O‘ZBEKISTON RESPUBLIKASI
OLIY TA’LIM, FAN VA INNOVATSIYALAR VAZIRLIGI
ABU RAYHON BERUNIY NOMIDAGI URGANCH DAVLAT UNIVERSITETIDA 15-16-SENTABR

“QURILISH VA ARXITEKTURA SOHASIDAGI INNOVATSION G‘OYALAR, INTEGRATSIYA VA TEJAMKORLIK” MAVZUSIDAGI RESPUBLIKA MIQYOSIDAGI ILMIY VA ILMIY-TEXNIK KONFERENSIYA MATERIALLARI

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“INNOVATIVE IDEAS, INTEGRATION, AND ECONOMY IN THE FIELD OF CONSTRUCTION AND ARCHITECTURE” SCIENTIFIC AND PRACTICAL REPUBLICAN CONFERENCE

РЕСПУБЛИКАНСКАЯ НАУЧНО-ПРАКТИЧЕСКАЯ КОНФЕРЕНЦИЯ «ИННОВАЦИОННЫЕ ИДЕИ, ИНТЕГРАЦИЯ И ЭКОНОМИКА В ОБЛАСТИ СТРОИТЕЛЬСТВА И АРХИТЕКТУРЫ»

URGANCH-2025

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ILMIY-TEXNIK ANJUMAN DASTURIY QO‘MITASI:

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Abu Rayhon Beruniy nomidagi Urganch davlat universitetida 2025 yil 15-16-sentabr kunlari “Qurilish va arxitektura sohasidagi innovatsion g‘oyalar, integratsiya va tejamkorlik” mavzusidagi respublika miqyosidagi ilmiy va ilmiy-texnik konferensiya materiallari kiritilgan.

To‘plamga kiritilgan maqolalar mazmuni, ilmiy salohiyati va keltirilgan dalillarning haqqoniyligi uchun mualliflar mas’uldirlar.

o‘rganish, zamonaviy texnologiyalar yordamida monitoring olib borish, xavfli zonalarni aniqlash va aholining ogohligini oshirish -bu boradagi eng muhim yo‘nalishlardir. O‘zbekiston va Markaziy Osiyo mintaqasi tektonik jihatdan faol hudud hisoblanadi. So‘nggi tadqiqotlar shuni ko‘rsatmoqdaki, ushbu mintaqada doimiy monitoring tizimlari, sun’iy yo‘ldosh texnologiyalari, GPS asosidagi kuzatuvlar va sun’iy intellektga asoslangan bashorat tizimlari joriy qilinmoqda. Bu esa zilzila xavfini erta aniqlash va unga tayyor turishga zamin yaratadi.

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EXAMPLE OF CALCULATION OF REINFORCED CONCRETE BEAM SPANS FOR TEMPORARY (A-14 and NK-100) AND PERMANENT LOADS.

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ABSTRACT

An example of the computation of reinforced concrete beam spans for calculated temporary (A-14 and NK- 100) and permanent loads was given in the article. Bridges are built to withstand a variety of loads, each of which consists of a mix of permanent and live loads.

Keywords

superstructures, unified, assembled, in bundles, end beams, protective layer, waterproofing, concrete protective layer, crowd.

There are currently two methods for calculating forces in spans due to the impacts of permanent and temporary loads.

Bridges are built to withstand a variety of loads, each of which consists of a mix of permanent and live loads.

Loads are divided into permanent and temporary.

1) Permanent loads - the own weight of the beams of the superstructure and the joints between them, the own weight of sidewalk blocks and railings, the own weight of the clothes of the driving deck and sidewalks.

2) Live loads - impact from rolling stock, pedestrians, and wind loads.

When roads cross natural or man-made impediments, structures should be designed to withstand the following live loads:

AK – Normative load from automobiles.

NK – A specific mode was used to pass the normative load from non-standard vehicles.

The bridge dimension is D-8+2x1.0. Design loads A-14 and NK-100. The span beams, support elements and other reinforced concrete structures are adopted unified according to the current standard designs.

The reinforced concrete bridge is designed according to the monitor 18+24m+24m+24 +18m.

total bridge length is 108,76 m.

