**Research on the safety of intersections for vehicle movement**

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**Abstract:** Another intersection was studied at the crossrail rate of the crossrail rate using the destruction of vehicle traffic movement in the crossroads. The security of the intersection and road conspirations is due to the number of dangerous points there, the traffic corner depends on the angle of intersection, the number of traffic, added and separated transportation. The safety indicator characterizing the frequency of road traffic accidents occurring at intersections has been analyzed. Road safety was assessed in the streets of the streets of Parkent Street and Mirzo Ulugbek. According to the study, the risk level of this intersection is 4.81, this area is considered to be low dangerous. A multifaceted approach is needed to ensure security: education, infrastructure improvement, practical experience, collaborative and constant research helps to improve the safety of all road users. As a result, the number of conflicts is aimed at reducing and creating an accidental territories. The article also emphasizes the importance of modern technologies, including intelligent traffic lights and pedestrian identification systems. Such technological advancements contribute significantly to the establishment of secure transportation networks and the preservation of driver and pedestrian safety.

**INTRODUCTION**

Ensuring road safety in the XXI century is one of the current problems on the global issue. The acceleration of urban planning and the increase in the number of cars is demanding a serious focus of road safety even with the efficiency of the transport system. Especially one of the most common areas of road accidents, especially the intersections of road flows. At the crossroads, the multidisciplinary action of the movement, the multidisciplinary movement, traffic lights and symbols will be likely to occur dangerous situations due to the complexity of the management system.

Recent trends indicate a significant rise in the urban population and vehicle fleet size within the city of Tashkent. Over the last decade, the urban vehicle fleet has expanded from 250,000 to 510,000 units, reflecting a twofold increase in motorization levels. According to the statistics, the number of cars related to the population of Tashkent exceeded half a million. As of January 1, the number of privately owned vehicles in Tashkent reached 562.1 thousand units, reflecting an annual increase of 94.9 thousand compared to the same date of the previous year. Consequently, the development of transport infrastructure is being systematically implemented to accommodate the growing mobility demand. New roads, bridges, and ground metust are being built. In particular, this year, the first stage of 2 UNDP, Tashkent station "Yunusabad" was launched. 56 routes were optimized by public transport. As a result, the transport service of 170,000 people improved, their time to transport traffic decreased by an average of 15-20 minutes. But many loads in the streets of the capital, there are enough deficiencies in regulating road traffic. The traffic congestion is growing from year to year.

On January 19, 2024, the Republic of Uzbekistan adopted the Law “On Traffic”, regulating road safety and traffic management throughout the country. [1-6] Road safety remains a critical concern, emphasizing that the protection of citizens’ lives and health through safe transportation systems is among the core duties of the state.

Tashkent has more than 500 large crossrets, including 200 of which do not meet the ability to conduct vehicles and road requirements. Due to the lack of parking lot, cars are collected and interferes with flights. Due to all this, the increase in traffic, delays and traffic detention. This leads to a decrease in the connection speed, unfounded excess fuel, and automobile components and aggregates. All this affects the reduction of the efficiency of vehicles and the reduction of the speed of vehicles. Vehicle delays caused by congestion at intersections contribute to elevated noise levels, increased urban air pollution, and intensified emissions of fuel and lubricants. Therefore, it is essential to develop, improve, and implement a comprehensive set of organizational measures aimed at ensuring the efficient and safe flow of traffic through intersections [7-12].

**EXPERIMENTAL RESEARCH**

Traffic safety is a state of traffic, reflecting the level of Road traffic accidents and their socio-economic, environmental, and public health consequences.

A road traffic accident is an event occurring during the movement of a vehicle on a roadway, resulting in human casualties (injury or death), damage to vehicles, infrastructure, cargo, or other material assets.

Traffic safety management encompasses a set of measures directed at eliminating the root causes of road traffic accidents and mitigating the severity of their consequences.

The intersections are one of the most important elements of the transport system, which ensue the safety of traffic is one of the important tasks. In the intersections of road accidents (OVER - the chances of traffic accidents increase when the road is not compliant or infrastructure. Therefore, this article will consider measures to assess and improve the safety of crossrails [13-19].

