European Journal of Interdisciplinary Research and Development
Volume-21 November 2023
Website: www.ejird.journalspark.org ISSN (E): 2720-5746

EFFICIENT ORGANIZATION OF THE PROCESS OF SERVICING AUTOMOBILE FLOWS ARRIVING AT THE POINT OF SHIPMENT

Muratov Abobakr Kholikberdievich
Doctor of Philosophy in Technical Sciences,
Termez State University, Uzbekistan

Abstract:
This article focuses on the effective organization of the process of servicing automobile flows, as well as improving the efficiency of cargo transportation and reducing the daily unproductive downtime of vehicles. Relevant recommendations are given to improve the performance of gross services and improve the efficiency of work.

Keywords: loading and unloading, automobile, transportation, effective, cargo dispatch point, queue, wait.

Introduction

In the process of loading, vehicles arrive at random times, while the start and continuation time of mass maintenance is expressed by random parameters. At the same time, the processes occurring in the service system are random processes [1, 2].

Examples of such flows in shipping activities are flows of various types – cargo volume, paperwork, number of shipments, number of cargo recipients, delivery address, waiting in line, loading and unloading. The behavior of the system is usually determined not by one, but by several streams of events at once [3, 5].

In order to give appropriate recommendations for improving gross service activities and improving work efficiency, it is advisable to use the following indicators: λ -the intensity of the influx of applicants for service; μ -the intensity of service; n -the number of service points; m -the number of cars waiting in line; p_{rad} -the probability that loaders will wait for cars; $\bar{t}_{\text{wait}}$ -vehicle speed average waiting time for service.

The transition of queuing from one state to another occurs under the influence of very specific phenomena – the fulfillment of orders and their maintenance. A sequence of events occurring one after another at random time is called an event stream [5, 6].

States of mass service systems are usually represented by rectangular or round shapes, and possible directions of transition from one state to another are controlled by directed arrows connecting these states [7, 8].

In this case, the system can be in one of three states: let channel S_0 –(waiting); channel S_1 –is busy with maintenance; channel S_2 – is busy with maintenance and there is one order in the queue.

The transition of the system from state S_0 to state S_1 occurs under the action of the simplest application current with an intensity of λ_{01}, and the system is transferred from state S_1 to state S_0 through a service current with an intensity of λ_{10}.

Since the probability that the system will remain in one state or another is probabilistic, the probability that the system will be in state S_i during t is called the probability of the i state of queue systems $S_i(t)$ and is determined by the number of services received.

A random process that occurs in the system at random points in time $t_0, t_1, t_2, ..., t_k, ..., t_n$ the system is in one or another discrete state known sequentially.

Such a random sequence of events is called a Markov chain, if for each step there is a probability of transition from one state S_i to another independent S_j due to when and how the system moved to the state S_i, then the Markov chain is described using the probabilities of states, and they form a complete group of events, so their sum is one.

For example, a daily order from j consumers (Q_j)compared to the average number of cars serviced per day and the intensity of arrival at the point (λ) is defined as:

$$\lambda = \frac{Q_1 + Q_2 + ... + Q_j}{q_n \gamma_{st} T_w} = \frac{250 + 200 + 100 + 200}{25 \cdot 1{,}0 \cdot 8} = 3{,}75\, auto/h \quad (1)$$

where $Q_j -$ is the volume of daily orders, t; $q_n -$ is the load capacity of the car, t; $\gamma_{st} -$ is the coefficient of static use of the load capacity of the car.

If there are $m = 3$ machines in the queue, then newly arriving machines have to spend time waiting for service, since the average time to load one machine is $t_{yuk} = 8$ minutes, and to load $n = 1$ single loader. If the average cost of loading one car is $c_1 = 30{,}0$ thousand soums, the intensity of the flow of applicants for the service is $\lambda = 3{,}75$ auto/hour, then we analyze the operation of the service system from $8^{\underline{00}}$ to $17^{\underline{00}}$ hours, i.e. we assume that one day of work is $T_w = 8$ hours, and determine the optimal solution (Fig.3).

