INFORMATION SUPPLY AND REGULATORY FRAMEWORK FOR THE ORGANIZATION OF WAGON FLOWS ON SECTIONS

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ABSTRACT

The purpose of the study is to discuss the role of information supply and its level of relevance in the transport system, as well as the interconnection of mathematical models of transport networks in the process of increasing the capacity of trains for rail transport and the effective organization of wagon flows. According to the results of these analyzes, analyzing the activities of the developed countries of the world's rail transport, we can see that even in them, automation of the transportation process is considered as an important factor in development.

Keywords*: carrying capacity, wagon flow, information supply, transport system, mathematical model, advanced state, automation of the transportation process.*

INTRODUCTION

Currently, the role of information technology in the process of effective organization and management of wagon flows in rail transport and its level of relevance is growing even more [1-6]. Also if we look closely at the development action strategy

of the developed countries of rail transport there we can see that the automation of the transportation process is considered as their priority task [7,8,9]. In this case, the automation of the operation of devices and auxiliary tools related to the transportation process has a positive effect on the quality of work and makes it possible to reduce the time indicators for performing work related to the transportation process [1,2]. As a clear example of this, we can show the country of Germany, which occupies one of the leading places in the world in terms of cargo and passenger transport [10,11]. One of the main reasons for this success can be seen in the example of the complete automation of the transport process and the clear and smooth work of the employees in the work process.

DISCUSSION AND RESULTS

The main components of providing information to the wagon flow control system are as follows[3,4]: initial parameters of the transport network and normative-reference information databases with variable data describing estimated traffic flows for solving problems of their organization (hereinafter referred to as NRI); Databases with parameters of the system of organizing the flow of wagons intended for the organization of transport and other applicable tasks of transport services [10-17]. Normative reference information for the calculated mathematical model should be compiled in accordance with calculation methods, programs and specifications for separate subsystems of AWFOS [5-22].

In the framework of NRI AWFOS, the creation and connection of a transport network model of databases with technical, technological and economic parameters is provided: train formation stations with the characteristics of wagon processing and track development and technical equipment; train processing technologies and shunting operations; work at a station of trains and locomotives specially allocated for shunting; technologies for the execution of the plan for the formation of freight trains assigned to the station; railway lines with characteristics of locomotive circulation sites (hereinafter referred to as LCS); work sites of locomotive crews (hereinafter referred to as WSLC); power supply systems; warranty zones for maintenance and service of

freight wagons; railroad crossings and approaches to them with characteristics of stations for cargo operations; objects of freight work; technologies for the use of specially allocated locomotives for export, delivery and shunting operations[2-13].

NRI AWFOS provides calculation of technical and economic specifications of stations, routes and nodes: technological time spent by various categories, lines and wagons within the object and its elements (including interoperational breaks with time allotted for the assembly of trains and groups of wagons); probabilistic descriptions of the time indicated to assess the reliability of the fulfillment of the specified deadlines for the delivery of goods; depending on the volume of transport (referred to as related costs in the next place) and special (belonging to one wagon of different categories, directions and directions) costs associated with the location, movement and processing of the wagon inside the; costs associated with the mileage and parks of cars and locomotives, employees of locomotive brigades, energy resources, wear of the upper structure of the road depending on the volume of movement); technical development of the object and its elements (the number of dimensions allowed for the processing of cars and the number of lines of trains formed by stations), restrictions on the size of; limitation of the time of delivery of goods, the volume of traffic flows and the allowable time of wagons inside the facility, which is determined by standards to distinguish them by purpose [20,21,22].

The technological process of developing wagon traffic consists of a sequence of technical stations and WSLC connecting them, which can be combined or interlocked according to the lines of the trains that have passed through. Therefore, for the system for organizing the flow of wagons, it is necessary to build interconnected network models (Figure 1) :

- transport network of freight and individual points by tariff codes;
- LCS and WSLC networks, special technical and cargo stations;
- networks for the formation of freight trains, loaded and empty lines;
- technological objects of the exploitation of rolling stock.

