to be homogeneous. Since, the public prefer a concise timetable, a constraint is added on the total number of periods that can be used. Ceder (1984) proposed four methods to obtain the bus frequency for a given time period using passenger count data. One hour was taken as an example to be set as the time period. In his study, the method for the time of day partition was not mentioned. Patnaik et al. (2006) developed a method for clustering the state variables (number served passengers and halting stations in each vehicle trip). The planner could collect new data sample from the field and determined if it is "classified" into the cluster with one of the used optimal bus headway plans. If a number of misclassified states were obtained, the planner could conclude that conditions of ridership had reached a point where current headway plans might no longer be applicable, and that it was time to develop a new set of schedule plans. Guihaire and Hao (2008) concluded that the transit agency provided frequencies for every line and for each time period. The time periods were mainly determined based on public demand, which varied as per the time of day, day of week and time of the year.

For example, in researching the quality of transport service, considering the processes of "traffic organization" as a separate system, it has not been researched by dividing it into separate sub-systems.

CONCLUSION

Time-of-day interval (ToD) partition of operating hours is essential to bus schedule design. In this paper, the contributing factors to ToD partition were analyzed firstly. Then bus dwell time at stops and inter-stop travel time, which can be obtained based on GPS data, were selected as partition indexes. For buses clustered in a same ToD interval, threshold values of differences in their dwell times at stops and inter-stop travel times were determined.

Taking into account the random nature of the transport service quality variable indicators, it is necessary to develop a method of ensuring their normative value. Capacity utilization factor is one of the most important factors affecting the quality of passenger transport services in city bus routes. That is, to standardize the coefficient of capacity utilization through indicators of the quality

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considered important (number of buses on the route, regularity of traffic, time spent by the passenger in the transport, capacity of the bus, etc.) it is possible to improve the quality of transport service to passengers.

To date, the analyzes of the indicators that affect the quality of transport services to passengers on bus routes carried out by scientists of the world and our country, made it possible to develop a scheme of dependence of the parameters that determine it on the coefficient of capacity utilization, and in turn, had a significant impact on the quality of the provided transport service. In the Andijan region, it is appropriate to give special importance to the organization of quality transport services for the population, especially to increase the number of buses and minibuses in the existing routes in the passenger transportation system and the fleet of vehicles moving in them.

In addition, in the management of the quality of transport services, the widespread introduction of modern information and communication systems, the equipping of bus stations and intermediate stations with modern equipment is one of the important elements of providing quality services to the population. Today, extensive use of the experience of developed countries, the introduction of scientific and innovative developments in this field and further development of its promotion play an important role in the organization of quality transport services for the population.

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