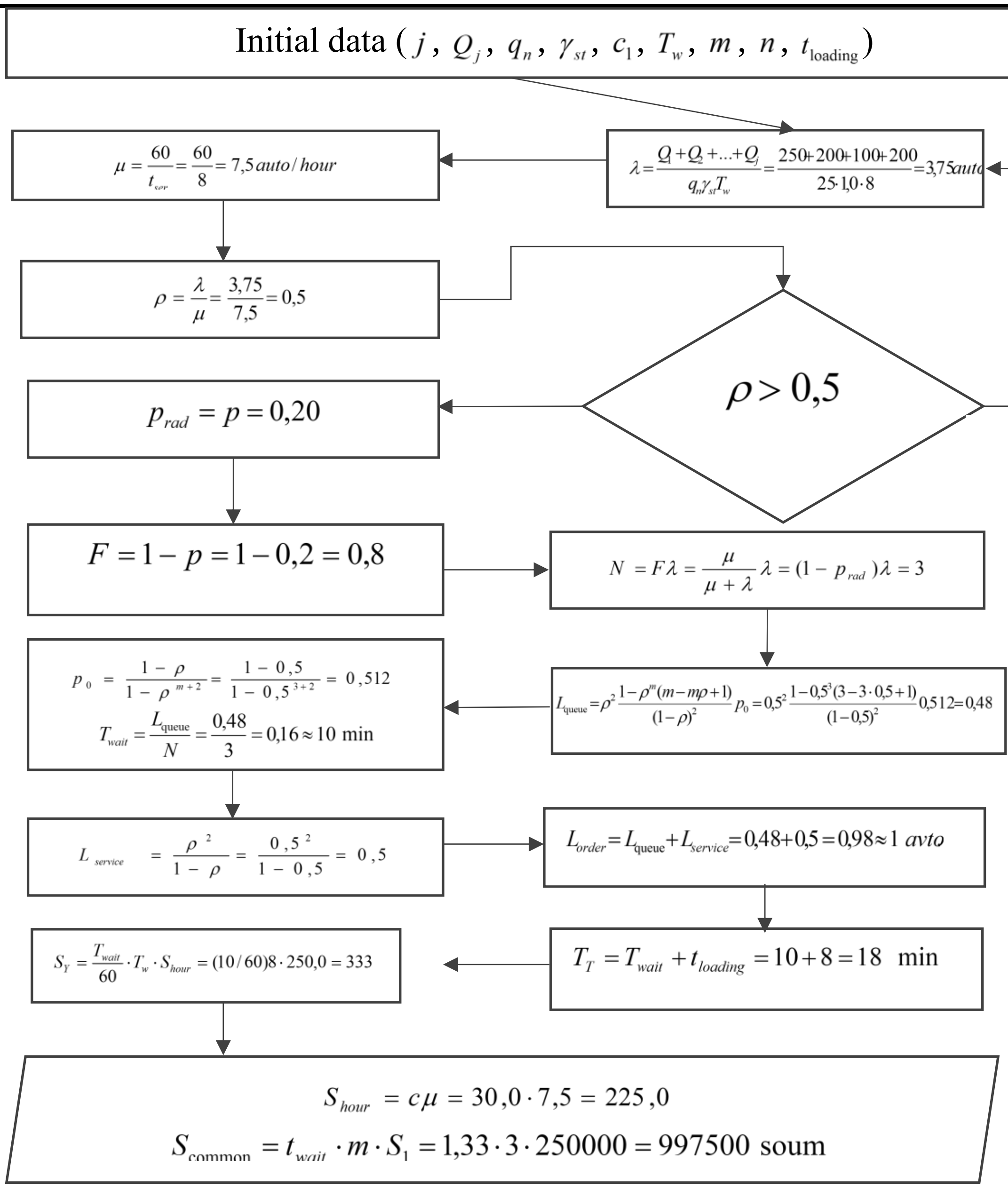

Figure 3. Effective organization of the process of servicing the flow of vehicles entering the queuing system, a block diagram of the algorithmю