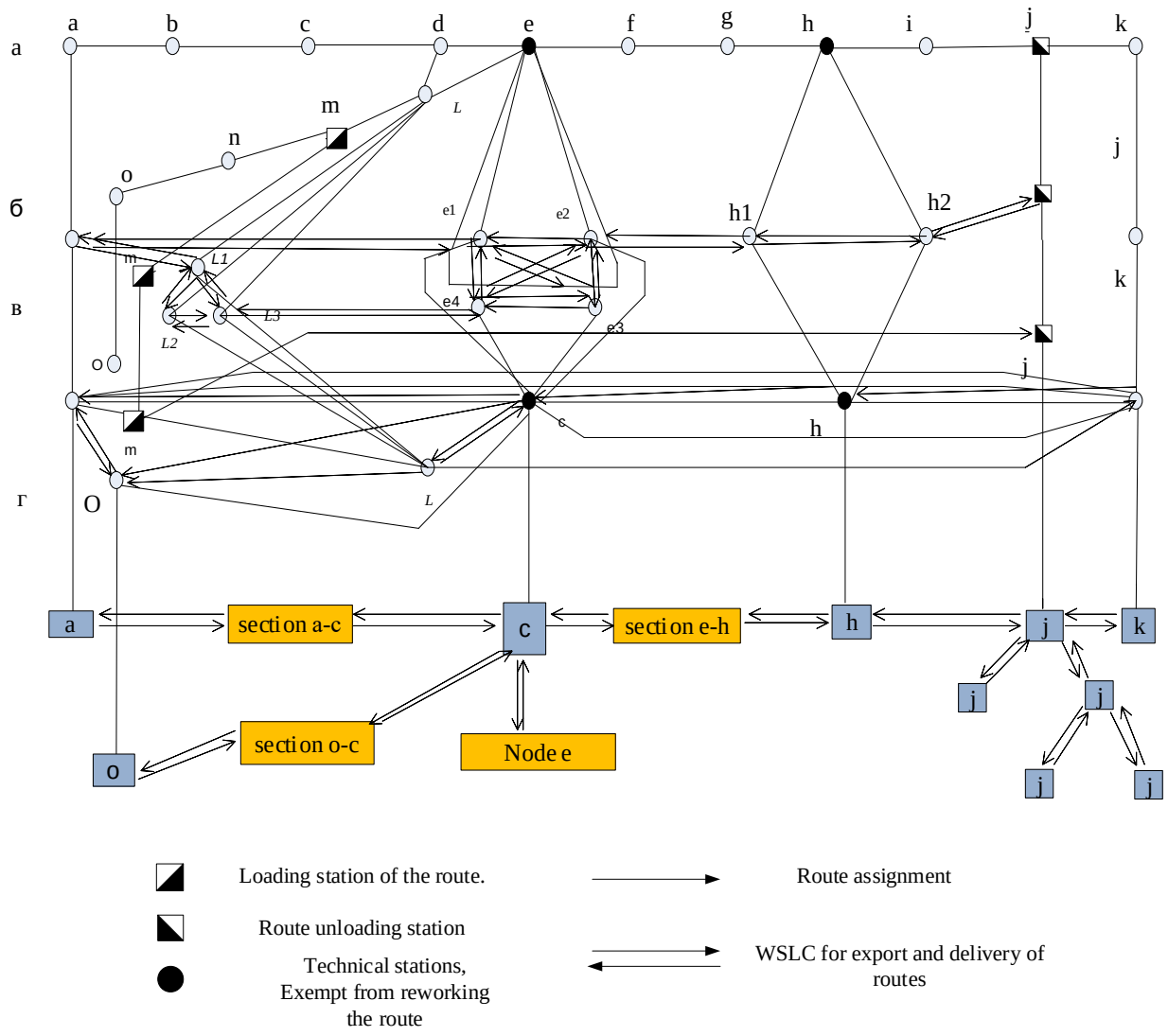

Figure 1 - Compatibility of mathematical models of Transport networks: a) freight traffic and individual points; b) LCS, WSLC and maintenance stations; c) train formation plan and route designation; d) technological devices for the use of moving content

Design standards are set by the elements of these models.

