

JOURNAL OF TRANSPORT



ISSUE 1, 2025 vol. 2

E-ISSN: 2181-2438

ISSN: 3060-5164



RESEARCH, INNOVATION, RESULTS



**TOSHKENT DAVLAT
TRANSPORT UNIVERSITETI**

Tashkent state
transport university



JOURNAL OF TRANSPORT

RESEARCH, INNOVATION, RESULTS

E-ISSN: 2181-2438

ISSN: 3060-5164

VOLUME 2, ISSUE 1

MARCH, 2025



jot.tstu.uz

TASHKENT STATE TRANSPORT UNIVERSITY

JOURNAL OF TRANSPORT

SCIENTIFIC-TECHNICAL AND SCIENTIFIC INNOVATION JOURNAL

VOLUME 2, ISSUE 1 MARCH, 2025

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

The “**Journal of Transport**” established by Tashkent State Transport University (TSTU), is a prestigious scientific-technical and innovation-focused publication aimed at disseminating cutting-edge research and applied studies in the field of transport and related disciplines. Located at Temiryo‘lchilar Street, 1, office 465, Tashkent, Uzbekistan (100167), the journal operates as a dynamic platform for both national and international academic and professional communities. Submissions and inquiries can be directed to the editorial office via email at jot@tstu.uz.

The Journal of Transport showcases groundbreaking scientific and applied research conducted by transport-oriented universities, higher educational institutions, research centers, and institutes both within the Republic of Uzbekistan and globally. Recognized for its academic rigor, the journal is included in the prestigious list of scientific publications endorsed by the decree of the Presidium of the Higher Attestation Commission No. 353/3 dated April 6, 2024. This inclusion signifies its role as a vital repository for publishing primary scientific findings from doctoral dissertations, including Doctor of Philosophy (PhD) and Doctor of Science (DSc) candidates in the technical and economic sciences.

Published quarterly, the journal provides a broad spectrum of high-quality research articles across diverse areas, including but not limited to:

- Economics of Transport
- Transport Process Organization and Logistics
- Rolling Stock and Train Traction
- Research, Design, and Construction of Railways, Highways, and Airfields, including Technology
- Technosphere Safety
- Power Supply, Electric Rolling Stock, Automation and Telemechanics, Radio Engineering and Communications
- Technological Machinery and Equipment
- Geodesy and Geoinformatics
- Automotive Service
- Air Traffic Control and Aircraft Maintenance
- Traffic Organization
- Railway and Road Operations

The journal benefits from its official recognition under Certificate No. 1150 issued by the Information and Mass Communications Agency, functioning under the Administration of the President of the Republic of Uzbekistan. With its E-ISSN 2181-2438, ISSN 3060-5164 the publication upholds international standards of quality and accessibility.

Articles are published in Uzbek, Russian, and English, ensuring a wide-reaching audience and fostering cross-cultural academic exchange. As a beacon of academic excellence, the "Journal of Transport" continues to serve as a vital conduit for knowledge dissemination, collaboration, and innovation in the transport sector and related fields.

Methodology for assessing the impact of the main comparative resistance to movement of various wagons on the weight of the freight train

U.U. Khusenov¹, Sh.M. Suyunbaev¹

¹Tashkent state transport university, Tashkent, Uzbekistan

Abstract:

The main comparative resistance to movement of freight cars is one of the main parameters in the normalization of the weight of trains on the plot, consisting of a combination of different wagons. This article developed an improved methodology for determining the main comparative resistance of trains to movement, consisting of a combination of different wagons, and evaluated the effect on the weight of trains on a railway track. The various carriages were researched in two different cases to investigate the effect of basic comparative resistance to movement on the weight of the freight train. In the first case, the average basic comparative resistance was calculated based on the proportion of wagons in the composition by number (existing methodology), in the second, the average basic comparative resistance was calculated based on the proportion of wagons in the composition by weight with different firing loads (proposed methodology). The result was found to be that the difference between the average basic comparative resistance calculated on the basis of the proportion of the different wagons in the freight train in the composition in terms of their number and weight, on average, is up to 26%. In this case, it is based on the fact that the average basic comparative resistance obtained on the basis of the share in the composition by weight of different wagons is always smaller or equal to the value obtained by their number. In the example of plots with different accounting slopes, it is indicated that the weight of the train obtained on the basis of the share in the composition by the weight of the wagons varies from 52 to 333 tons from the value obtained by the number of them.