The effective organization of the process of servicing the flow of vehicles is presented in the algorithm-block scheme in Figure 3, in which the operations below are performed in each block:

In the A_1 block, the initial data is entered j, Q_j, q_n, γ_{st}, c_1, T_w, m, n, $t_{loading}$;

In block A_2, the cadence of the arrival of cars at the service point is determined by λ ;

In block A_3, the service speed of the boot tool will be found μ;

In block A_4, the ratio of the flow of cars to the speed of service of the loading vehicle of the arrival at the service point is determined ρ ;

A_5 – below condition $\rho > 0,5$ is checked in order to effectively organize the speed of service in the block;

In block A_6, the probability of denial of Service is determined p_{rad};

The relative permeability of the service point in block A_7 is F;

In block A_8, absolute conductivity N is determined;

In block A_9, an average queue length of L_{queue} is found;

Block A_{10} – determines the average queue downtime of T_{wait};

A_{11} – the average number of orders served in the block is determined $L_{service}$;

Block A_{12} – determines the average number of orders in the system L_{ordek};

At the loading point in block A_{13} –, the average stay time of the car is determined T_T;

In block A_{14} –, the economic transmission of the car in the one-day wait at the loading point is determined S_Y;

In block A_{15} –, the one-hour wage of the loading vehicle is determined S_{hour} and the value of the daily untimely transmission of cars is determined S_{common}.

Conclusion. Thus, the average share of cars rejected or waiting for their turn was 20%, which is $t_{wait} = T_w \cdot p_{rad} = 8 \cdot 0,167 = 1,33\ hour$ for one car operating for 8 hours in one working day.

If the car's one-hour wage is estimated at $S_1 = 250$ s., then the cost of one-day economic inflows of 3 cars will be. $S_{commmon} = t_{wait} \cdot m \cdot S_1 = 1,33 \cdot 3 \cdot 250000 = 997500\ soum$

REFERENCES

1. Butayev Sh.A., Sidiknazarov K.M., Murodov A.S., Kuziev A.U. (2012). Logistics (flow management in the supply chain).- T.: "Extremum Press", 2012. -577 pp.

2. Abobakr Kholikberdievich Muratov. (2022). Increasing The Efficiency of Cargo Delivery to Consumers. Eurasian Journal of Engineering and Technology, 12, 20–23. Retrieved from https://www.geniusjournals.org/index.php/ejet/article/view/2688

3. A.U.Kuziev., A.Kh. Muratov (2021). Application Of Logistical Principles In The Development Of Directions In The Region. The American Journal of Engineering and Technology (ISSN – 2689-0984). Volume-03 Issue-05. May 31, 2021 | 143-149 Doi: https://doi.org/10.37547/tajet/Volume03Issue05-20

4. Urokovich, K.A., & Dostmurodovich, S.O. (2022). Issuing the Plan for the Development of the Automobile Road Network. International journal of inclusive and sustainable education, 1(5), 195–201. Retrieved from https://inter-publishing.com/index.php/IJISE/article/view/450

5. Abobakr Kholikberdievich Muratov. (2022). Increasing The Efficiency of Cargo Delivery to Consumers. Eurasian Journal of Engineering and Technology, 12, 20–23 pp. Retrieved from https://www.geniusjournals.org/index.php/ejet/article/view/2688

6. Komilov, A.L. (2020). Methods for Optimizing and Modeling Routes for Selecting a Routing Scheme for Passenger Transport in Buses (On the example of Surkhandarya). International Journal of Advanced Research in Science, Engineering and Technology, 7(9).
7. Komilov, A.L. (2021). Research and verification of urban public transport routes using mathematical methods (On the example of the city of termez). Asian Journal of Multidimensional Research, 10(10), 810-818 pp.
8. Komilov, A.L. (2021). Rational on the route a day hours according to passengers of flow distribution (Termiz city example). Scientific progress, 2 (2), 1449-1456 pp.