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ANALYSIS AND SCIENTIFIC METHODOLOGICAL RECOMMENDATIONS FOR REDUCING THE DELAY ON RAILWAY CROSSINGS

Abstract: *in this research focus on reduces waiting time and safe travel time at a level crossing. Current research interest is the application to improve implementation, reducing the waiting time for motor vehicles at a railroad crossing. At last, got at the level crossing 5% effective result for one improving period.*

Keywords: *level crossings, delay, vehicle-to-vehicle, vehicle-to-infrastructure, guarded LC, unguarded LC.*

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АНАЛИЗ И НАУЧНО-МЕТОДИЧЕСКИЕ РЕКОМЕНДАЦИИ ПО УМЕНЬШЕНИЮ ВРЕМЕНИ ЗАДЕРЖЕК НА ЖЕЛЕЗНОДОРОЖНЫХ ПЕРЕЕЗДАХ

Аннотация: *в этом исследовании основное внимание уделяется сокращению времени ожидания и безопасному времени в пути на железнодорожном переезде. Текущий исследовательский интерес представляет приложение для улучшения реализации, сокращающее время ожидания автомобилей на железнодорожном переезде. Наконец, получили на переезде 5% эффективный результат за один оздоровительный период.*

Ключевые слова: *железнодорожные переезды, задержка, автомобиль-машина, транспорт-инфраструктура, охраняемый ЛЦ, неохраняемый ЛЦ.*

The rapid growth of the passenger car fleet is accompanied, on the one hand, by an increase in the number of road accidents, on the other hand, by an increase in traffic density on automobile transport. At the same time, during the last 5–8 years, vehicle transport delays have sharply increased at railway level crossings (LC), especially in

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densely populated suburban and urban areas, at the intersection of highways and railways [2]. The urban area has every time more and more time congested by transport flow lane [7]. Even the travel distance has around the fifth kilometer from the orientation until destination, passengers have stopped average four or six times. Secondly, if traffic jam has been in peak time [4]. Thirdly if in your road has ahead had a more turning. And also extra stop has been a railway level crossing [3].

For the experiment, I had chosen one railway level crossing in Tashkent city. My focus on the obtain daily train frequency, level crossing gate closing time and count of automobile daily and when level crossing gate was closing time how many cars are stopped both sides on the railway level crossing. This data is for getting calculate the different type of solution. First of all, determine delay time for all vehicles when the railroad the barrier is closed. The rest off in peak period is how many percent has influenced to delaying cars when the train entered. What kind of influence has in this situation to inhabitant population? At last, estimating the of automobile transport the travel time savings and the travel time delay due to the level crossing. Therefore, chosen the peak periods were from 7 AM to 9 AM for the AM Peak, from 5 PM to 7 PM for the PM Peak. Railway crossings operate in automatic mode. Their opening and closing takes place when the train arrives at the approach section. The time for the closure of the move is due to the speed of the approaching composition, as well as the profile of the path in this particular section. An exception is the high-speed mobile passenger train. When the «high-speed» trains proceed, the crossing is automatic in no less than 10 minutes. The opening is also automatic, as soon as the train has been liberated by the train. The shift attendant (or another railway employee) cannot change the opening or closing hours of the crossings. Actions in such an emergency situation are strictly regulated. Information on the presence of items that threaten traffic safety is brought to the duty officer at the nearest station, as well as the train driver who is approaching the move. The crossing closes automatically after the arrival of the train to the block section which is long up to 2 km-depends on the speed of the trains on the section and the track profile. The rail chain that the wheel pair closes can be of different lengths, at my railroad crossing about 1500 meters. When the train enters the block-

section for crossing by means of closing the track circuit, notifications are sent and red signals begin to blink. After 20 seconds, the railway barriers begin to fall. After they have fully lowered, the level crossing ramp plates rise. Many railway crossings are equipped with video surveillance and fixation devices.
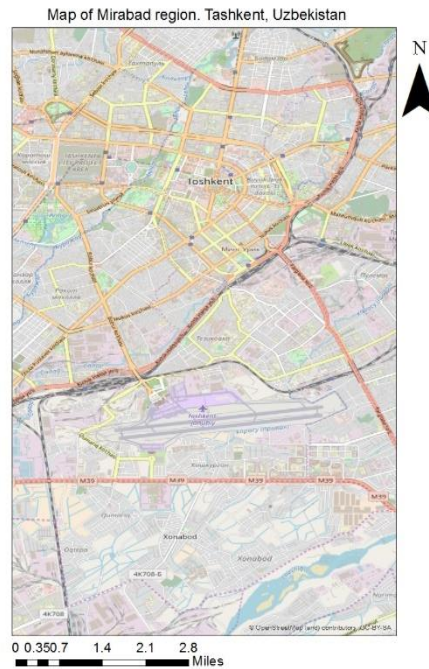