Keywords:

the main comparative resistance to movement, traction calculations, the standard of weight of the freight train, the railway track, the methodology, the weight of the cars

Turli vagonlarni harakatga asosiy solishtirma qarshiligining yuk poyezdi og'irligiga ta'sirini baholash metodikasi

Xusenov O'.O'.¹, Suyunbayev Sh.M.¹

¹Tashkent davlat transport universiteti, Toshkent, O'zbekiston

Annotatsiya:

Yuk vagonlarini harakatga asosiy solishtirma qarshiligi turli xil vagonlar kombinatsiyasidan tashkil topgan poyezdlarning uchastkadagi og'irligini me'yorlashda asosiy parametrlardan biri hisoblanadi. Ushbu maqolada turli xil vagonlar kombinatsiyasidan tashkil topgan poyezdlarning harakatga asosiy solishtirma qarshiligini aniqlashning takomillashtirilgan metodikasi ishlab chiqilib, temir yo'l uchastkasidagi poyezdlar og'irligiga ta'siri baholangan. Turli vagonlarni harakatga asosiy solishtirma qarshiligining yuk poyezdi og'irligiga ta'sirini o'rganish uchun ikki xil holatda tadqiq qilindi. Birinchi holatda, vagonlarning soni bo'yicha tarkibdagi ulushi asosida o'rtacha asosiy solishtirma qarshilik hisoblandi (mavjud metodika), ikkinchisida o'qqa tushadigan yuklamasi turlicha bo'lgan vagonlarning og'irligi bo'yicha tarkibdagi ulushi asosida o'rtacha asosiy solishtirma qarshilik hisoblandi (taklif etilgan metodika). Natijada yuk poyezdi tarkibdagi turli vagonlarning ular soni va og'irligi bo'yicha tarkibdagi ulushi asosida hisoblangan o'rtacha asosiy solishtirma qarshilik orasidagi farq o'rtacha 26% gacha bo'lishi aniqlangan. Bunda, turli vagonlarning og'irligi bo'yicha tarkibdagi ulushi asosida olingan o'rtacha asosiy solishtirma qarshilik, ular soni bo'yicha olingan qiymatdan doim kichik yoki teng bo'lishi asoslangan. Turli hisobiy nishabliklarga ega uchastkalar misolida vagonlarning og'irligi bo'yicha tarkibdagi ulushi asosida olingan poyezd og'irligi, ular soni bo'yicha olingan qiymatdan 52 dan 333 tonnagacha farq qilishini ko'rsatilgan.

Kalit so'zlar:

harakatga asosiy solishtirma qarshilik, tortish hisoblari, yuk poyezdi og'irlik me'yori, temir yo'l uchastkasi, metodika, vagonlarning og'irligi

1. Kirish

Temir yo'l transportida tortish hisoblarini bajarishda vagonlarning harakatga qarshiligi asosiy hisobiy

elementlardan biri hisoblanadi. Temir yo'l uchastkalari o'tkazuvchanlik va tashuvchanlik qobiliyatini oshirishda poyezdlarning og'irligi muhim ahamiyatga ega. Shu sababli temir yo'l uchastkalarida harakatlanuvchi poyezdlarning

 <https://orcid.org/0000-0001-7500-4741>

 <https://orcid.org/0000-0002-4867-8270>



og'irliklarini me'yorlashda poyezd tarkibining harakatga qarshiligini to'g'ri hisobga olish talab etiladi. Dunyodagi barcha mamlakatlarda temir yo'l transporti muhim texnik va iqtisodiy ahamiyatga ega bo'lganligi sababli harakatlanuvchi tarkibning qarshiligini o'rganish tizimli ravishda olib boriladi. Vagonlarning poyezdlar harakatiga asosiy qarshiligi tarkib turiga, yo'l nishabligi, egriligi, harakat tezligi va vagonlarning yuklanish darajasiga (o'qqa tushadigan og'irlikka) bog'liq.

"O'zbekiston temir yo'llari" AJda yuk vagonlarining harakatga asosiy solishtirma qarshiligini hisoblash tartibi "Rossiya temir yo'llari" OAJda belgilangan talablarga muvofiq "Poyezd ishlari uchun tortish hisoblari Qoidalari" asosida amalga oshiriladi. "1520 mm koleyali yuk vagonlarini raqamlashning 8 xonali tizimi bo'yicha ma'lumotnoma"ga muvofiq yuk vagonlari 6 turga (yopiq vagon, platforma, yarim ochiq vagon, sisterna, sovutkichli vagon va boshqalar) bo'linadi [1].