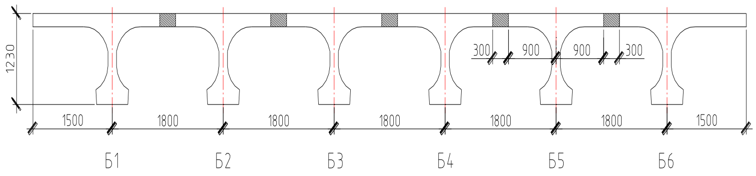
The accepted dimension of the bridge is D-8+2×1. The bridge dimension is designed in accordance with the requirements of SRDC 2.05.03-12.

Roadway width is 6 m

Safety lane width is 1,0 m

Width of sidewalks is 1 m

The 1.23m high cross section is made up of 6 T-beams with prestressed reinforcing. Superstructure of reinforced concrete integrally carried beams 24 and 18 meters long, strengthened with horizontal beams. Concrete of B35 class, longitudinal prestressing reinforcement of B-1400 class, and non-prestressing reinforcement of A-540 class.



Cross section of the bridge spans structure.

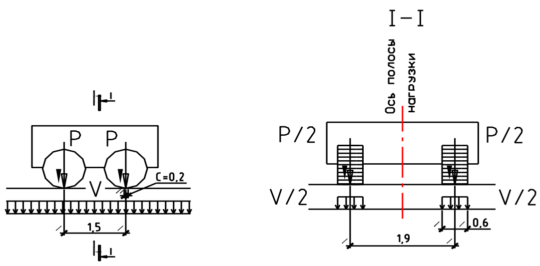
For individual beams, the designation B1, B2 ... B6 is accepted. Formwork dimensions of the beams of the superstructure in relation to the standard project of the series 3.503.1-81.

The span's beams are joined by embedding the 30cm wide longitudinal seams of the loop joint, which links the flanges of contiguous beams along the whole span. The intermediate beams have reinforcing ports on both sides on the side surfaces of the top shelf's overhangs to accomplish this. For their connection with the intermediate beams, the end beams feature strengthening protrusions on one side. Barriers and railings are installed on the superstructure's extreme beams.

The bridge deck is dressed as follows: a 3cm thick leveling layer of class B25 concrete reinforced with a wire mesh with a diameter of 2.5mm is applied to the upper surface of the superstructure beams, followed by a 7cm thick two-layer asphalt concrete coating.

Load class A14 in accordance with point 4.1 [2]

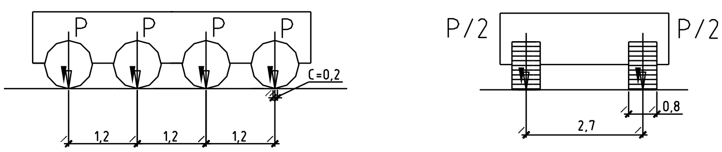
P=14 thou; V=1,4 thou



Load diagram A14

Load class NK100.8 in accordance with point 4.1 [2]

P=25 thousand



Load diagram of NК-100.

Reliability factors for load in accordance with the table 14[1]

Load A14

$\gamma^{тел}$=1,5; γ_f=1,2

Load NК-100,8.

$\gamma^{тел}$=1,0

Dynamic coefficients applied to the load from the rolling stock in accordance with paragraph.

For load A14

$1+\mu=1+\frac{45-\lambda}{135}$, where λ is loading length

$$1+\mu=1+\frac{45-\lambda}{135}=1{,}16$$

For load NK-100,8

1+ μ=1,10 at λ≥5,0 m;

For NK100 moving string, a reduction factor is applied $\gamma_{кол}$=0,75

The standard live load for pedestrian sidewalks (from the crowd) according to point is calculated by the formula:

p=400-2 λ ≥200 kgf/m^2

λ – distance between the axes of the supporting parts of the beam.

p=400-2×23,4=353,2 kgf/m^2

Calculation of intermediate support:

We accept a support in the form of a frame pinched at the level of the top of the base (line of local erosion). The calculation scheme of the frame is divided into finite rod elements. Calculation of the own weight of the sidewalks of the carriageway and sidewalks