The types of intersection and their safety are divided into the following types when the crossroads are structured:

• simple crossrets (four-way intersections);

• Woles moving intersections (detours);

• multi-level intersections (bridges and tunnels systems);

• The intersections controlled by signal (organized by traffic lights).

Each of this type of crossrails has its own unique security requirements and it is necessary to design and control them properly.

The complexity of cross-class classification of intentions is evaluated on the basis of the following factors:

• Number of routes - how many roads intersect at the crossroads and in what order is organized;

* Traffic flow density refers to the number of vehicles passing through an intersection within a given time interval and the dynamics of their movement, including speed, headway, and traffic volume.
* • The effectiveness of road signs and management systems is the presence of traffic lights, road signs and other means regulating the movement;

• Pedestrians and cycling movement - regulated by pedestrians and bike corridors.

Complex intersection often requires the technological approaches to the safety of their safety.

Methodology for the safety of crossrails is carried out on the basis of the following criteria for intentions:

• Density of road traffic;

• Interaction of cars and pedestrians;

• Efficiency of road signs and traffic lights;

• Analysis of YTH statistics and causes.

According to these factors, the security index of the intersection is determined and recommendations are developed.

The following measures may be taken to ensure the safety of security strategies in the intersection:

• Improving road infrastructure (lines and modernization of road signs);

• Introduction of smart transport systems (smart traffic lights, automatic control of transport flow);

• Carrying out explanatory work for drivers and pedestrians (promoting the rules of traffic);

• Eat monitoring and analysis system (real-time monitoring and analysis).

Effects to determine the safety movement of road transport during operation and the proper organization of action is carried out. Based on the results of the observation, various recommendations will be developed on the basis of security of traffic flow traffic on the roads, which will be developed to repair or reconstruct.

In determining the dangerous parts of the highway, the methods of security and final accidentalism methods are based on and they are based on them.

Determination and evaluation methods of the highway Professor V.F. It is recommended by Babkov (Madi-Russia).

All road operating indicators of the highway, its elements and dimensions, the number of vehicles moving on the road is the main information in determining the final safety and final accident.

The style of crash coefficients.

The level of security safety is determined not only upon compliance with the requirements for the size of some geometric elements of the road, but also with the harmonization of these elements.

The method of accidents will be based on the generalized materials of road accidents on road. It is easy to analyze the project solutions in the analysis of project solutions in the repair or reconstruction of existing roads and determine its dangerous plots. The level of risk of roadbooks is characterized by accumulated accidents and is found on the basis of a product of private coefficients, counting the impact of certain elements of the road: [20-38]

The final accident coefficient is characterized by an increase in private coefficients of the path to the planned and individual elements of the road to:

(1)

Here,

𝐾𝐴 - final accidents coefficient;

Ki - from different elements of the road in the plan and the longitudinal section the number of road transport accidents in the consisting of 7.5 m, the coating surface is a gigar and horizontal body of roadside roads The road ratio of the traffic accident in the ligners of the League.

As the crash rate, the number of the traffic in the plans and various elements in the section of the different elements is mentioned that the number of events in the ethais of the road. The security of the intersection and road conspirations is due to the number of dangerous points there, the traffic corner depends on the angle of intersection, the number of traffic, added and separated transportation.

• Destination of dangerous intentions are identified and special attention to the coefficient of high destruction.

• Development of measures to increase traffic safety can be reduced through the risk of measures - by taking measures.

• Improving the traffic control is to help infrastructure change to increase the safety of the intersection.

Methods of calculating the coefficient of destruction

The coefficient of destruction can be calculated in a variety of methods. Based mainly, the following formulas are used:

Caucasion of accidentality in the number of road traffic accidents.

This method is based solely on the number of events and is calculated as follows:

HK= (2)

Here,

• N - the number of previous traffic in the quarter (for example, within 1 year);

• T - Account period (years);

• A - Average Transportation Flow (Average Daily Traffic).

This formula is simple and shows a general security level, but does not take into account the severity of events.

Caucastive coefficient based on the number of victims

This approach takes into account the number of victims as a result of road traffic accidents:

HK= (3)

Here,

• J - The number of injuries and killed in the age of period.