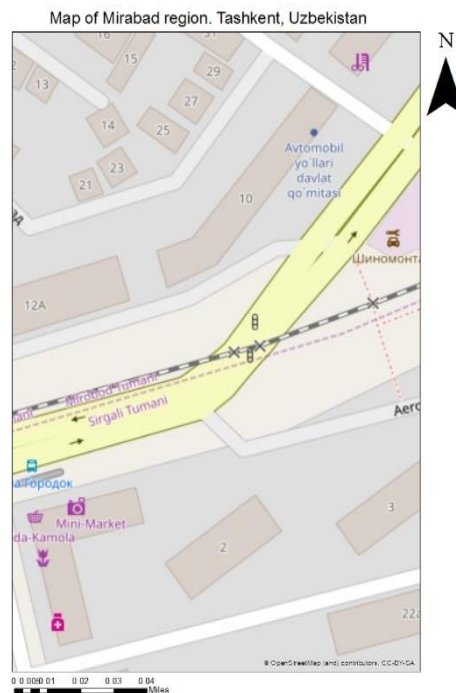Fig. 1. Source Yandex map. Railway location in the study area

Fig. 2. Source Yandex map. Location at the level crossing.

Result and analysis

Base on the data, the average weekday traffic volume for considered level crossings when combined is 15–16 thousand vehicles daily. In general, a boom gate is active for a total 5.5 hours on a given weekday. The boom gate, on the average, is active for 50% of the time during peak period on a weekday The peak periods are 7–9 AM and 5–7 PM. With 95% confidence, when a railway level crossing gate is active, it stays active for at least 8 minutes.
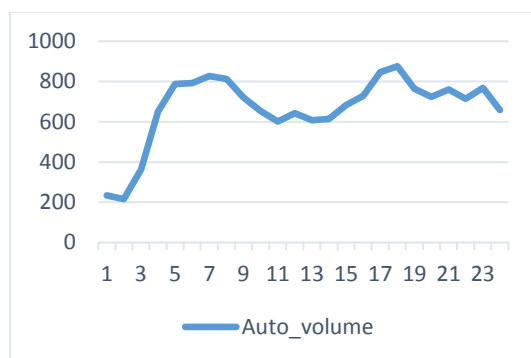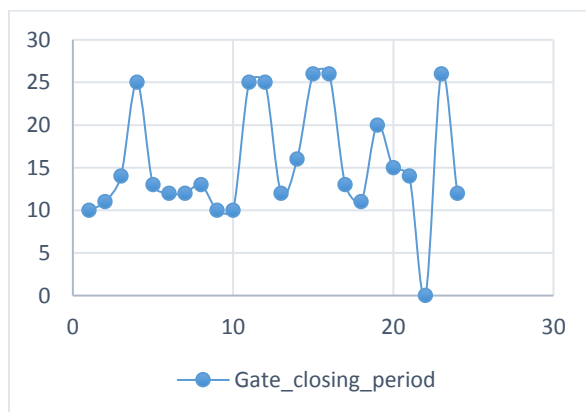

Fig. 3. Graph of car vehicle volume daily

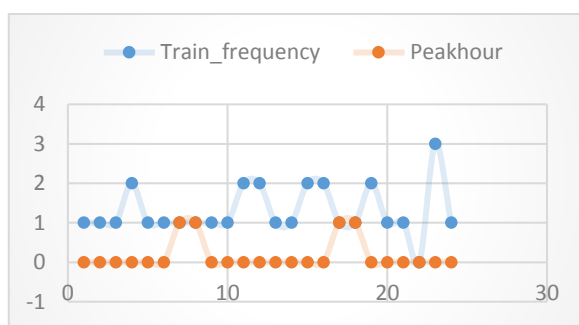Fig. 4. Graph of boom gate «down time» daily

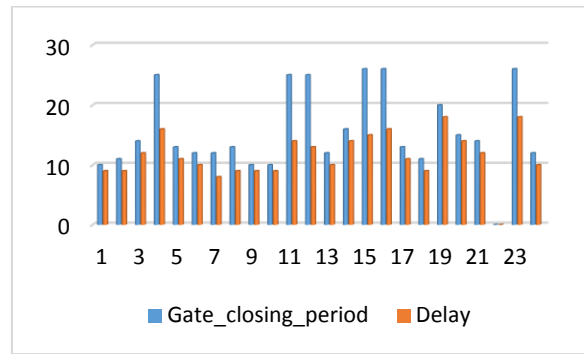Fig. 5. Graph of train frequency and peak hour period daily

Fig. 6. Graph of boom gate «down time» and vehicles average delay time daily

Transport vehicle volume is on the peak period higher than another time period. That's side is few difficulty of passing thought railway level crossing. If the train arrives during the peak period, for cars to come out of congestion it also requires several times difficulties. From the graph also almost peak period has more traffic jam. If the railway company heads the schedule and does not start up, then the time on the roads the traffic volume will not be delayed.

