

JOURNAL OF TRANSPORT



ISSUE 3, 2024 vol. 1
ISSN: 2181-2438



SLIB.UZ
Scientific library of Uzbekistan

RESEARCH, INNOVATION, RESULTS



**TOSHKENT DAVLAT
TRANSPORT UNIVERSITETI**

Tashkent state
transport university



JOURNAL OF TRANSPORT

RESEARCH, INNOVATION, RESULTS

ISSN 2181-2438

VOLUME 1, ISSUE 3

SEPTEMBER, 2024



jot.tstu.uz

TASHKENT STATE TRANSPORT UNIVERSITY

JOURNAL OF TRANSPORT

SCIENTIFIC-TECHNICAL AND SCIENTIFIC INNOVATION JOURNAL

VOLUME 1, ISSUE 3 SEPTEMBER, 2024

EDITOR-IN-CHIEF

SAID S. SHAUMAROV

Professor, Doctor of Sciences in Technics, Tashkent State Transport University

Deputy Chief Editor

Miraziz M. Talipov

Doctor of Philosophy in Technical Sciences, Tashkent State Transport University

Founder of the scientific and technical journal “Journal of Transport” – Tashkent State Transport University, 100167, Republic of Uzbekistan, Tashkent, Temiryo‘lchilar str., 1, office: 465, e-mail: publication@tstu.uz.

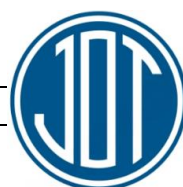
The “Journal of Transport” publishes the most significant results of scientific and applied research carried out in universities of transport profile, as well as other higher educational institutions, research institutes, and centers of the Republic of Uzbekistan and foreign countries.

The journal is published 4 times a year and contains publications in the following main areas:

- Business and Management;
- Economics of Transport;
- Organization of the Transportation Process and Transport Logistics;
- Rolling Stock and Train Traction;
- Infrastructure;
- Research, Design, and Construction of Railways, Highways, and Airfields:
- Technology and Organization of Construction, Management Problems;
- Water Supply, Sewerage, Construction Systems for Water Protection;
- Technosphere Safety;
- Power Supply, Electric Rolling Stock, Automation and Telemechanics, Radio Engineering and Communications, Electrical Engineering;
- Materials Science and Technology of New Materials;
- Technological Machines and Equipment;
- Geodesy and Geoinformatics;
- Car Service;
- Information Technology and Information Security;
- Air Traffic Control;
- Aircraft Maintenance;
- Traffic Organization;
- Operation of Railways and Roads;

Tashkent State Transport University had the opportunity to publish the scientific-technical and scientific innovation publication “Journal of Transport” based on the Certificate No. 1150 of the Information and Mass Communications Agency under the Administration of the President of the Republic of Uzbekistan. Articles in the journal are published in Uzbek, Russian and English languages.

S. Salixanov, T. Kenjaev <i>Structure production of cement concrete based on secondary fillers from concrete slaves.....</i>	60
N. Turaeva <i>Model of a multi-agent system for monitoring aeronautical information transmission network.....</i>	64
G. Samatov, M. Burikhodjaeva <i>Analysis of the essence of financial flows in the supply chain.....</i>	69
D. Butunov, S. Abdukodirov <i>Regulation of factors affecting the speeds of freight trains.....</i>	73
A. Adylkhodjaev, I. Kadyrov, B. Kudratov, D. Azimov <i>Development and research of complex modified concretes of a new generation for non-heating and low-temperature technologies based on local raw materials.....</i>	78
I. Khurramov, X. Umarov, J. Azimov <i>Study of the effect on the amount of cargo flow between Uzbekistan and Kyrgyzstan by the method of multiple regression.....</i>	83
U. Ziyamukhamedova, F. Nurqulov, A. Djumabaev, J. Nafasov, E. Turgunaliev, M. Rustamov <i>Study of the influence of modifier on the physical and mechanical properties of sulfur composite material.....</i>	87
Sh. Yuldashev, A. Abdunazarov <i>Advantages of circular and rectangular seismic barriers.....</i>	91
M. Burikhodjaeva, Sh. Sharapova <i>Supporting components: key paradigms and information systems...</i>	94
Z. Adilova (Mukhamedova), D. Boboev, N. Akhtamov <i>Mathematical model of fastening conditions in piggyback transport, taking into account different conditions.....</i>	98
A. Urokov, E. Ashurov, U. Bekturodov <i>Problems caused by the impact of heavy trucks on the surface of asphalt concrete pavements.....</i>	104