This method is useful to calculate the weight of the previous residences that occur at the crossroads.

Coastity coefficient based on the number of death and severe injuries

Given the severity of the resources and the impact of human life, the following formula is used:

H= (4)

Here,

• H - number of people killed and heavy injured during the score period.

This approach is only analyzing heavy-effective events and is important for identifying the most dangerous intentions.

**TABLE 1** The security rate of crossbreedability on the basis of destruction is as follows

|  |  |  |
| --- | --- | --- |
| HK value | Assessment | Recommended measures |
| HK < 1 | Secure | No additional measures are required |
| 1 ≤ HK < 3 | Average dangerous | The security inspections are required |
| HK ≥ 3 | High-risk | Emergency security measures should be taken |

High-HK values may require measures such as road traffic control, infrastructure changes or speed limitation. Measures to reduce destruction

The following measures can be taken on the intersection with high destruction coefficient Road movement management

• Optimization of the processing procedure of traffic lights

• Update road signs and lines

• Install speed limiting cameras

• Improving pedestrian crossings

Improving infrastructure

• Installation of additional trafficophor or LLetododafes

• Introduction of working hours

• Update the road coverage

Transportation flood optimization

• Change the crossroadation movement scheme

• separating the right turn or left turn pieces

• Separation of public transport corridors

The security of the intersection and road conspirations is due to the number of dangerous points there, the traffic corner depends on the angle of intersection, the number of traffic, added and separated transportation.

**TABLE 2** Controversial points

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Separation | Снимок1  To the right | Снимок2  To the left | Снимок3  Right and left | Снимок4  Straight, right and left |
| Affiliation | Снимок12  From the right | **Снимок13**  From the left | Снимок14  right and left | Снимок15  Straight, right and left |
| Intersection | Снимок21  On the right | Снимок22  On the left | Снимок24  On the one hand | Снимок25  The opposite, against |

The traffic safety indicator, representing the frequency of road traffic accidents occurring at a specific intersection, is calculated using the following formula:

(5)

here: M - number of conflicting points, N - traffic intensity of conflicting traffic flows, *ki* - relative hazard ratio of each conflict point

**TABLE 3** The value of the relative risk coefficients for the ki cases of conflict points at the intersection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **№** | **Terms of action** | **Car direction** | **Intersection** | **ki** |
| 1 | Adding a stream | Turn right | R<15 m | 0,025 |
| R≥15 m | 0,004 |
| Turn left | R<10 m | 0,032 |
| 10<R<25 m | 0,025 |
| 2 | Flow separation | Turn right | R<15 m | 0,02 |
| R≥15 m | 0,006 |
| Turn left | R<10 m | 0,03 |
| 10<R<25 m | 0,004 |
| 3 | Flow intersection | Corner intersection | a≤300 | 0,008 |
| 500≤a≤750 | 0,036 |
| 900≤a≤1200 | 0,012 |
| 1500≤a≤1800 | 0,035 |

ka depending on the value, each intersection of the level of danger can be:

ka < 3 - not dangerous

3 < ka < 8 – low risk

8 < ka < 12 - dangerous

ka > 12 - very dangerous

**RESEARCH RESULTS**

For the purposes of this study, the intersection of Parkent Street and M.Ulugbek Branch Street was identified as the primary research location. The general characteristics of the selected intersection are presented below. The total number of lanes of Parkent street is 4, equipped with a pedestrian crossing, the total width of the street is 28 meters, the total number of lanes of Mirzo Ulugbek branch street is 4, equipped with a pedestrian crossing, the street The total width of the cha is 32 meters.

In this direction, the average hourly traffic volume is about 4,000 vehicles, while the average daily vehicle flow surpasses 45.000. Data collection included road geometry (length, width, and number of lanes), crosswalks, bus stops, intersection signal times and operation, and other information. . Traffic flow and speed data were collected using GPS devices installed in the specified section. The maximum speed of vehicles was 67 kilometers/hour, the minimum speed was 20 kilometers/hour, and the average speed was 35 kilometers/hour.

Vehicles moving at different speeds and lane changes affect the capacity of streets. In addition, traffic lights in the city further limit the ability to pass.