Technological objects of exploitation of the structure of movement must be connected with the corresponding territorial objects in the network model.

As technological objects of moving content in the network model, the following stand out:

1) A mathematical model of transport networks (in the general case, a set of territorial and technological interconnected stations and an arbitrary complex range)

and its networks:

A mathematical model of transport networks (in the general case, a set of territorial and technological interconnected stations and an arbitrary complex range) and its networks ;

- the railway of JSC “Russian Railways’’; railway infrastructure not part of Railways ; foreign state railway; railway precinct; railway crossing;

2) Special railway station:

- technical station; station for freight operations; JSC railway station “Russian Railways” ; railway infrastructure border station.

The calculation of normative technical and economic descriptions is carried out on the basis of rational (according to the criterion of clearly related costs in terms of the above restrictions) performance technology parameters-the number, series (sections) of exports and modes of operation. , the transfer of shunting locomotives and a special allocation, the processing time of trains in station parks, the distribution of operations with traffic flows between elements of facilities (sorting systems, station technological lines). Regulatory technical and economic descriptions make it possible to assess the impact of measures to improve technology and eliminate obstacles to the effectiveness of the use of stations and lines for processing and conducting transit wagon flows.

The standards for calculating and evaluating the options for the formation of freight trains are set for the approximate validity of the plan under development, taking into account changes in the parameters of technical development, analyzing the implementation of the current plan, and include the planned norms for loading stations and sections, as well as for the mass and length of trains. When changing the parameters of the technical development of stations and plots, appropriate adjustments are made to the regulatory and reference data.

CONCLUSION

Currently, we can see that the role of information technology in the implementation of work related to the process of organizing traffic in rail transport is incomparable. It should also be noted that the work on increasing and reducing loads and restructuring trains based on modern technologies introduced and used effectively on Russian Railways.

REFERENCES

1. Butunov D.B. Improvement of technical experimental methods for organization of wagon flows and management evaluation at sorting stations. Dis. ... doc. Phil. (PhD). Tashkent: TashIIT. – 2019. – 187 p.
2. Butunov, Dilmurod Baxodirovich; Aripov, Nodir Kodirovich; and Bashirova, Alfiya Mirkhatimovna (2020) *"Systematization of factors influencing during processing of wagons at the sorting station"* Journal of Tashkent Institute of Railway Engineers: Vol. 16: Iss. 2, Article 10. (https://uzjournals.edu.uz/tashiit/vol16/iss2/10/)
3. Butunov, D.B. (2020) *"Substantiation of the input of the parameters of the unprofitable loss of time when norming the time of the duration of the wagons on the sorting station"* Journal of Tashkent Institute of Railway Engineers: Vol. 16: Iss. 3, Article 16. (https://uzjournals.edu.uz/cgi/viewcontent.cgi?article=1191&context=tashiit)
4. Otkir Oktamjon Ogli Xusenov, Dilmurod Boxodirovich Butunov, & Shuxrat Xamroqul Ogli Boriyev (2021). SHAHAR ATROF POYEZDLARI TO'XTASH PUNKTLARINING ORALIQ MASOFALARINI ANIQLASH TARTIBLARI. Academic research in educational sciences, 2 (3), 890-896. doi: 10.24411/2181-1385-2021-00483
5. Butunov D.B. *Development of a technical and operational model for calculating costs when processing cars at a sorting station* / D.B. Butunov // Bulletin of TashIIT: Tashkent, 2019. No. 3. pages 181-195. (https://uzjournals.edu.uz/cgi/viewcontent.cgi?article=1074&context=tashiit)
6. Butunov D., Abdukodirov S., Khusenov U., Buriyev Sh., *Methods of improving technological practices of processing of combined trains at intermediate stations*, The scientific heritage, Vol 1, No 67 (67), pp. 39-43, (2021), DOI: 10.24412/9215-0365-2021-67-1-39-43 (http://www.scientific-heritage.com/wp-content/uploads/2021/06/The-scientific-heritage-No-67-67-2021-Vol-1.pdf)
7. Saburov M.B *Prognostication loading of goods on railway transport republic of Uzbekistan* / Saburov M.B, Butunov D.B. // Universum, 2021, №1, p. 36-42. (https://cyberleninka.ru/article/n/prognozirovanie-pogruzki-gruzov-na-zheleznyh-dorogah-uzbekistana/viewer)
8. Butunov D.B. *Determination of factors affecting wagon turnover time* / D.B. Butunov, Sh.X. Buriyev, B.Sh. Kamalov // Deutsche Internationale Zeitschrift für zeitgenössische Wissenschaft. – 2021. – No. 8-1. pages 29-33. DOI: 10.24412/2701-8369-2021-8-1-29-33 (https://cyberleninka.ru/article/n/determination-of-factors-affecting-wagon-turnover-time)