Problems caused by the impact of heavy trucks on the surface of asphalt concrete pavements

A.X. Urokov¹^a, E.T. Ashurov², U.B. Bekmurodov²

¹Tashkent state transport university, Tashkent, Uzbekistan

²Termez state of engineering and agrotechnologies university, Termez, Uzbekistan

Abstract: Analysis of the current condition of the 1400-1426 km section of the M-39 "Almaty-Bishkek-Tashkent-Shahrisabz-Termiz" highway in the southern region of our republic shows that the heavy load on the road surface and bridge surfaces is caused by vehicles. There are a number of structural problems and deficiencies in the load-bearing capacity of the road surface, and there are a number of structural problems and defects in the road surface.

Keywords: Heavy load, asphalt concrete pavement, transport, displacement, wheel track, deformation, defect

Asfaltbeton qoplamalari yuzasida og'ir yuk avtomobillarining tasiri natijasida vujudga kelgan muammolar

Urokov A.X.¹^a, Ashurov E.T.², Bekmurodov U.B.²

¹Toshkent davlat transport universiteti, Toshkent, O'zbekiston

²Termiz davlat muhandislik va agrotekhnologiyalar universiteti, Termiz, O'zbekiston

Annotatsiya: Respublikamizning janubiy hududidagi M-39 "Almaty-Bishkek-Toshkent-Shahrisabz-Termiz" avtomobil yo'lining 1400-1426 km qismining hozirgi holatidagi taxlilar shuni ko'rsatadiki, yo'l qoplamasi va ko'priq qoplamalariga og'ir yuk transport vositalaridan tushadigan yuklamalar ta'sirida bo'ylama noravonliklar, deformatsiya, buzilishlar, qoplamaning yuk ko'tarish qobiliyatidagi bir qator tizimli muammolar va kamchiliklar yuzaga kelmoqda. Natijada, avtomobil yo'llarining belgilangan xizmat muddatini ta'minlanmasligi, yo'l qoplamasida ko'p sonli deformatsiya va buzilishlar, nuqsonlar paydo bo'lishi yo'l harakati xavfsizligiga katta ta'sir ko'rsatmoqda.

Kalit so'zlar: Og'ir yuk, asfaltbeton qoplama, transport, siljish, g'ildirak izi, deformatsiyalar, nuqson

1. Kirish

Mamlakatimizda amalga oshirilayotgan islohotlar natijasida umumiy foydalanishdagi avtomobil yo'llari, shahar ko'chalari va ichki xo'jalik yo'llarini, ko'priq va boshqa sun'iy inshootlarni qurish, rekonstruksiya qilish va ta'mirlash ishlari amalga oshirildi. Respublikada transport logistikasi sohasini rivojlantirish va tranzit salohiyatini oshirish, hamda transport sohasida keng ko'lamli amalga oshirilayotgan bunyodkorlik ishlari hisobiga amaldagi 25 tonna va undan ortiq yuk ko'tarish qobiliyatiga ega uch, to'rt va undan ko'p o'qli avtotransport vositalarining importi sezilarli darajada ko'paydi. Bugungi kunda avtomobil yo'llarida katta hajmli va og'ir vaznli avtotransport vositalarining harakat jadalligi oshib borayotgan bir vaqtda ularning vazn va hajm parametrlarini nazorat qilish to'liq tartibga solinmaganligi hamda ushbu yo'nalishda avtomatlashtirilgan tizimlarni qo'llanilmayotganligi sababli, yo'llarni saqlanganligini ta'minlashda bir qator muammolar yuzaga kelmoqda, xususan avtomobil yo'llari, ko'priklar va yo'l o'tkazgichlarning ta'mirlashlararo va xizmat qilish muddatlarini qisqarishi va ekspluatatsiya xarajatlarini ortishi, yo'llarda bo'ylama va ko'ndalang noravonliklarini

yuzaga kelishi, ushbu yo'l bo'laklarida harakat tezligini pasayishi va harakatning xavflilik darajasini ortishi. Ekspluatatsiya davrida avtomobil yo'llari qoplamalarining jadal deformatsiyalanishi va buzilishning sabablaridan biri - ularning ishlash sharoitlarini o'zgarishidir. Yuqori havo haroratida yo'lning asfaltbeton qoplamasi harorati yuqori bo'ladi, natijada asfaltbeton tarkibidagi bitum bog'lovchisining yumshashi oqibatida uning elastiklik modulini kamayishi kuzatiladi.