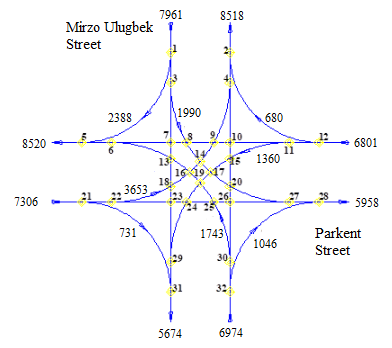
**FIGURE 1.** The intersection of Parkent Street and M.Ulugbek Branch Street is shown below using satellite imagery from Google Maps.

**FIGURE 2.** Analysis of the types of accidents committed in Mirzo Ulugbek district in 2023

According to the results of the analysis, it can be seen that hitting a pedestrian is the most committed, followed by collision. It follows that it is very important to improve the safety of pedestrians and cars at intersections.

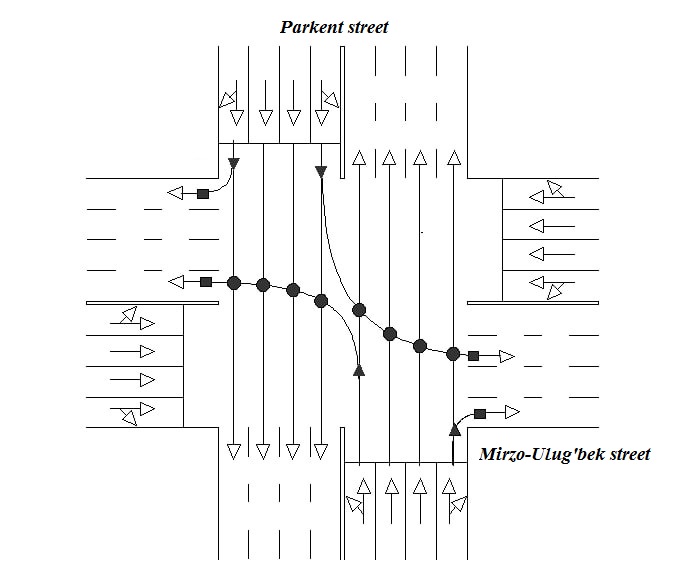
Traffic intensity at the intersection of Parkent Street and M.Ulugbek Branch Street is determined by manually registering each passing vehicle on a structured data collection sheet during a predefined observation period (typically one or more hours). In most countries, as well as in Uzbekistan, the amount of traffic on highways is determined by monitors. In this study, we determine the fatality coefficient considering a 1-hour flow.

**FIGURE 3.** Oncoming traffic flow diagram on Parkent Street



**FIGURE 4.** Parkent and Mirzo Ulugbek horn streets Transportation flow of intersection

*G = 8,32+0,53+5,34+12,2+9,78+6,71+2,41+4,97+7,98 +2,79+11,2+2,08+11,5+0,59+2,98+0,32+0,13+6,87 +0,12+4,37+2,4+8+1,46+2,08+2,67+1,71+4,65+3,21+ 0,62+5,47+1,63+3,1=138,19*



**FIGURE 5.** A schematic layout of the intersection between Parkent and M.Ulugbek Branch Street is presented below.

1. **Adding a stream:**
2. **Flow separation:**
3. **Current intersection**:

**CONCLUSION**

It can be concluded that Parkent and Mirzo Ulugbek Shohr streets of the Shahkins streets accounted for all possible risk of traffic, accounting for traffic safety in 19.03. Therefore, it is very dangerous at this intersection.

From the calculations, we concluded that Parkent Street and Mirzo Ulugbek, taking into account the possible directions of transport flows in intersection and the intersection rate of 4.81 was 4.81. It follows that the area is low dangerous.

Ensuring a multifaceted approach requires a multifaceted approach, where we create a safer environment for all traffic participants, to create a safer environment for all road participants, the first O ' Remember to work together to put and work together to put our zones without accident. Every effort to be done today will bring us closer to usury clashes a step closer to the future.

The role of technology cannot be increased in increasing urgeon safety. Every innovation to pedestinal detection systems and technology will bring us closer travel relations, using these achievements and using an integrated approach, we minimize clashes and drivers and It is to try to protect the life of pedestrians.