"Poyezd ishlari uchun tortish hisoblari Qoidalari"da turli guruh vagonlarning harakatga solishtirma qarshiligi ularning tarkibdagi vagonlar ulushi asosida [2-3], manyovr ishlarida o'rtacha og'irliqi bo'yicha hisoblanadi [4]. Ushbu tadqiqotda yuqoridagi keltirilgan metodikalar bo'yicha aniqlangan asosiy solishtirma qarshilikning yuk poyezdi og'irligiga ta'sirini baholash natijalarini bayon etamiz.

2. Tadqiqot metodikasi

Poyezd harakatiga vagonlarning asosiy solishtirma qarshiligini hisoblashning amaldagi metodikasi

[3, 5-6] ilmiy ishlarda qarshilikni hisoblashda vagonlarni 6 turga turga bo'lish belgilangan, ammo ma'lum bir turdagi vagonlar guruhi ham o'qqa tushadigan og'irliqi turlicha bo'lgan vagonlar kombinatsiyasidan tashkil topganligi hisobga olinmagan.

Yuk vagonlarining poyezdlar harakatiga asosiy solishtirma qarshiligi harakatlanish tezligidan (v) kelib chiqqan holda vagonlar turiga bog'liq ravishda quyidagicha hisoblanadi [2-3]:

- o'qqa tushadigan og'irliqi olti tonnadan katta ($q_{04} > 6 t$) bo'lgan 4 o'qli yarim ochiq vagonlarning poyezd harakatiga harakatiga asosiy solishtirma qarshiligi (N/kN):

$$\omega_{04}^{(pv)} = 0,53 + \frac{3,609 + 0,08 \cdot v + 0,00275 \cdot v^2}{q_{04}(pv)} \quad (1)$$

- o'qqa tushadigan og'irliqi olti tonnadan katta ($q_{04} > 6 t$) bo'lgan 4 o'qli sisternalarning poyezd harakatiga asosiy solishtirma qarshiligi (N/kN):

$$\omega_{04}^{(sys)} = 0,64 + \frac{2,93 + 0,047 \cdot v + 0,00275 \cdot v^2}{q_{04}(sys)} \quad (2)$$

- o'qqa tushadigan og'irliqi olti tonnadan katta ($q_{04} > 6 t$) bo'lgan 4 o'qli platforma, yopiq vagon, sovutkichli vagon va boshqa vagonlarning poyezd harakatiga harakatiga asosiy solishtirma qarshiligi (N/kN):

$$\omega_{04}^{(pl,kr,rf,pr)} = 0,7 + \frac{3 + 0,01 \cdot v + 0,0025 \cdot v^2}{q_{04}(pl,kr,rf,pr)} \quad (3)$$

- o'qqa tushadigan og'irliqi olti tonnadan kichik yoki teng ($q_0 \leq 6 t$) bo'lgan vagonlarning poyezd harakatiga harakatiga asosiy solishtirma qarshiligi (N/kN):

$$\omega_0^{(por)} = 1,0 + 0,044 \cdot v + 0,000204 \cdot v^2 \quad (4)$$

- tarkibdagi 8 o'qli vagonlarning poyezd harakatiga asosiy solishtirma qarshiligi (N/kN):

$$\omega_{08} = 0,7 + \frac{6 + 0,038 \cdot v + 0,0021 \cdot v^2}{q_{08}} \quad (5)$$

bunda

$q_{04}(pv)$, $q_{04}(sys)$, $q_{04}(pl,kr,rf,pr)$, q_{08} —tarkibdagi ma'lum

turdagi 4 va 8 o'qli vagonlarning o'qlaridan relsga tushadigan yuklama, t.

"Poyezd ishlari uchun tortish hisoblari Qoidalari"da qarshilikni hisoblash bir turdagi vagonlarning tarkibdagi ulushi asosida (amaldagi metodika) (1-5) formulalardan foydalanib quyidagicha aniqlanadi (N/kN) [2-3].

$$\omega_0'' = \sum (\alpha_i \cdot \omega_{0,i}'') \quad (6)$$

bunda $\omega_{0,i}''$ — tarkibdagi i -turdagi vagonlarning poyezdlar harakatiga ko'rsatiladigan asosiy solishtirma qarshilik (vagon turlari kesimida), N/kN ; α_i —tarkibdagi i -turdagi vagonlarning ulushi (vagonlar soni kesimida).