2. Tadqiqot metodikasi

Yozgi hisobiy davrda asfaltbeton qoplamasining elastiklik modulini kamayishi davrida transport oqimining miqdor va sifat jihatdan o'zgarishi natijasida og'ir yuk transport vositalarining o'qiga tushadigan yuklamasini ortib borishi hisobiga yo'l qoplamasining ko'ndalang noravonliklarini yuzaga kelishi, shuningdek harakat tezligi pasayishi yuzaga keladi [1].

Asfaltbeton qoplamalarda ko'p yuzaga keladigan muammolar quyidagilar hisoblanadi: yoriqlar, o'yiqlar, cho'kishlar, siljishlar, g'ildirak izlari. Bugungi kunda

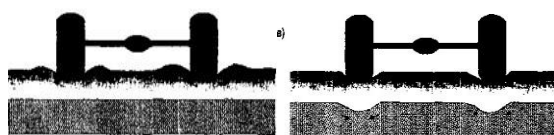
^a <https://orcid.org/0000-0002-9412-2708>



bunday nuqsonlarning paydo bo'lishiga transport oqimida hisobiy avtomobillarda belgilangan bitta o'qqa tushadigan hisobiy yukdan yuqori bo'lgan og'ir yuk avtomobillarining sonini keskin ko'payib borayotganligi sabab bo'lmoqda [2]

Qoplamalarga transport vositalaridan va tabiiy-iqlim omillardan tushadigan zo'riqishlar ruxsat etilgan me'yorlardan ortib ketganda qoplama deformatsiyalanadi. Yilning turli fasllarida havo haroratining o'zgarishlari, qoplamalarda muzlash-erish jarayonlarining kechishi natijasida asfaltbeton qoplamalarda kuchlanishlar hosil bo'ladi. Asfaltbeton qoplama elastik-plastik material bo'lganligi, qizish sovish jarayonlarda xususiyatlari o'zgarishi, mo'rt holatdan plastik holatga o'tishi sabablaridan plastik deformatsiyalar yuzaga keladi. Bunda qoplamaning deformatsiyaga bardoshligi turli yuklamalarning ta'sir etish davomiyligiga bog'liq bo'ladi. Yilning issiq vaqtlarida qoplama harorati ancha ko'tarilib asfaltbeton yumshab qoladi va transport vositalari ta'sir etganidan qoldiq deformatsiyalar to'planib qoladi [1].

Qoplama yuzasida ishlash jarayonida turli xil deformatsiyalar, jumladan g'ildirak izi deformatsiyasi hosil bo'ladi (1-rasm).



1– rasm. Qoplamada g'ildirak izi shakllanishining asosiy sxemalari: a) yuzaki g'ildirak izi; b) pastki qatlamlarda xam hosil bo'luvchi g'ildirak izi.

Respublikaning janubidagi Surxondaryo viloyatidan o'tadigan xalqaro ahamiyatdagi "M-39 "Almata-Bishkek-Toshkent-Shahrisabz-Termiz" avtomobil yo'lining 1330-1451km (121 km) bo'lagini rekonstruksiya qilish loyihasi xalqaro sarmoyalar hisobidan bajarildi. Hozirgi kunda ushbu yo'l bo'lagidan o'tadigan transport oqimi tarkibida yuqori dinamik xususiyatlarga ega bo'lgan xorijiy rusumdagi avtomobillarni harakat jadalligi ortib bormoqda. Ushbu hududlarda Sherobodsement zavodi hamda Sherobod qurilish materiallari ishlab chiqaruvchi kareerlar joylashgan bo'lib, ularda tashilayotgan yuk miqdorlarining belgilangan o'qqa tushadigan yuklama me'yoridan yuqori ekanligi aniqlandi.

