

Dilmuhammad G'ulomov

ORCID (0009-0002-3636-8993) (Farg'ona politexnika instituti)

tel: +998906344330 gulomovdilmuhammad990@gmail.com

Abdurahmonov Abduxoliq Abduxodi o'g'li

(ORCID 0009-0005-2929-0499) Farg'ona Politexnika Instituti,

farpi@ferpi.uz,

Nabiyev Muminjon

Farg'ona Politexnika Instituti,

nabiev@muminjon@gmail.com (0000-0002-3289-813X)

Nasriddinov Xasan Shavkatovich

Farg'ona Politexnika Instituti,

biqaxasanboy@gmail.com (ORCID 0000-0002-0484-1048)

Qodirov Giyosjon Mirzajonovich

Farg'ona Politexnika Instituti,

qodirovgiyosjon@gmail.com (ORCID 0000-0002-4772-3770)

N.D. Zakhidov

Farg'ona Politexnika Instituti, O'zbekiston,

n.d.zahidov@ferpi.uz

Annotatsiya. Maqolada tizimli tuzilmalarni me'moriy tasvirni va uch o'lchamli strukturani tashkil etuvchi yuqori qavatli binolarning konstruksiyaviy tizimining tarkibiy qismi sifatida o'rganish dolzarb masalalariga bag'ishlangan bo'lib, ular ob'ektning hajmiy tuzilishi, fazoviy puxtaligi va umumiy turg'unligini mustahkamligini ta'minlaydi. Yuqori qavatli binolarda vertikal elementlardan (ustunlar, devorlar, yadrolar, diafragmalar va boshqalar) va gorizontal elementlardan (orayopmalar, rigellar, nishabli kamarlar va boshqalar) iborat turli tuzilmalar qo'llaniladi.

Kalit so'zlar: konstruktiv tuzilmalar va tizimlar; yuqori qavatli binolar; yuqori qavatli binolarning karkazlari; karkaz tizimlari.

Аннотация. Статья посвящена актуальным вопросам изучения конструкционных конструкций как составных частей конструктивной системы высотных зданий, составляющих архитектурный образ и объемное строение, обеспечивающее прочность объемной структуры, пространственную продуманность и общую устойчивость объекта.

Ключевые слова: конструкционные конструкции и системы; высотные здания; каркасы многоэтажных зданий; каркасные системы.

Annotation. The article is devoted to the topical issues of studying structural structures as components of the structural system of high-rise buildings that make up an architectural image and a three-dimensional structure that ensures the strength of the three-dimensional structure, spatial thoughtfulness and overall stability of the object. In multi-storey buildings, various structures are used, consisting of vertical elements (columns, walls, cores, diaphragms) and horizontal elements (crossbars, inclined belts).

Keywords: structural structures and systems; high-rise buildings; frames of multi-storey buildings; frame systems.

Kirish. Kam qavatli binolar bilan taqqoslaganda, baland binolar asosan yagona kompleks struktura sifatida ishlaydi va bu xususiyat ushbu turdagi binolarni loyihalash jarayoniga sezilarli ta'sir ko'rsatadi. Yuqori qavatli binolarning strukturaviy dizayni ob'ektning mustahkamligi, fazoviy qat'iyli va umumiy barqarorligini ta'minlaydigan bir-biriga bog'liq bo'lgan konstruksiyaviy elementlar majmuasidan tashkil topgan muayyan me'moriy tasvirni va ma'lum bir fazoviy konstruksiyani hosil qiladi.

Qurilish tizimining har qanday versiyasi yuqori qavatli binoning ishonchli ishlashini kamida 150 yil davomida ta'minlashi kerak, bunda ob'ektning resursini tiklash mumkin bo'lgan taqdirda uning xavfsiz ishlashi va texnik xizmat ko'rsatish kafolati hisobga olinadi.

Yuqori qavatli binolarning konstrukturaviy tizimlarida vertikal (ustunlar, devorlar, diafragma va boshqalar) va gorizontalar (orayopmalar, tomlar, rigellar va boshqa elementlardan) tashkil topgan turli tizimli tuzilmalar qo'llaniladi. Yuqori

qavatli binolarning gorizontal qo'llab-quvvatlovchi tuzilmalari, odatda, bir xil va ular qattiq beton disk (quyma, yig'ma quyma, yoki yig'ma). Gorizontal tuzilmalar vertikal va gorizontal yuklarni sezadi va ularni boshqa vertikal yuk ko'taruvchi tuzilmalarga uzatadi, bu esa o'z navbatida bu yuklarni poydevorga o'tkazadi.