Agar poyezd tarkibi har xil turdagi (sisterna, yopiq vagon, yarim ochiq vagon va h.k.) yuklangan va bo'sh vagonlardan tuzilgan bo'lsa, turli guruh vagonlarning harakatga solishtirma qarshiligi ularning tarkibdagi o'rtacha og'irlik ulushi bo'yicha quyidagicha hisoblanadi (N/kN) [4]:

$$\omega_0'' = \frac{\omega_0'' \cdot Q_1 + \dots + \omega_{0n}'' \cdot Q_n}{Q} \quad (7)$$

bunda $\omega_0'', \dots, \omega_{0n}''$ —vagonlar harakatiga ko'rsatiladigan asosiy solishtirma qarshilik (vagon turlari kesimida), N/kN ; $Q_1, \dots, Q_n$ —tarkibdagi har xil turdagi vagonlarning brutto og'irliklari, t; Q —tarkibning og'irliqi ($Q = Q_1 + \dots + Q_n$), t.

Poyezd harakatiga vagonlarning asosiy solishtirma qarshiligini hisoblash metodikasini takomillashtirish

Yuqoridagi (6) ifodani vagonlar turiga bog'liqligini quyidagi ko'rinishda tasvirlab, kelgusi hisoblashlarda foydalanamiz (N/kN):

$$\omega_0'' = \lambda_{pv} \cdot \omega_{04}^{(pv)} + \lambda_{pl,kr,rf,pr} \cdot \omega_{04}^{(pl,kr,rf,pr)} + \lambda_{sys} \cdot \omega_{04}^{(sys)} + \lambda_{por} \cdot \omega_{04}^{(por)} + \lambda_8 \cdot \omega_{08}'' \quad (8)$$

bunda λ_{pv} , λ_{sys} , $\lambda_{pl,kr,rf,pr}$, λ_{por} , λ_8 —mos ravishda poyezd tarkibidagi ma'lum bir turdagi vagonlarning og'irlik ulushi.

Poyezd tarkibidagi ma'lum bir turdagi vagonlarning og'irlik ulushi quyidagi tenglikni qanoatlantirishi talab etiladi.

$$\lambda_{pv} + \lambda_{sys} + \lambda_{pl,kr,rf,pr} + \lambda_{por} + \lambda_8 = 1 \quad (9)$$

Turli vagonlardan (sisterna, yopiq vagon, yarim ochiq vagon va h.k.) tuzilgan poyezd tarkibidagi ma'lum bir turdagi vagonlar guruhi (masalan, yarim ochiq vagon) ham o'qqa tushadigan og'irligidan kelib chiqib bir nechta guruhlarni o'z ichiga oladi. Bu esa bir turga mansub, ammo o'qqa tushadigan og'irliqi turlicha bo'lgan vagonlarning har bir guruhi uchun poyezd harakatiga solishtirma qarshiligini alohida-alohida aniqlashni talab etadi. Natijada turli vagonlardan tuzilgan poyezd harakatiga vagonlarning solishtirma qarshiligini aniqlash formulasi quyidagicha ko'rinish oladi:

$$\omega_0'' = \sum \left(\frac{q_j \cdot n_j}{Q} \omega_{04/08}^{(j)} \right) = \sum \left(\frac{q_{pl,kr,rf,pr} \cdot n_{pl,kr,rf,pr}}{Q} \omega_{04}^{(pl,kr,rf,pr)} \right) + \sum \left(\frac{q_{pv} \cdot n_{pv}}{Q} \omega_{04}^{(pv)} \right) + \sum \left(\frac{q_{sys} \cdot n_{sys}}{Q} \omega_{04}^{(sys)} \right) + \sum \left(\frac{q_{por} \cdot n_{por}}{Q} \omega_{04}^{(por)} \right) + \sum \left(\frac{q_8 \cdot n_8}{Q} \omega_{08}'' \right) \quad (10)$$