REFERENCES

1. Law of the President of the Republic of Uzbekistan dated January 19, 2024 No. ORQ-900.Order of the president of the Republic of Uzbekistan dated January 19, 2024.
2. Babkov, V.F. Road Conditions and Traffic Safety. — Moscow: Transport, 1982. — p. 110.
3. [Turdibekov, S.](https://www.scopus.com/authid/detail.uri?authorId=58561349200), [Isoxanov, U.](https://www.scopus.com/authid/detail.uri?authorId=59235503900), [Shermatov, S.](https://www.scopus.com/authid/detail.uri?authorId=57224728139), [Abdusamatov, E.](https://www.scopus.com/authid/detail.uri?authorId=59235328200), [Usmanova, M.](https://www.scopus.com/authid/detail.uri?authorId=57768782700) (2024). [Road traffic incidents involving pedestrians in areas with limited visibility](https://www.scopus.com/record/display.uri?eid=2-s2.0-85199655829&origin=resultslist). E3S Web of Conferences 549, 06012 (2024) TransSiberia 2024 <https://doi.org/10.1051/e3sconf/202454906012>
4. [Turdibekov, S.](https://www.scopus.com/authid/detail.uri?authorId=58561349200), [Isoxanov, U.](https://www.scopus.com/authid/detail.uri?authorId=59235503900), [Shermatov, S.](https://www.scopus.com/authid/detail.uri?authorId=57224728139), [Abdusamatov, E.](https://www.scopus.com/authid/detail.uri?authorId=59235328200) (2024). Analysis of the parameters of technological material sprinkling devices of special road vehicles (wδ=const): MAN CLA 18.280 4x2 BB CS45. E3S Web of Conferences 549, 02016 (2024) TransSiberia 2024 <https://doi.org/10.1051/e3sconf/202454902016>
5. [Fayzullayev, E.](https://www.scopus.com/authid/detail.uri?authorId=58561049300), [Khakimov, S.](https://www.scopus.com/authid/detail.uri?authorId=57768003900), [Rajapova, S.](https://www.scopus.com/authid/detail.uri?authorId=57381619200), [Rakhimbaev, Z.](https://www.scopus.com/authid/detail.uri?authorId=58561749100) (2023). [Traffic intensity on roads with big longitudinal slope in mountain conditions](https://www.scopus.com/record/display.uri?eid=2-s2.0-85169677085&origin=resultslist). E3S Web of Conferences 401, 01073 (2023) CONMECHYDRO - 2023 <https://doi.org/10.1051/e3sconf/202340101073>.
6. [Khakimov, S.](https://www.scopus.com/authid/detail.uri?authorId=57768003900) (2022). [Vehicle ride regime as a main factor for GHG emission reduction](https://www.scopus.com/record/display.uri?eid=2-s2.0-85133032608&origin=resultslist). AIP Conf. Proc. 2432, 030127 (2022) <https://doi.org/10.1063/5.0089563>
7. [Fayzullaev, E.](https://www.scopus.com/authid/detail.uri?authorId=57224724530), [Tursunbaev, B.](https://www.scopus.com/authid/detail.uri?authorId=57768488200), [Xakimov, S.](https://www.scopus.com/authid/detail.uri?authorId=57768003900), [Rakhmonov, A.](https://www.scopus.com/authid/detail.uri?authorId=57768004000) (2022). [Problems of Vehicle Safety in Mountainous Areas and Their Scientific Analysis](https://www.scopus.com/record/display.uri?eid=2-s2.0-85132984069&origin=resultslist). [AIP Conference Proceedings](https://www.researchgate.net/journal/AIP-Conference-Proceedings-1551-7616?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6InB1YmxpY2F0aW9uIiwicGFnZSI6InB1YmxpY2F0aW9uIn19) 2432(1):030099 https://doi.org/[10.1063/5.0089596](http://dx.doi.org/10.1063/5.0089596).