9. Abdukodirov, S.A., & Butunov, D.B. (2021). Factors affecting the speed of movement of trains on railway stations. Academic research in educational sciences, 2(9), 467-473. https://doi.org/10.24412/2181-1385-2021-9-467-473
10. Butunov D., Buriyev Sh., Pardayeva U. *Non-productive time losses in sorting park operation,* The scientific heritage, Vol 1, No 74 (74), pp. 28-31, (2021), DOI: 10.24412/9215-0365-2021-74-1-28-31 (http://www.scientific-heritage.com/wp-content/uploads/2021/09/The-scientific-heritage-No-74-74-2021-Vol-1.pdf)
11. Bo‘riyev, S.X., & Butunov, D.B. (2021). The process of meeting wagons at the station “Ch” research. Academic research in educational sciences, 2(9), 438-444. https://doi.org/10.24412/2181-1385-2021-9-438-444
12. Bo‘riyev, S.X., Butunov, D.B., & Ikramov, G.S. (2021). Determination of causes of disorders of full train formation plan. Academic Research in Educational Sciences, 2(11), 331-338. doi:10.24412/2181-1385-2021-11-331-338 https://ares.uz/storage/app/media/2021/Vol_2_No_11/331-338.pdf
13. Butunov D. *System analysis of uniformality of operation of sorting station “CH” in daily mode* / Butunov D., Akhmedova M., Buriyev Sh. // Deutsche Internationale Zeitschrift für zeitgenössische Wissenschaft. – 2022. – No. 25. pages 30-33. DOI: 10.24412/2701-8369-2022-25-30-33 (https://cyberleninka.ru/article/n/system-analysis-of-uniformality-of-operation-of-sorting-station-ch-in-daily-mode)
14. Butunov D. *Operating results of the sorting station “CH” model in daily mode* / Butunov D., Buriyev Sh., Abdukodirov S., Musayev M. // The scientific heritage. – 2022. – No 82, pages 18-25. DOI: 10.24412/9215-0365-2022-82-1-18-25 (https://cyberleninka.ru/article/n/operating-results-of-the-sorting-station-ch-model-in-daily-mode)
15. Mardonbek Saburov, Dilmurod Butunov, Sokijon Khudayberganov, Sunnatillo Boltaev, Muslima Akhmedova, Mukhamedjan Musaev. Determination of the optimal requirement of the number of freight wagons. AIP Conference Proceedings 2432, 030091 (2022). 030091-1-030091-5. https://doi.org/10.1063/5.0090343
16. Буриев Шухрат Хамрокул Угли, Бутунов Дилмурод Баходирович, Икрамов Гайрат Шухрат Угли, Ахмедова Муслима Джалоловна НАРУШЕНИЯ ПЛАНА ФОРМИРОВАНИЯ ГРУЗОВЫХ ПОЕЗДОВ, ВЛИЯЮЩИХ НА ПРОЦЕСС ПЕРЕВОЗКИ // Universum: технические науки. 2022. №6-3 (99). URL: https://cyberleninka.ru/article/n/narusheniya-plana-formirovaniya-gruzovyh-poezdov-vliyayuschih-na-protsess-perevozki
17. Сардор Асқар Ўғли Абдуқодиров, Дилмурод Баходирович Бутунов, Сирожиддин Иброхимжон Ўғли Рахмонов ЮК ПОЕЗДЛАРИНИНГ УЧАСТКА ТЕЗЛИГИНИ ҲИСОБЛАШ УСУЛИНИ МАТЕМАТИК МОДЕЛИНИ ИШЛАБ ЧИҚИШ // Academic research in educational sciences. 2022. №7. URL:

https://cyberleninka.ru/article/n/yuk-poezdlarining-uchastka-tezligini-isoblash-usulini-matematik-modelini-ishlab-chi-ish
18. Shuxrat Xamroqul O‘G‘Li Bo‘Riyev, Dilmurod Baxodirovich Butunov, Islom Obitjon O‘G‘Li Abdumalikov VAGON OQIMLARINI TASHKIL ETISH USULLARINING RIVOJLANISH BOSQICHLARI // Academic research in educational sciences. 2022. №7. URL: https://cyberleninka.ru/article/n/vagon-oqimlarini-tashkil-etish-usullarining-rivojlanish-bosqichlari
19. Shuxrat Xamroqul O‘G‘Li Bo‘Riyev, Dilmurod Baxodirovich Butunov, G‘Ayrat Shuxrat O‘G‘Li Ikramov YUK POYEZDLARINI TUZISH REJASINING BAJARILISHI BUZILISHLARI SABABLARINI ANIQLASH // Academic research in educational sciences. 2021. №11. URL: https://cyberleninka.ru/article/n/yuk-poyezdlarini-tuzish-rejasining-bajarilishi-buzilishlari-sabablarini-aniqlash
20. Бутунов , Д. Б., Мусаев , М. Ю., Абдукодиров , С. А. у., & Даминов , Ш. А. у. (2023). АНАЛИЗ ОТЕЧЕСТВЕННЫХ И ЗАРУБЕЖНЫХ ИССЛЕДОВАНИЙ В ОБЛАСТИ СОВЕРШЕНСТВОВАНИЯ МЕТОДОВ ОЦЕНКИ РАБОТЫ СОРТИРОВОЧНОЙ СТАНЦИИ . Educational Research in Universal Sciences, 2(2), 223–236. Retrieved from http://erus.uz/index.php/er/article/view/1717
21. Бутунов Дилмурод, Хабибуллаев Файзулла и Даминов Шахриёр. (2023). АНАЛИЗ ВЛИЯНИЯ ПЛАНА ФОРМИРОВАНИЯ И ВЕСА ГРУЗОВЫХ ПОЕЗДОВ НА РАЗВИТИЕ ПУТЕЙ СОРТИРОВОЧНОГО ПАРКА СТАНЦИЙ. Американский журнал междисциплинарных исследований и разработок, 14, 106–115. Получено с. http://ajird.journalspark.org/index.php/ajird/article/view/566.
22. Сардор Асқар ўғли Абдукодиров, Дилмурод Баходирович Бутунов, & Мусаев Мухамеджан Юсупович. (2022). ЮК ПОЕЗДЛАРИ ҲАРАКАТ ТЕЗЛИКЛАРИНИНГ ЎРНАТИЛГАН ТЕХНИК МЕЪЁРЛАРИ БАЖАРИЛИШИ ТАҲЛИЛИ.
https://doi.org/10.5281/zenodo.6584509