The bridge deck consists of: Leveling layer of concrete B25 Waterproofing

Protective layer of concrete Asphalt concrete sidewalks $S_{п.м}$=13,5m×23,4m=315,9 m^2 (total surface area of the bridge) 1) Leveling layer of concrete:

h_b=0,03 м; ρ=2,5 t/m^3

q= ρ h_b $S_{п.\ м}$=2,5×0,03×315,9=22,27 t

2) Waterproofing:

h_b=0,04 м; ρ=1,5 t/m^3

q= ρ h_b $S_{п.\ м}$=1,5×0,04×315,9=18,95 t

3) Protective layer of concrete:

h_b=0,04 м; ρ=2,35 t/m^3

q= ρ h_b $S_{п.\ м}$=2,35×0,04×315,9=29,69 t

4) Asphalt concrete sidewalks:

h_b=0,07 м;ρ=2,3 t/m^3

q= ρ h_b $S_{п.\ м}$=2,3×0,07×315,9=50,86 t

5) Metal fence:

q= 0,042×23,4=0,91 t

on both sides =1,96t

Temporary (normative and design) loads

Load A14 according to point 4.1 [2] Axle load is 14 thousand (P)

Uniformly distributed load from the track is 0,1×14=1,4 thousand (V)

Table 1.

Type of load	**Normative for per wheel**	**Estimated per wheel**
Spot from per wheel	**P/2=7 thou**	**P/2=7×1,5×1,16=12,18 thou**
distributed along the span	**V/2=0,7 thou**	**V/2=0,7×1,5×1,16=1,218 thou**

Crowd load (A14):

p=400-2×23,4=0,3532 thousand/m^2

$q^н$=0,3532 тс/ $м^2$ γ_f=1,2 q^p=0,3532×1,2=0,42384 thousand/m^2

Load NK-100.8 according to point 4.1

Axle load is 25,2 thousand (P)

Table 2.

Type of load	Normative for per wheel	Estimated per wheel
from per wheel	P/2=12,6 thou	P/2=12,6×1,1=13,86 thou

Estimated constant load on the support elements

The calculation of loads is carried out taking into account the requirements of design standards.

1. Uniformly distributed load from the weight of the support:

$q_{оп}=y_f\times\pi\times R^2\times\nu=1,1\times3,14\times0,75^2\times2,5=4,86$ thousand/m.

R – support radius;

ν – bulk density of reinforced concrete.

2. Uniformly distributed load from the weight of the crossbar:

$q_p=b\times h\times y_f\times\nu=1,25\times0,7\times1,1\times2,5=2,4$ thousand/m.

b, h – cross section.

3. Self weight of the extreme beams of the superstructure:

$F_к=(F_{бк}+F_{мк})y_f=(39,4+1,48)\times1,1=44,97$ thousand.

$F_{мк}$ – weight of the monolithic section of the extreme beam;

$F_{бк}$ – the weight of the edge beam without a monolithic section.

4. Dead weight of intermediate beams:

$F_п=(F_{бп}+F_{мп})y_f=(37,23+2,96)\times1,1=44,21$ thousand.

$F_{мп}$ – weight of the monolithic section of the intermediate beam

5. Sidewalks and metal railing load:

$F_{тр}=q_{тр}\times L\times y_f=0,57\times24\times1,1=15,1$ thousand.

L – span length (beams).

$F_п=q_п×L× y_f =0,042×24×1,1=1,1$ thousand.

$q_{тр}$, $q_п$ – the weight of one linear meter of the sidewalk and railings.

The wind load is applied to the bridge support in the form of a concentrated force W collected from the cargo area:

$W=w×L× y_f =0,18×24×1,5=6,48$ thousand.

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Annotatsiya

Osma ko'priklarni loyihalash va hisoblashda to'g'ri metodlarni qo'llash, ularning mustahkamligi va barqarorligini ta'minlashda hal qiluvchi ahamiyatga egadir. Ushbu maqolada, osma ko'priklarni loyihalash va hisoblashning nazariy va amaliy asoslari yoritilgan. Hisoblashning asosiy parametrlari, statik va dinamik tahlil usullari, hamda zamonaviy hisoblash dasturlaridan foydalanish bo'yicha tavsiyalar berilgan.

Kalit so'zlar

Osma, vanta, kanat, ko'prik, fazoviy, nochiziqli, ravoq, po'lat, tugun, zo'riqish, zo'riqtirish, solqilik, deformatsiya, montaj.

Аннотация

Применение правильных методов при проектировании и расчёте подвесных мостов имеет решающее значение для обеспечения их прочности и устойчивости. В данной статье освещены теоретические и практические основы проектирования и расчёта подвесных мостов. Представлены основные параметры расчёта, методы статического и динамического анализа, а также рекомендации по использованию современных программных средств расчёта.

Ключевые слова