8. [Khakimov, S.](https://www.scopus.com/authid/detail.uri?authorId=57768003900), [Rajapova, S.](https://www.scopus.com/authid/detail.uri?authorId=57381619200), [Amirkulov, F.](https://www.scopus.com/authid/detail.uri?authorId=57381092100), [Islomov, E.](https://www.scopus.com/authid/detail.uri?authorId=57382324600) [Road Intersection Improvement - Main Step for Emission Reduction and Fuel Economy](https://www.scopus.com/record/display.uri?eid=2-s2.0-85121560144&origin=resultslist). ICECAE 2021 IOP Conf. Series: Earth and Environmental Science 939 (2021) 012026 IOP Publishing doi: <https://doi.org/10.1088/1755-1315/939/1/012026>
9. [Kutlimuratov, K.](https://www.scopus.com/authid/detail.uri?authorId=55535071500), [Khakimov, S.](https://www.scopus.com/authid/detail.uri?authorId=57768003900), [Mukhitdinov, A.](https://www.scopus.com/authid/detail.uri?authorId=6508195507), [Samatov, R.](https://www.scopus.com/authid/detail.uri?authorId=57224727986) (2021). [Modelling traffic flow emissions at signalized intersection with PTV vissim](https://www.scopus.com/record/display.uri?eid=2-s2.0-85108240005&origin=resultslist). E3S Web of Conferences 264, 02051 (2021) <https://doi.org/10.1051/e3sconf/202126402051> CONMECHYDRO - 2021.
10. [Khakimov, S.](https://www.scopus.com/authid/detail.uri?authorId=57768003900), [Fayzullaev, E.](https://www.scopus.com/authid/detail.uri?authorId=57224724530), [Rakhmonov, A.](https://www.scopus.com/authid/detail.uri?authorId=57768004000), [Samatov, R.](https://www.scopus.com/authid/detail.uri?authorId=57224727986) [Variation of reaction forces on the axles of the road train depending on road longitudinal slope](https://www.scopus.com/record/display.uri?eid=2-s2.0-85108222375&origin=resultslist). E3S Web of Conferences 264, 05030 (2021) [https://doi.org/10.1051/e3sconf/202126405030 CONMECHYDRO - 2021](https://doi.org/10.1051/e3sconf/202126405030%20CONMECHYDRO%20-%202021)
11. [Khalmukhamedov, A.](https://www.scopus.com/authid/detail.uri?authorId=58951169300), [Samatov, R.](https://www.scopus.com/authid/detail.uri?authorId=57224727986), [Rajapova, S.](https://www.scopus.com/authid/detail.uri?authorId=57381619200)(2024). [Prospects for the use of an automatic system for weight and dimensional control of vehicles in the Republic of Uzbekistan](https://www.scopus.com/record/display.uri?eid=2-s2.0-85188418771&origin=resultslist). AIP Conference Proceedings, 2024, 3045(1), 050031. <https://doi.org/10.1063/5.0197415>
12. [Samatov, R.](https://www.scopus.com/authid/detail.uri?authorId=57224727986), [Samatov, U.](https://www.scopus.com/authid/detail.uri?authorId=57768010900) [Improvement of Methods for Assessing the Quality of Road Transport Services](https://www.scopus.com/record/display.uri?eid=2-s2.0-85133020270&origin=resultslist). AIP Conference Proceedings, 2022, 2432, 030094. <https://doi.org/10.1063/5.0091190>
13. [Faizullaev, E.Z.](https://www.scopus.com/authid/detail.uri?authorId=57224724530), [Mukhtorjanov, U.M.](https://www.scopus.com/authid/detail.uri?authorId=58561744900), [Turdibekov, S.](https://www.scopus.com/authid/detail.uri?authorId=58561349200), [Nasirjanov, S.I.](https://www.scopus.com/authid/detail.uri?authorId=58561349300) [Parameters of the access road for disaster situations on the roads in the mountain area](https://www.scopus.com/record/display.uri?eid=2-s2.0-85169661249&origin=resultslist). E3S Web of Conferences 401, 03022 (2023) CONMECHYDRO - 2023 <https://doi.org/10.1051/e3sconf/202340103022>
14. [Rajapova, S.](https://www.scopus.com/authid/detail.uri?authorId=57381619200), [Juraev, Y.](https://www.scopus.com/authid/detail.uri?authorId=57768782800) [Innovative Ways to Train Drivers and Improve Their Skills](https://www.scopus.com/record/display.uri?eid=2-s2.0-85133001621&origin=resultslist). AIP Conference Proceedings, 2022, 2432, 030100 <https://doi.org/10.1063/5.0090825>