Yuqori qavatli binoning yoki osmono'par binoning gorizontal qismlarining asosiy turlari uning balandligiga qarab 40x40, 50x50, 40x60 m. Bunday turdagi cheklovlar shamol yuklarining binoning barqarorligiga ta'siri bilan bog'liq bo'lib, uning tebranishlari natijasida qo'zg'alish imkoniyatini hisobga olgan holda. Shuning uchun ham 80-100 qavatli osmono'par binolar 2,0-2,5 ming kvadrat metrdan oshmaydi.

Shamol ta'sirini kamaytirish uchun aerodinamik shakllar (silindrsimon, piramidal yoki prizmatik) ishlatiladi.



a) silindrsimon



b) piramidal



c) prizmatik

Binoning barqarorligini oshirish uchun ular kesim maydonini bir, ikki, uch yoki to'rt yo'nalishda kengaytirishga murojaat qilinadi. Ko'p qavatli binolarning moslashuvchanligi, ya'ni balandligi kengligi nisbati odatda birdan sakkizgacha.

Moslashuvchanlik koeffitsientining yuqori qiymati binoning yuqori qismida qabul qilinadigan tezlasmalarga olib keladi va shuning uchun binoning normal ishlashini ta'minlash uchun ba'zi damping elementlarini ishlatish talab etiladi. Binoning yuqori qismidagi standart gorizontal siljishlar 150 m balandlikdagi binolar uchun 0,002 mm dan oshmasligi kerak, 250 m dan ortiq-

0,001 mm gacha bo'lishi kerak. Oraliq balandliklar uchun standart qiymat interpolatsiya usuli bilan olinadi.

Bundan tashqari, yuqori qavatli binolarda tabiiy va texnogen xususiyatli favqulodda vaziyatlarda ularni avariya bilan himoya qilish uchun maxsus qurilish choralari ko'zda tutilgan. Ushbu chora-tadbirlar yuk ko'taruvchi tuzilmalarning kuchini saqlab qolishdan iborat.

Yuqori qavatli binolarning turli xususiyatlari ularning makon-rejalashtirish va arxitektura-dizayn echimlariga sezilarli ta'sir ko'rsatadi. Ushbu turdagi binolarda quyidagi xususiyatlar mavjud:

- yuk ko'taruvchi tuzilmalar tomonidan sezilarli yuklar;
- binolarning tarkibiy qismlarining turli xil yuklanishi;
- gorizontalar komponent sifatida katta shamol yuki;
- Po'lat va beton konstruksiyalarni birgalikda ishlash muammolari;
- tabiiy omillarning ta'siri (seysmik, ob-havo, shamol);
- texnogen omillarning ta'siri (tebranish, shovqin, favqulodda vaziyatlar, yong'inlar);
- yong'in va hayot faoliyati xafsizligi tizimlariga qo'yiladigan talablar;
- murakkab muhandislik va texnik yordam.

Baland binolar xarakterli xususiyati, an'anaviy ko'p qavatli binolardan farqli o'laroq, gorizontalar shamol yuki ta'sirida. Jahon amaliyotida yuqori qavatli binolarning mustahkamligi va barqarorligini ta'minlash uchun binoning qavatiga, qurilish sharoitlariga, qurilish maydonining seysmik faolligiga, muhandislik-geologik sharoitlarga, havo sharoitlariga, birinchi navbatda shamol yuklariga, shuningdek, arxitektura-rejalashtirish talablariga bog'liq.

Zamonaviy yuqori qavatli qurilishning asosiy vazifalaridan biri tuzilmalarning ishonchliligi va xavfsizligini ta'minlash bilan bog'liq masalalarni hal qilishdir. Shuning uchun loyixachining vazifasi, uning ayrim tarkibiy qismlari qulab tushmaydigan bino yaratishdir.

So'nggi yillarda yuqori qavatli binolarning tarkibiy tizimlarini ishlab chiqishni umumlashtirib, ularning asosiy xususiyatlarini qayd etish mumkin:

- uchta asosiy tizimni qo'llash: slindirsinom, qutisimon, silindirsimon va qutisimon ularning birikish variantlari;

- yangi tizimni yaratish: yirik fazoviy karkaz;

- tashqi qobiqning yotiq elementi sifatida diagonal panjaradan foydalanish;

- binolarning konstruktiv tizimi tomonidan shamol yuklarini samarali qabul qilish uchun loyihalash metodlarini joriy etish

- tashqi tuzilmalar;

- ikki tomonlama ventilyatsiya qilingan jabhadan foydalanish.