(8) formula elementlarini hisobga olgan holda (10) formulani quyidagi ko'rinishda ifodalash mumkin:

$$\omega_0'' = \sum (\lambda_j \cdot \omega_{04/08}^{(j)}) = \sum (\lambda_{pv} \cdot \omega_{04}^{(pv)}) + \sum (\lambda_{sys} \cdot \omega_{04}^{(sys)}) + \sum (\lambda_{pl,kr,rf,pr} \cdot \omega_{04}^{(pl,kr,rf,pr)}) + \sum (\lambda_{por} \cdot \omega_{04}^{(por)}) + \sum (\lambda_8 \cdot \omega_{08}'') \quad (11)$$



bunda q_j – tarkibdagi o'qqa tushadigan og'irligi bir xil bo'lgan j -guruhidagi bitta vagonning brutto og'irligi, t; n_j – tarkibning j -guruhidagi vagonlar soni; λ_j – tarkibdagi j -guruhdagi vagonlarning og'irlik bo'yicha ulushi ($\lambda_j = \frac{q_j n_j}{Q}$).

Poyezd tarkibidagi ma'lum bir turdagi o'qqa tushadigan og'irligi turlicha bo'lgan vagonlarning og'irlik bo'yicha ulushi quyidagi tenglikni qanoatlantirishi talab etiladi.

$$\sum \lambda_j = \sum \lambda_{pv} + \sum \lambda_{sys} + \sum \lambda_{pl,kr,rf,pr.} + \sum \lambda_{por} + \sum \lambda_8 = 1 \quad (11)$$

Shunday qilib, poyezd tarkibidagi vagonlar soni quyidagicha aniqlanadi:

$$m = \sum n_j = \sum \frac{Q_j}{q_j} \quad (12)$$

bunda Q_j – tarkibdagi o'qqa tushadigan og'irligi bir xil bo'lgan j -guruhidagi vagonlarning brutto og'irligi, t.

3. Natija va muhokamalar

Yuqorida metodikalar asosida o'qqa tushadigan og'irligi olti tonnadan katta ($q_{04} > 6 t$) bo'lgan 4 o'qli va 8 o'qli sistema, platforma, yarim ochiq vagon, yopiq vagon, sovutkichli vagon va o'qqa tushadigan og'irligi olti tonnadan kichik bo'lgan ($q_0 < 6 t$) 4 o'qli bo'sh vagonlardan tashkil topgan tarkib misolida harakatga vagonlarning asosiy solishtirma qarshiligi va uning poyezd og'irligiga ta'siri ko'rib chiqamiz. Poyezd tarkibidagi vagonlar turi va ular to'g'risidagi ma'lumotlar 1-jadvalda keltirilgan.

Yuklangan va bo'sh vagonlardan tuzilgan turli vagonlarning o'qqa tushadigan o'rtacha og'irligidan kelib chiqib vagonlarning poyezdlar harakatiga asosiy solishtirma qarshiligini vagon turlari kesimida (8) formula asosida aniqlash natijalari

2-jadvalda keltirilgan.

Yuklangan va bo'sh vagonlardan iborat tarkibdagi turli vagonlarning poyezdlar harakatiga asosiy solishtirma qarshiligini guruhlar kesimida (11) formula asosida aniqlash natijalari 3-jadvalda keltirilgan.

1-jadval

Poyezd tarkibidagi vagonlar soni va ularning turi to'g'risidagi ma'lumotlar

Vagon turi	Vagonlarning turlari bo'yicha tarkibdagi ulushi, %	Vagonning bitta o'qiga tushadigan o'rtacha brutto og'irligi, t.	Guruhlar kesimidagi vagon turlari	Vagonlar turlarining guruhlar kesimidagi ulushi, %	Vagonning bitta o'qiga tushadigan brutto og'irligi, t.
1	2	3	4	5	6
4 o'qli yarim ochiq	14,7	18,5	4 o'qli yarim ochiq	7	18
4 o'qli sistema	19,3	16,5	4 o'qli yarim ochiq	9	19
			4 o'qli sistema	10	16
			4 o'qli sistema	9	17
4 o'qli boshqa vagonlar	33,2	21,0	4 o'qli platforma	10	21
			4 o'qli yopiq vagon	20	20
			4 o'qli sovutkichli vagon	10	22
8 o'qli vagonlar	9,4	16,5	8 o'qli vagonlar	8	19
			8 o'qli vagonlar	10	14
4 o'qli bo'sh vagonlar	23,4	5,0	4 o'qli bo'sh vagonlar	7	5

