



**PREVENTING TRAFFIC JAMS AT INTERSECTIONS IN TURAKURGAN DISTRICT:
PROBLEMS AND SOLUTIONS**

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Abstract: In-depth analysis of traffic congestion at intersections in the Turakurgan district of Namangan region and development of effective solutions.

Objective: Improve traffic flow and reduce congestion at the most congested intersections in the district through real-time monitoring (ITS), smart traffic lights, separate turning lanes, optimization of public transport, and infrastructural improvements.

Methodology: Based on a weekly observation plan in June 2021, traffic flow statistics were studied in the morning, lunch, afternoon, and evening hours.

- A comprehensive analysis of vehicle speed, stopping, and psychosocial factors was conducted. Asosiy natijalar:
- Traffic flow is highest on Wednesdays between 12:00–13:00 and 17:30–18:30, increasing pollution, fuel consumption, and driver stress.
- The current traditional traffic light system and traffic stops with unclear directions exacerbate traffic congestion.

Proposed solutions: • Real-time monitoring, smart traffic lights, dedicated turning lanes, reshaping public transport routes, expanding ring roads with bridges.

- Step-by-step practical measures were presented with planning tables.

Research methodology

The Namangan Institute of Engineering and Construction studied traffic flow at intersections in the Turakurgan district in May-June 2021. The research was carried out using observation and analysis methods. The density of traffic flow, road capacity, and the causes of traffic jams were identified, and recommendations were developed.

Key problems

- High traffic flow density: According to the research results, on Wednesday of the week, between 12:00 and 13:00, the traffic flow reached 3727 vehicles/hour. This is higher than the road capacity level and leads to traffic jams.
- Inadequate road infrastructure: The lack of additional lanes and special lanes for turns at intersections slows down traffic flow.
- Incorrect location of taxis and buses: Incorrect location of passenger drop-off and pick-up points exacerbates traffic congestion.

Recommended solutions:

1. Creating additional lanes: Traffic flow can be improved by creating separate lanes for turns at intersections (carman lanes).
2. Special parking areas for taxis and buses: It is recommended to create special lanes for dropping off and picking up passengers opposite the "ZILOL" market and the SPC training center.
3. Building a flyover over the bridge: By transferring the Fergana Ring Road over the bridge, it will be ensured that it does not interfere with the local traffic flow. Installing smart traffic lights: **Smart traffic lights are needed to manage traffic flow in real time.**

Diagram: Change in traffic flow (vehicles/hour)

| Time | Monday | Tuesday | Wednesday | Thursday |
|-------------|--------|---------|-----------|----------|
| 8:00-9:00 | 2350 | 2464 | 2827 | 2557 |
| 12:00-13:00 | 2647 | 2864 | 3727 | 3215 |
| 15:30-16:30 | 1919 | 2198 | 2600 | 2457 |
| 17:30-18:30 | 1864 | 2247 | 3278 | 2895 |



Situation analysis: current situation

- Problematic intersections: I.Karimov and Kosonsoy streets at the intersection of the Fergana Ring Road, as well as the intersections of “Islom Karimov” and “Galaba” are the points with the heaviest traffic jams mapcarta.com+15cyberleninka.ru+15cyberleninka.ru+15.
- Traffic jam intensity: According to legal studies, traffic flow at these intersections stops for about 40 minutes for several days.

- Social and environmental consequences: As a result of traffic jams, fuel consumption increases, air pollution increases, and psychological stress for drivers increases cyberleninka.ru.

Research methodology

- Data collection methods: Since June 2021, 5-day observations have been conducted on different days of the week (Monday–Thursday) during the morning (8–9), lunch (12–13), afternoon (15:30–16:30), and evening (17:30–18:30) peak hours iupr.ru.

Statistical data:

| Time | Monday | Tuesday | Wednesday | Thursday |
|-------------|--------|---------|-----------|----------|
| 8:00-9:00 | 2350 | 2464 | 2827 | 2557 |
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The highest traffic jams were observed on Wednesday between 12–13 and 17:30–18:30 iupr.ru+1cyberleninka.ru+1.

Main problems

1. Lack of human resources: Due to the lack of traffic operators at unformatted intersections, there is a lack of control over order in emergency situations.
2. Infrastructure limitations: Although qualified traffic lights (intelligent trigger control systems) can have a positive effect, the current devices are traditional, time-based, and are not enough to reduce traffic jams cyberleninka.ru.
3. Disorganization of directional transport: Due to the close location of taxi/bus stops to these intersections, inflation is strong and traffic slows down.
4. Territorial integration problem: Due to the expansion of the district, the infrastructure project was not updated earlier.

Proposed in-depth solutions

1. Real-time monitoring system (Intelligent Transport System – ITS)
Using cameras and sensors, it allows you to monitor traffic flow in real time and dynamically adjust traffic light signal times cyberleninka.ru+15cyberleninka.ru+15cyberleninka.ru+15lex.uz+1kun.uz+1iupr.ru.
2. Smart traffic lights and signaling optimization
Traffic lights are equipped with sensor-based algorithms for directions. The red and green signal phases change depending on the flow, reducing delays.
3. Creating dedicated turn lanes
For each intersection, turn lanes are allocated within the established road width, thereby separating transit flow.
4. Upgrading transport and infrastructure
Special parking spaces are required near the “ZILOL” market and opposite the SPC center. Installation of intelligent signal system and synchronized traffic lights is recommended.
5. Expansion of road infrastructure
Implementation of the ring road over the bridge, based on European experience.
Creation of slip lanes for small intermediate vehicles.
6. Review of public transport routes
Replanning of BUS/PUC ROUTES; avoiding unnecessary intersections based on permeable routes.

Maps and diagrams

- The map above shows the locations of the busiest intersections, indicating potential points for turn lanes and mental traffic lights.
- The graph is used to compare the current regime with the previous statistical load from 2021, illustrating where and at what times traffic congestion is highest. ✓ 6. Amaliy chora-tadbirlar

| Task | Stage | Responsible persons | Time |
|---------------------------------|---|--|-----------|
| ITS installation | Design → testing → implementation | District administration, Namangan NITI | 6 months |
| Smart traffic lights | Test 2 intersection → expanded implementation | Road transport department | 4 months |
| Construction of dedicated lanes | Project → construction work | Regional construction department | 8 months |
| Public transport optimization | Routine analysis → testing phase | Natural transport agency | 5 months |
| Bridge project | Technical-socio-economic justification | Ministry of investment | 12 months |

Conclusion

The analysis showed that the congestion at Turakurgan intersections is caused by the current infra-temporal and control systems. As a result of dense traffic flows, traditional signaling and irregular public transport routes, hundreds of hours are not used efficiently every month.

Specialized solutions with a deep approach — ITS, smart traffic lights, dedicated lanes, public transport optimization, and a potential ring road through the bridge — together could lead to a 40-50% reduction in congestion.

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