Katta hajmli va og'ir vaznli yuklarni avtomobil transportida tashish Vazirlar Mahkamasining 2011 yil 26 dekabrda 342-son qaroriga asosan quyidagicha:

Avtotransport vositalarining ruxsat etilgan massasi ko'rsatkichlari

1-jadval

Transport vositasi turi	Ko'rsatkich (t)
Yakka avtotransport vositalari:	
ikki o'qli	18
uch o'qli	26
to'rt o'qli	32
Mingashmali va tirkamali avtopoezdlar:	
uch o'qli	28
to'rt o'qli	36
besht o'qli	40
olti va undan ortiq o'qli	44

Umumiy foydalanishdagi avtomobil yo'llari yo'l to'shamasining mustahkamligini hisoblashda avtomobilning eng ko'p yuklangan yakka o'qidagi og'irlik I-II toifa uchun

130 kN (13 t), III-V toifa uchun 100 kN (10 t) qabul qilingan [3]. Respublikamizdagi ko'pgina avtomobil yo'llaridagi yo'l to'shamasiga tushadigan og'irlik ushbu me'yoriy qiymatlardan oshib ketgan holatlar ko'p uchraydi.

Xalqaro ahamiyatdagi M39 "Almata-Bishkek-Toshkent-Shahrisabz-Termiz" avtomobil yo'lini Surxondaryo viloyatidan o'tadigan bo'lagini rekonstruksiya keyin foydalanishga topshirilmasdan (qoplama yotqizilganiga 3 yil bo'lgan) ushbu yo'l bo'lagida ko'p sonli deformatsiya va buzilishlar: yoriqlar, o'yiqlar, cho'kishlar, siljishlar, g'ildirak izlari, yo'l qoplamasining bo'ylama va ko'ndalang noravonliklar va buzilishlar yuzaga kelishi kuzatilmoqda. Bunday nuqsonlarni paydo bo'lishini bartaraf etish, avtomobil yo'lining zarur transport-ekspluatatsion ko'rsatkichlarini uzoq muddatli saqlashni ta'minlash, yo'l qoplamasining yaxlitligini saqlash va xizmat muddatini oshirishga yordam beradigan samarali yechimlar topish maqsadida M39 "Almata-Bishkek-Toshkent-Shahrisabz-Termiz" avtomobil yo'lining 1395-1420 km qismlarida kuzatuv ishlari olib borildi (2-rasm).



2– rasm. M-39 "Almata-Bishkek-Toshkent-Shahrisabz-Termiz" avtomobil yo'lining 1398-1420 km larda qoplama g'ildirak izi va siljish deformatsiyalar

Bugungi kunda og'ir yuk avtomobillarini ko'payib ketishi me'yordan ortiq yuk ortishi oqibatida qoplamaga jiddiy zarar yetkazmoqda. Yo'l qoplamalarida g'ildirak izini paydo bo'lishi hamda ko'priq qoplamalarini siljishi ortidan foydalanishga topshirilmasdan (qoplama yotqizilganiga 3 yil bo'lgan), bugungi kunga kelib yo'l bo'lagi qoplamasi qayta ta'mirlanmoqda.

Ushbu buzilishlar sababini tadqiq qilish maqsadida «Sherobod yo'llardan foydalanish» unitar korxonasi mutaxassisleri 2023 yil sentabr oyida xalqaro ahamiyatga molik M39 «Almati-Bishkek-Toshkent-Shahrisabz-Termiz» avtomobil yo'lining 1402 kilometrda "Sherobod-Termiz" yo'nalishida og'ir yuk transport vositalarining vazn va hajm o'lchamlarini nazorat qilish mobil tarozi ishga tushirildi.

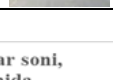
Og'ir yuk transport vositalari nazorat qilinganda ortiqcha vazn yuk bilan harakatlanayotgan transport vositalari aniqlandi (2-jadval).