2-jadval

Vagonlarning poyezdlar harakatiga asosiy solishtirma qarshiligini aniqlash natijalari (vagon turlari kesimida)

Vagon turi	Harakat tezliklari, km/soat											
	0	10	20	30	40	50	60	70	80	90	100	110
	Vagonlar harakatiga ko'rsatiladigan asosiy solishtirma qarshilik, ω_0'' , N/kN											
4 o'qli yarim ochiq	0,73	0,78	0,87	0,99	1,14	1,31	1,52	1,76	2,02	2,32	2,64	3,00
4 o'qli sistema	0,82	0,86	0,94	1,05	1,20	1,38	1,59	1,83	2,11	2,42	2,77	3,15
4 o'qli boshqa vagonlar	0,86	0,87	0,92	0,99	1,08	1,21	1,35	1,53	1,73	1,95	2,20	2,48
8 o'qli vagonlar	1,06	1,10	1,16	1,25	1,36	1,50	1,66	1,85	2,06	2,30	2,57	2,86
4 o'qli bo'sh vagonlar	1,00	1,46	1,96	2,50	3,09	3,71	4,37	5,08	5,83	6,61	7,44	8,31
$\omega_{0,ort}''$, N/kN	0,88	1,02	1,18	1,38	1,61	1,87	2,16	2,48	2,83	3,22	3,64	4,08

3-jadval

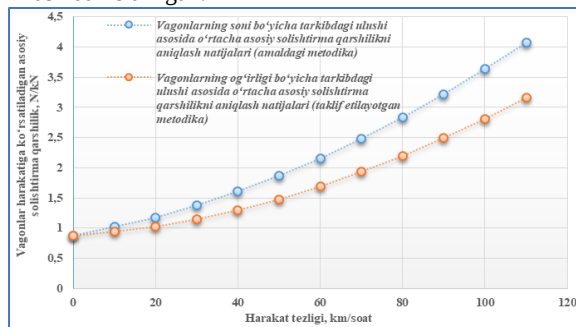
Vagonlarning poyezdlar harakatiga asosiy solishtirma qarshiligini aniqlash natijalari (guruhlar kesimida)

Vagon turi	Harakat tezliklari, km/soat											
	0	10	20	30	40	50	60	70	80	90	100	110
	Vagonlar harakatiga ko'rsatiladigan asosiy solishtirma qarshilik, ω_0'' , N/kN											
4 o'qli yarim ochiq	0,73	0,79	0,88	1,00	1,15	1,33	1,55	1,79	2,06	2,37	2,7	3,07
4 o'qli yarim ochiq	0,72	0,78	0,86	0,98	1,12	1,29	1,49	1,72	1,98	2,27	2,59	2,93
4 o'qli sistema	0,82	0,87	0,95	1,07	1,22	1,40	1,62	1,87	2,16	2,48	2,84	3,23
4 o'qli sistema	0,81	0,86	0,93	1,04	1,18	1,36	1,56	1,80	2,07	2,37	2,71	3,07
4 o'qli platforma	0,84	0,86	0,90	0,96	1,05	1,16	1,30	1,46	1,64	1,85	2,08	2,34
4 o'qli yopiq vagon	0,85	0,87	0,91	0,98	1,07	1,19	1,33	1,50	1,69	1,90	2,15	2,42



4 o'qli sovutkichli vagon	0,88	0,90	0,95	1,03	1,14	1,27	1,44	1,64	1,86	2,12	2,41	2,72
8 o'qli vagonlar	1,02	1,05	1,10	1,18	1,27	1,39	1,53	1,70	1,88	2,09	2,32	2,57
8 o'qli vagonlar	1,13	1,17	1,24	1,35	1,48	1,64	1,83	2,05	2,31	2,59	2,90	3,24
4 o'qli bo'sh vagonlar	1,00	1,46	1,96	2,50	3,09	3,71	4,37	5,08	5,83	6,61	7,44	8,31
$\omega_0, N/kN$	0,88	0,94	1,03	1,15	1,30	1,48	1,69	1,93	2,19	2,49	2,81	3,16

Poyezd tarkibidagi vagonlarning harakatiga asosiy solishtirma qarshiligini aniqlash natijalari o'rtasidagi tafovut 1-rasmda keltirilgan.