Xulosa: Yuqoridagilarni inobatga olgan xolda shuni umumiy xulosa kilib aytish mumkin, xozirgi kunda bizning respublikamizda xam unikal ko'p qavatli karkasli binolar kurilishini rivojlantirish uchun xar tomonlama shart-sharoitlar mavjud va yetarli. Buning uchun rivojlangan davlatlarning ushbu binolarni loyixalashtirish va qurilish tajribalarini yanada chuqurroq o'rganishni davom ettirib, to'plangan materiallarni chuqur taxlil qilish asosida o'zimizning xududlarimiz va milliyeligimizdan kelib chiqqan xolda davom ettirish kerak bo'ladi. Bu ishlarni natijasida yirik shaxarlarimiz arxitekturasi va infratuzilishini zamon talablariga muofiq yanada boyitishga katta xissa qo'shilgan bo'linadi.

Adabiyotlar ro'yxati:

[1].Xasanjon, X. R. (2024). Review and Analysis of the Operation of Monolithic Biaxial Ceilings With Void Generators in Dry and Hot Climates. *Miasto Przyszłości*, 49, 896-901.

[2]. Akramov Kh.A, Davlyatov Sh.M, Kimsanov B.I, Nazirov A.S "APPLICATION AND CLASSIFICATION OF COMPOSITE REINFORCEMENT IN CONSTRUCTION" Spectrum Journal of Innovation, Reforms and Development Volume 09, Nov., 2022 Page 95-100

[3]. Akramov Kh.A, Davlyatov Sh.M, Kimsanov B.I, Nazirov A.S "CONSTRUCTION FEATURES OF PERFORMING EXTERNAL REINFORCEMENT FROM COMPOSITE MATERIALS" Spectrum Journal of Innovation, Reforms and Development Volume 09, Nov., 2022 Page 110-115

- [4]. Akramov Kh.A, Davlyatov Sh.M, Kimsanov B.I, Nazirov A.S “THE ROLE OF ROD STAYED-SHELL SYSTEMS IN STUDIES OF INNOVATIVE STRUCTURES IN CONSTRUCTION” Spectrum Journal of Innovation, Reforms and Development Volume 09, Nov., 2022 Page 116-123
- [5]. Dusmatov, A., Nabiyev, M., Baxromov, M., & Azamjonov, A. (2023). Influence of two-layer axisymmetric cylindrical shells on their physical and mechanical characteristics. In E3S Web of Conferences (Vol. 452, p. 06010). EDP Sciences.
- [6]. Azamjonov Asadbek Tursunali o‘g‘li, "COMPUTER PROGRAMS FOR DESIGNING BUILDING STRUCTURES." Spectrum Journal of Innovation, Reforms and Development 21 (2023): 178-184.
- [7]. Abdukarimov, B. A., Tillaboyeva F. Sh, and A. T. Azamjonov. "CALCULATION OF HYDRAULIC PROCESSES IN SOLAR WATER HEATER COLLECTOR HEAT PIPES." Экономика и социум 4-1 (107) (2023): 4-10.
- [8]. Onorboyev Shavkat, and Azamjonov Asadbek Tursunali o‘g‘li. "IMPACT OF THE CONSTRUCTION INDUSTRY ON ECOLOGY." Miasto Przyszłości 44 (2024): 394-399.
- [9]. Сотволдиев, Ф., & Азамжонов, А. (2023). Анализ солнечных водонагревателей. Тенденции и перспективы развития городов, 1(1), 320-323.
- [10]. Davlyatov , S. M., & Solijonov , F. S. o‘g‘li. (2023). O‘ZBEKISTONDA YETISHTIRILAYOTGAN MAHALLIY YOG‘OCH MATERIALLARINING XUSUSIYATLARI. *GOLDEN BRAIN*, 1(1), 263–265. Retrieved from <https://researchedu.org/index.php/goldenbrain/article/view/4568>
- [11]. Абобакирова, З. А., Эркабоев, А. А. У., & Солижонов, Ф. С. У. (2022). ИССЛЕДОВАНИЕ СОСТОЯНИЯ ДЕФОРМАЦИИ ПРИ РАСТЯЖЕНИИ С ИСПОЛЬЗОВАНИЕМ СТЕКЛОВОЛОКОННОЙ АРМАТУРЫ В БАЛКАХ. *Talqin va tadqiqotlar ilmiy-uslubiy jurnali*, 4(4), 47-55.
- [12]. Asrorovna, A. Z., Abdug‘ofurovich, U. S., & Sodiqjon o‘g‘li, S. F. (2022). ISSUES OF IMPROVING THE ECONOMY OF BUILDING MATERIAL-

WOOD PRODUCTION. *Spectrum Journal of Innovation, Reforms and Development*, 8, 336-340.