15. [Rustamov, K.](https://www.scopus.com/authid/detail.uri?authorId=58951093100), [Komilov, S.](https://www.scopus.com/authid/detail.uri?authorId=57224726191), [Kudaybergenov, M.](https://www.scopus.com/authid/detail.uri?authorId=57224740559), [Shermatov, S.](https://www.scopus.com/authid/detail.uri?authorId=57224728139), [Xudoyqulov, S.](https://www.scopus.com/authid/detail.uri?authorId=57224725037) [Experimental study of hydraulic equipment operation process](https://www.scopus.com/record/display.uri?eid=2-s2.0-85108216687&origin=resultslist). E3S Web of Conferences 264, 02026 (2021) <https://doi.org/10.1051/e3sconf/202126402026> CONMECHYDRO – 2021
16. Sharifbaeva, K.,Niyazova, G.,Abdurazzakova, D.,Abdurashidov, I.,Alimardonov, R. [Formation of Methodical Competence of Special Subjects Teachers in Technical Universities](https://www.scopus.com/record/display.uri?eid=2-s2.0-85132968464&origin=reflist). AIP Conference Proceedings, 2432, art. no. 050043. <https://doi.org/10.1063/5.0089618>
17. [Rabat, O.](https://www.scopus.com/authid/detail.uri?authorId=57203264787), [Pirnaev, Sh.](https://www.scopus.com/authid/detail.uri?authorId=57224729515), [Rustamov, K.](https://www.scopus.com/authid/detail.uri?authorId=58951093100), Usmanov I. [Shermatov, Sh.](https://www.scopus.com/authid/detail.uri?authorId=57224728139), [Magdiyev, K.](https://www.scopus.com/authid/detail.uri?authorId=57767814200) Development of corrosion-resistant material for asphalt concrete cutting part. E3S Web of Conferences 587, 03012 (2024) <https://doi.org/10.1051/e3sconf/202458703012>
18. [Korabayev, S.](https://www.scopus.com/authid/detail.uri?authorId=57768012900), [Yuldashev, J.](https://www.scopus.com/authid/detail.uri?authorId=57197820747), [Isokhanov, U.](https://www.scopus.com/authid/detail.uri?authorId=59472693100), [Makhkamova, S.](https://www.scopus.com/authid/detail.uri?authorId=57803202700), [Saparboyeva, N.](https://www.scopus.com/authid/detail.uri?authorId=59473216300) Overcoming obstacles: solving cutting resistance problems. E3S Web of Conferences 587, 03015 (2024) <https://doi.org/10.1051/e3sconf/202458703015>
19. [Isokhanov, U.](https://www.scopus.com/authid/detail.uri?authorId=59472693100), [Turdibekov, S.](https://www.scopus.com/authid/detail.uri?authorId=58561349200) A method of experimental study of the operation of technological material distributors. E3S Web of Conferences 587, 03013 (2024) <https://doi.org/10.1051/e3sconf/202458703013>
20. [Turdibekov, S.](https://www.scopus.com/authid/detail.uri?authorId=58561349200), [Xamraqulov, R.](https://www.scopus.com/authid/detail.uri?authorId=59538034600), [Negmatov, N.](https://www.scopus.com/authid/detail.uri?authorId=59537753900), [Raximbayev, Z.](https://www.scopus.com/authid/detail.uri?authorId=59537893500) [The method of calculating the parameters of the materials delivery mechanism of the technological materials distributor](https://www.scopus.com/record/display.uri?eid=2-s2.0-85216642813&origin=recordpage). BIO Web of Conferences 145, 03025 (2024) Forestry Forum 2024 <https://doi.org/10.1051/bioconf/202414503025>
21. Kuvondik, U., Yusupov, U., Zilola, R., & Mashrab, I. (2025). Improvement of the classification of causes for the decommissioning of large-size tires. Vibroengineering Procedia, 58, 291–299. https://doi.org/10.21595/vp.2025.24964