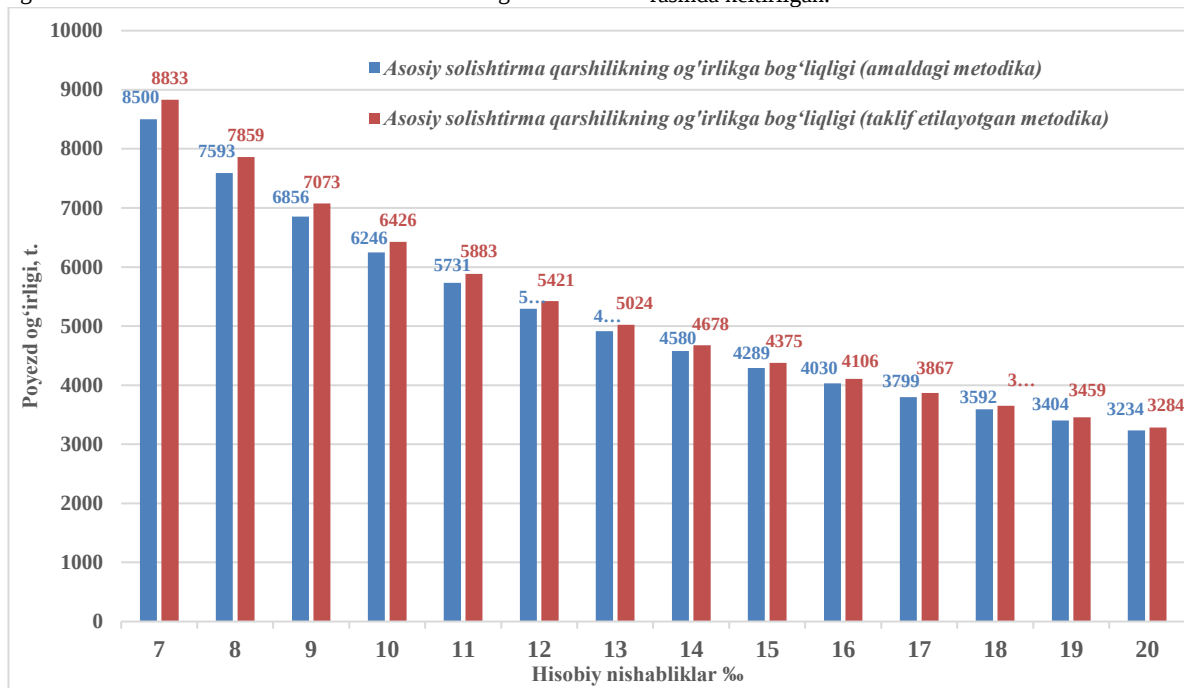
1-rasm. Poyezd tarkibidagi vagonlarining harakatiga asosiy solishtirma qarshilikni turli metodikalar asosida hisoblash natijalari

“O‘zbekiston temir yo‘llari” AJda yuk poyezdlarining peregonda maksimal harakatlanish tezliklari chegarasi

“O‘zbekiston temir yo‘llari” AJ raisining 2021-yil 24-dekabrda “Yuk poyezdlarining bekatlararo (peregon) qatnash vaqtlarini belgilash vedomosti”da belgilangan. Ushbu vedomostga asosan yuk poyezdlarining peregonda maksimal harakatlanish tezligi 50-90 km/soatni tashkil etadi.

Yuqoridagi 1-rasmdan ko‘rinib turibdiki, poyezd tarkibidagi vagonlarning harakatiga asosiy solishtirma qarshiligini aniqlashda amaldagi va taklif etilayotgan metodika o‘rtasidagi tafovut harakat tezligi ko‘tarilgan sari ortib bormoqda. Bu esa o‘z navbatida uchastkada harakatlanuvchi poyezdlar og‘irligiga bevosita o‘z ta‘sirini o‘tkazadi.

Uchastkada harakatlanuvchi poyezd og‘irligiga uchastkaning hisobiy nishabligi va tortuv turiga bog‘liqligi sababli tadqiqotda 3VL80C elektrovozining tortuv tavsifidan foydalanildi [7]. Tortuv turi 3VL80C elektrovozi bo‘lganda turli hisobiy nishabliklarga ega uchastkalarda harakatlanuvchi poyezd og‘irligini aniqlash natijalari 2-rasmda keltirilgan.