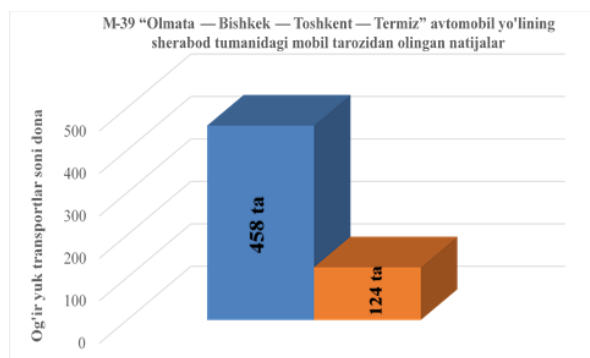


3– rasm. M-39 "Almata-Bishkek-Toshkent-Shahrisabz-Termiz" avtomobil yo'lining 1402 km da og'ir yuk transport vositalarining vaznini TENZO mobil tarozida o'lchov ishlari

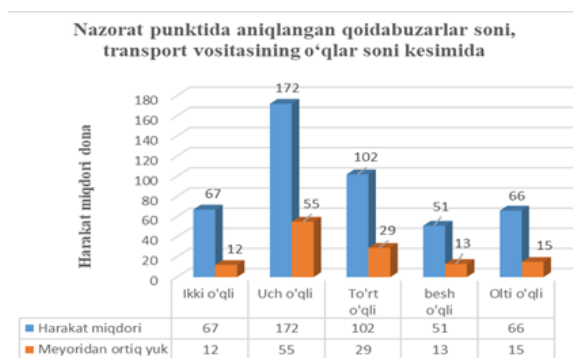
2-jadval

M-39 “Almata-Bishkek-Toshkent-Shahrisabz-Termiz” avtomobil yo‘lining 1395-1420 km larida mobil tarozi nazorat punktlar

№	Sana va vaqt	Og‘ir yuk avtomobillarni o‘qlar soni						Umumiy og‘irlik (t)	Ortiqcha og‘irlik yuk (t)	Foto
		1-o‘qli (t)	2-o‘qli (t)	3-o‘qli (t)	4-o‘qli (t)	5-o‘qli (t)	6-o‘qli (t)			
1.	13.11.2023 Soat 08:44	8.50	14.02	13.05	17.43	11.91	10.52	75.43	11.43	
2.	13.11.2023 Soat 09:04	7.08	18.71					25.79	7.79	
3.	14.11.2023 Soat 09:29	8.19	18.90	18.76				45.85	19.85	
4.	23.12.2023 Soat 09:41	9.41	20.85	20.30				50.56	24.56	
5.	16.01.2024 Soat 10:52	6.30	17.23					23.53	5.53	
6.	16.01.2024 Soat 10:58	7.17	18.21					25.38	7.38	
7.	16.01.2024 Soat 11:01	9.29	18.82	17.97				46.08	20.08	
8.	16.01.2024 Soat 11:25	6.87	18.75	17.62				43.24	17.24	
9.	22.01.2024 Soat 11:37	5.57	13.77					19.34	1.34	
10.	22.01.2024 Soat 12:11	7.80	14.77	14.75				37.32	11.32	
11.	1002.2024 Soat 09:30	8,37	14,2	13,64	13,49	13,28	15,66	78,64	34, 64	
12.	10.02.2024 Soat 11:18	6,79	8,55	7,98	4,96	10,06	9,94	48,28	4,28	
13.	04.03.2024 Soat 11:30	7,58	12,42	11,9				31,9	5.9	
14.	04.03.2024 Soat 11:42	7,14	12,31	6,92	7,17			33,54	1.54	



4-rasm. Nazorat punktida aniqlangan qoidabuzarlar soni



5-rasm. Nazorat punktida aniqlangan qoidabuzarlar transport vositasining o‘qlar soni kesimida



M-39“Almata-Bishkek-Toshkent-Shahrisabz-Termiz” avtomobil yo‘lining 1402 km da og‘ir yuk transport vositalarining vaznini Sherobod tumanida joylashgan mobil TENZO nazorat tarozisidan 2023 yil oktabr oyidan 2024 yil mart oyiga qadar umumiy nazoratdan o‘tgan og‘ir transport vositasining soni 458 ta bo‘lib, meyyordan ortiq yuklangan transport vositalari 124 dona (27 %) ni tashkil etdi.