Based on the result, the railway barrier is almost always significant. This means that before the train comes it falls ahead of time. The speed of approaching the train is also different. To reduce the waiting time at the railway crossing, it is necessary to increase the speed of the train.

Conclusions

Railway level crossing gate close period shows a high significance level on motor vehicle delays. It means that waiting time at the level may be affected by train speed. Another significant factor is a train frequency. To improve the level crossing at the study area the research shows the importance of the V2I system. The implementation of this system will help to decrease a waiting time of a motor vehicle. The level crossing is not predictable. affected by gate close period the entering train at level crossing at the peak time. The analysis shows that factors like gate closing period, train frequency and this thesis studied the importance of V2I system implementation [1]. Also, the research indicates and provided certain theoretical supports for traffic management and control.

Список литературы

1. Giuseppe Martuscelli, Azzedine Boukerche, Luca Foschini and Paolo Bellavista, (2016) V2V protocols for traffic congestion discovery along routes of interest in vanets: a quantitative study. Wireless communications and mobile computing. Wirel. Commun. Mob. Comput. 2016; 16:2907–2923

2. Aliev, Marat; Aliev, Ravshan; Tokhirov, Ezozbek; and Nurmuhamedov, Tolaniddin (2019) «Four-Pole Rail Coefficients Of The Jointless Track Circuit In The Presence Of One Of The Ends Track Circuit Insulating Joints», Chemical Technology, Control and Management: Vol. 2019: Iss. 4, Article 6. https://uzjournals.edu.uz/ijctcm/vol2019/iss4/6

3. Railway Signalling & Interlocking. International Compendium. Editors: Gregor Theeg, & Sergej Vlasenko. A DVV Media Group publication. Eurailpress, 2009, – 448 p.

4. Aliev, R. M. & Tokhirov, E. T. & Aliev, M. M. (2020) The Mathematical Model of the Sensor for Monitoring the State of the Track Section with Current Receivers IJRTE ISSN: 2277–3878, Volume-8 Issue-5, January 2020, DOI:10.35940/ijrte. E5936.018520

5. Розенберг Е.Н. Интеллектуальные системы интервального регулирования / Е.Н. Розенберг, В.А. Воронин // Автоматика, связь и информатика. – 2011. – №2. – С. 23–24.

6. Intelligent Transport Systems (ITS) for sustainable mobility. UN, Economic Commission for Europe, UNECE. Geneva, February 2012. 120 p.

7. Ravshan Aliev, Malohat Gulyamova Database concept, relevance and expert systems Международная научно-практическая конференция, Чебоксары: ЦНС «Интерактив плюс», 2021. – с.125–127

8. Ravshan Aliev A Rail line model with distributed parameters of track circuit 1st International Ninevah Conference on Engineering and Technology (INCET 2021) IOP Conf. Series: Materials Science and Engineering 1152

References

1. Giuseppe Martuscelli, Azzedine Boukerche, Luca Foschini and Paolo Bellavista, (2016) V2V protocols for traffic congestion discovery along routes of interest in vanets: a quantitative study. Wireless communications and mobile computing. Wirel. Commun. Mob. Comput. 2016; 16:2907–2923

2. Aliev, Marat; Aliev, Ravshan; Tokhirov, Ezozbek; and Nurmuhamedov, Tolaniddin (2019) «Four-Pole Rail Coefficients Of The Jointless Track Circuit In The Presence Of One Of The Ends Track Circuit Insulating Joints», Chemical Technology, Control and Management: Vol. 2019: Iss. 4, Article 6. https://uzjournals.edu.uz/ijctcm/vol2019/iss4/6

3. Railway Signalling & Interlocking. International Compendium. Editors: Gregor Theeg, & Sergej Vlasenko. A DVV Media Group publication. Eurailpress, 2009, – 448 p.

4. Aliev, R. M. & Tokhirov, E. T. & Aliev, M. M. (2020) The Mathematical Model of the Sensor for Monitoring the State of the Track Section with Current Receivers IJRTE ISSN: 2277–3878, Volume-8 Issue-5, January 2020, DOI:10.35940/ijrte. E5936.018520

5. Rozenberg, E. N., & Voronin, V. A. (2011). [5] Intellektual'nye sistemy interval'nogo regulirovaniia. Avtomatika, sviaz' i informatika, 2, 23-24.

6. Intelligent Transport Systems (ITS) for sustainable mobility. UN, Economic Commission for Europe, UNECE. Geneva, February 2012. 120 p.

7. Ravshan Aliev, Malohat Gulyamova Database concept, relevance and expert systems Международная научно-практическая конференция, Чебоксары: ЦНС «Интерактив плюс», 2021. – с.125–127

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