2-rasm. Vagonlarni harakatga asosiy solishtirma qarshiligining poyezd og‘irligiga ta‘siri

4. Xulosa

Poyezd tarkibidagi turli vagonlarni harakatga asosiy solishtirma qarshiligini aniqlashning takomillashtirilgan metodika ishlab chiqildi. Amaldagi va taklif etilayotgan metodikalar orqali vagonlarning poyezdlar harakatiga asosiy solishtirma qarshiligi o‘rtasidagi tafovut o‘rtacha 26,4 foizdan 29,3 foizgacha o‘zgarishi aniqlandi. Taklif etilayotgan metodika orqali qarshilikni hisoblash natijasida

uchastkada harakatlanuvchi har bir poyezd massasini hisobiy nishablikka bog‘liq ravishda o‘rtacha 52 dan 333 tonnagacha yoki 1 tadan 4 ta yuklangan vagongacha oshirish imkoniyati mavjudligi asoslandi.

Foydalangan adabiyotlar / References



[1] Справочник 8-мизначная система нумерации грузовых вагонов колеи 1520 мм. 2005. – 31 р.

[2] Правила тяговых расчетов для поездной работы. 1985. – 289 с.

[3] Правила тяговых расчетов для поездной работы. 2016. – 515 с.

[4] Актуализация правил тяговых расчетов на промышленном железнодорожном транспорте: методическое пособие. – М.: ПромтрансНИИпроект, 2016. – 95 с.

[5] Машарипов М.Н., Суюнбаев Ш.М., Абляимов О.С., Хусенов У.У., Лесов А.Т. Совершенствование метода выполнения тяговых расчетов с учетом особенности разных типов вагонов // Научных журнал транспортных средств и дорог, – 2023. – №1. – С. 133-147.

[6] Машарипов М.Н., Адилова Н.Д., Суюнбаев Ш.М., Абляимов О.С., Хусенов У.У. Исследование зависимости основного удельного сопротивления движению от типа вагонов // Научных журнал транспортных средств и дорог, – 2023. – №1. – С. 85-97.

[7] <https://sites.google.com/site/tagapoezd/tagsredstv/a/electrPeremTok/15v180s>

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

Xusenov O'tkir O'ktamjon o'g'li /
Khusenov Utkir Tashkent davlat transport universiteti
"Temir yo'ldan foydalanish ishlarini boshqarish" kafedrasi doktoranti (DSc), texnika fanlari bo'yicha falsafa doktori (PhD), dotsent
E-mail: otkirkhusenov@mail.ru
Tel.: +998 94 122 66 44
<https://orcid.org/0000-0001-7500-4741>

Suyunbayev Shinpolat Mansuraliyevich /
Suyunbaev Shinpolat Tashkent davlat transport universiteti
"Temir yo'ldan foydalanish ishlarini boshqarish" kafedrasi professori, texnika fanlari doktori (DSc), professor
E-mail: shinbolat_84@mail.ru
Tel.: +998 93 510 92 82
<https://orcid.org/0000-0002-4867-8270>



D. Mahmudova

Impact of increasing labor productivity in the company contributing factors.....139

S. Absattarov, N. Tursunov

Numerical Simulation of the spatial distribution of temperature fields in spring elements of freight wagons of railway transport...141

U. Khusenov, Sh. Suyunbaev

Methodology for assessing the impact of the main comparative resistance to movement of various wagons on the weight of the freight train.....146

F. Khudaynazarov

Development of a forecasting model of the change in the volume of international cargo transportation in automobile transport.....151

O. Kasimov, R. Isroilov, Z. Isomov

Study of the causes of corrosion in the insulating materials of traction motors.....154

A. Artykbaev, M. Toshmatova

Mathematical model of railway plan.....158

Kh. Kamilov

Assessment of the effect of fibrogenic aerosols on employees working at non-stationary workplaces on railway transport.....163

A. Shermukhamedov, M. Juraev, D. Akhmedov

Application of the method of discrete allocation of vehicles to routes in the transportation of cotton raw materials.....167

N. Tursunov, U. Rakhimov, T. Urazbaev, Sh. Mamaev

Improvement of the technology for preparing a sand mold and a rod mixture for casting a D49 type diesel engine cover from high-strength cast iron.....172

N. Tursunov, U. Rakhimov, T. Urazbaev

Improvement of the technology for obtaining synthetic cast iron using local secondary waste raw materials.....177