22. Makhmudov, G. (2024). Development of methods for calculating thermal conductivity of gas condensates-alternative motor fuels. E3S Web of Conferences, 515, 03002. https://doi.org/10.1051/e3sconf/202451503002
23. Mikhaltsevich, M., & Ziyaev, K. (2024). Modeling the braking process for motorcycle with ABS. E3S Web of Conferences, 592, 07002. https://doi.org/10.1051/e3sconf/202459207002
24. Mukhitdinov, A., Yusupov, U., Tukhtamishov, S., & Urinbayev, Q. (2024). Results of the study of the influence of an average longitudinal slope of routes on the life of tires in the quarry. 040041. https://doi.org/10.1063/5.0197301
25. Petrovich, B. V., & Ugli, A. A. A. (2025). Analysis of static load on a tire in quarry operating conditions. 030017. https://doi.org/10.1063/5.0266786
26. Tursunbaev, B. H., Fayzullaev, E. Z., Akbarov, N. A., & Nigmatov, H. (2023). A new methodology for evaluating the efficiency of complex machine mechanisms. 040098. https://doi.org/10.1063/5.0145575
27. Tursunov, S. R., Khikmatov, R. S., & Khusanov, S. N.-U. (2024). Increasing the efficiency of the use of mining transport due to increasing the periodicity of maintenance time. 050021. https://doi.org/10.1063/5.0197547
28. Tursunov, S. R., Sharipov, S. S., & Khikmatov, R. S. (2024). Saving natural gas through the use of used oils in replacement by the method of their safe burning. 050022. https://doi.org/10.1063/5.0197545
29. Yusupov, U., & Shavkatov, X. (2024). Development of a standard mileage for large-sized tires under moderately severe quarry conditions. BIO Web of Conferences, 141, 04034. https://doi.org/10.1051/bioconf/202414104034
30. Yusupov, U., Urinbaev, K., Boykov, V., & Israilov, M. (2025). Optimizing TKPH for Large-Sized Tires in Quarry Conditions (pp. 381–391). https://doi.org/10.1007/978-3-031-95649-2\_33
31. Ziyaev, K., & Omarov, J. (2024). Research of passenger traffic in public transport. 040030. https://doi.org/10.1063/5.0197314
32. Ziyaev, K., Vokhidov, D., Shavkatov, K., Khadiyeva, G., & Yangiyeva, I. (2025). Influence of traffic light management on traffic capacity of Urban highways. 060038. https://doi.org/10.1063/5.0266822
33. Khalmukhamedov, A.S., Samatov, R.G., Islamov, E.B. and Narziyev, J.S. (2025) Assessment of the Highway Network of International Importance of the Republic of Uzbekistan. Lecture Notes in Networks and Systems <https://doi.org/10.1007/978-3-031-99028-1_21>
34. Improving the method of assessing road safety at intersections of single-level highways. Botir Abdullaev, Davron Yuldoshev, Tolqin Muminov and Dilmurod Axmedov, E3S Web Conf., 264 (2021) 05027. DOI: <https://doi.org/10.1051/e3sconf/202126405027>
35. A. Kuziev, M. Juraev, Z. Yusufkhonov, D. Akhmedov; Application of multimodal transportation in the development of future flows of the region. AIP Conf. Proc. 15 March 2023; 2612 (1): 060027. <https://doi.org/10.1063/5.0134950>
36. Zokirkhan Yusufkhonov, Malik Ravshanov, Akmal Kamolov, and Dilmurod Ahmedov , "Prospects for the development of transport corridors of Uzbekistan", AIP Conference Proceedings 2432, 030074 (2022) <https://doi.org/10.1063/5.0089689>
37. Management of consumers needs for volume of transportation, taking into account the probable nature. Mukhiddin Zhuraev, Jamshid Togaev and Zokirkhon Yusufkhonov. E3S Web of Conf., 401 (2023) 01066 DOI: <https://doi.org/10.1051/e3sconf/202340101066>
38. A. A. Shermukhamedov, M. N. Juraev, S. N. Kenjayev; Efficient distribution of motor vehicles of different loading capacities on routes. AIP Conf. Proc. 15 March 2023; 2612 (1): 060013. <https://doi.org/10.1063/5.0134786>