3. Xulosa

Xalqaro ahamiyatdagi avtomobil yo‘llarining transport-ekspluatatsion sifatlarini oshirish, viloyatlar oralig‘ida ishonchli transport muhitini tashkil qilish, tranzit aloqani yaxshilash maqsadida M-39 “Almata-Bishkek-Toshkent-Shahrisabz-Termiz” avtomobil yo‘lining saqlanganligini ta‘minlash muhim hisoblanadi. Yuqorida keltirilgan tadqiqotlardan ma‘lum bo‘ladiki, me‘yordan ortiq vaznli transport vositalari harakatlanishi davomida asfaltbeton qoplamali avtomobil yo‘llarida g‘ildirak izi deformatsiyasini hosil bo‘lishi jadallashib bormoqda.

Natijalari shuni ko‘rsatadiki og‘ir yuk avtomobillaridan tushadigan yuklar yo‘l qoplamasini xizmat qilish muddatini kamaytiradigan eng asosiy omillardan biri bo‘lmoqda. 2023 yil oktabr, noyabr, dekabr, 2024 yil yanvar, fevral, mart oylarida tadqiqot o‘tkazildi. Tadqiqotlar natijasiga ko‘ra quydagilar aniqlandi:

- Og‘ir yuk avtomobilidan tushayotgan eng kam ortiqcha yuk 1.01 tonna
- Og‘ir yuk avtomobilidan tushayotgan eng ko‘p ortiqcha yuk 34.64 tonna
- Og‘ir yuk avtomobilidan tushayotgan ortacha og‘ir yuk 10.71 tonna

Shu o‘rinda aytish mumkinki, mamlakatimiz hududida iqlim sharoiti tez o‘zgaruvchan bo‘lganligi uchun yoz kunlarida janubiy hududlarda harorat (Termiz) 46 °C ga teng. Surxondaryo viloyati mamlakatimizni eng issiq hududlaridan biri bo‘lganini inobatga olgan holda yo‘llarni saqlash hamda xizmat qilish muddatini uzaytirishga quydagi takliflarni berib o‘tamiz:

- og‘irlik va gabarit parametrlarini nazorat qilishning avtomatlashtirilgan o‘lchov tizimlari bilan jihozlangan og‘irlik va gabarit nazorati bo‘yicha statsionar shoxobchalarni o‘rnatish;

- yuqori haroratli iqlim sharoitlarda havo harorati 40 oC dan o‘tgandan so‘ng og‘ir yuk avtomobillar harakatini vaqtincha cheklash;

- asfaltbeton qoplamali yo‘llarda g‘ildirak izi deformatsiyasini keltirib chiqaruvchi omillarni oldini olish;

- bog‘lovchi yo‘l qurilish materiallarni yuqori haroratga chidamliligini oshirish;

- avtomobil yo‘llarini qurishda, qurish texnologiyasini to‘g‘ri tashkil qilinishini nazorat qilish.

Foydalangan adabiyotlar / References

[1] Abdunazarov, A., & Sharofitdin, Y. (2023). Binoga ta‘sir etayotgan seysmik sirt to‘lqinlarni aniqlash va seysmik to‘siq (penopoliuretan) yordamida kamaytirish.

[2] Abdunazarov, A., & Sharofitdin, Y. (2023). Yer osti suvlari sathining seysmik sirt to‘lqinlari tarqalishiga ta‘siri.

[3] Abdunazarov, A., & Sharofitdin, Y. (2023). Binoga ta‘sir etayotgan seysmik sirt to‘lqinlarining grunt xususiyatiga bog‘liqligi.

Mualliflar to‘g‘risida ma‘lumot/ Information about the authors

Urakov Asliddin Xushvaqtoich	Toshkent davlat transport universiteti “Yo‘l muhandisligi” fakulteti t.f.d. prof, Tel.: +998977842608 https://orcid.org/0000-0002-9412-2708
------------------------------	---

Ashurov Elyor To‘lqinovich	Termiz davlat muhandislik va agrotexnologiyalar universiteti “Yo‘l muhandisligi” kafedrasida assistenti. E-mail: elyor.ashurov.2015@mail.ru Tel.: +998902473390
----------------------------	---

Bekmurodov Umid Bekmurodovich	Termiz davlat muhandislik va agrotexnologiyalar universiteti “Yo‘l muhandisligi” kafedrasida assistenti. E-mail: umidbekmurodov.2021@gmail.ru Tel.: +99886920987
-------------------------------	--