[13]. Abdug‘Ofurovich, U. S., O‘G‘Li, S. F. S., & O‘G‘Li, E. A. A. (2022). KOMPOZIT ARMATURALI EGILUVCHI BETON ELEMENTLARNING KUCHLANIB-DEFORMATSIYALANGANLIK HOLATINI EKSPERIMENTAL TADQIQ ETISH. *Talqin va tadqiqotlar ilmiy-uslubiy jurnali*, 4(4), 41-46.

[14]. Abdukarimov B. A., Sh T. F., Azamjonov A. T. CALCULATION OF HYDRAULIC PROCESSES IN SOLAR WATER HEATER COLLECTOR HEAT PIPES //Экономика и социум. – 2023. – №. 4-1 (107). – С. 4-10.

[15]. Azamjonov Asadbek Tursunali o‘g‘li, Use of Solar Battery Batteries Research Parks Publishing LLC (2023) С. 76-83.

[16]. Obidovich A. T. Architecture And Urban Planning In Uzbekistan //Texas Journal of Engineering and Technology. – 2022. – Т. 9. – С. 62-64.

[17]. Muxammadovich A. A. et al. IMPROVING SUPPORT FOR THE PROCESS OF THE THERMAL CONVECTION PROCESS BY INSTALLING REFLECTIVE PANELS IN EXISTING RADIATORS IN PLACES //CENTRAL ASIAN JOURNAL OF MATHEMATICAL THEORY AND COMPUTER SCIENCES. – 2022. – Т. 3. – №. 12. – С. 179-183.

[18]. Obidovich A. T. et al. ROMAN STYLE QUALITY CHANGES IN EUROPEAN ARCHITECTURE IN X-XII CENTURIES //Spectrum Journal of Innovation, Reforms and Development. – 2022. – Т. 10. – С. 121-126.

[19]. BEAMS, D. I. B. R. C. *Spectrum Journal of Innovation, Reforms and Development* Volume 22, December, 2023 ISSN (E): 2751-1731 Website: www.sjird. journalspark. org DEVELOPMENT OF COMPOSITE REINFORCEMENTS AND CONCRETE DEFORMATIONS IN BASALT REINFORCED CONCRETE BEAMS.

[20]. Солижонов, Ф., & Курбонов, К. (2023). Расчет бетонных конструкций с композитной арматурой методом предельных состояний. *Тенденции и перспективы развития городов*, 1(1), 481-485.

- [21]. Sodiqjon o'g'li, S. F. (2023). BAZALT KOMPOZIT ARMATURALI BETON TO 'SINLARNI NORMAL KESIMLAR BO 'YICHA MUSTAHKAMLIGINI TADQIQ ETISH.: BAZALT KOMPOZIT ARMATURALI BETON TO 'SINLARNI NORMAL KESIMLAR BO 'YICHA MUSTAHKAMLIGINI TADQIQ ETISH.
- [22]. Solijonov, F. S. (2023). BAZALT KOMPOZIT ARMATURALI TO 'SINLARNI NORMAL KESIMLAR BO 'YICHA TADQIQ ETISH.: BAZALT KOMPOZIT ARMATURALI TO 'SINLARNI NORMAL KESIMLAR BO 'YICHA TADQIQ ETISH.
- [23].Набиев, М. Н., Насриддинов, Х. Ш., & Кодиров, Г. М. (2021). Влияние Водорастворимых Солей На Эксплуатационные Свойства Наружные Стен. *Ta'lim va rivojlanish tahlili onlayn ilmiy jurnali*, 1(6), 44-47.
24. Shavkatovich, N. K. (2022). SYSTEMS OF ARTIFICIAL REGULATION OF THE AIR ENVIRONMENT OF APARTMENTS AND HOUSES. *Spectrum Journal of Innovation, Reforms and Development*, 9, 169-174.
25. Nabiyev, M., Salimov, O., Khotamov, A., Akhmedov, T., Nasriddinov, K., Abdurakhmanov, U., ... & Abobakirov, A. (2024). Effect of external air temperature on buildings and structures and monuments. In *E3S Web of Conferences* (Vol. 474, p. 03011). EDP Sciences.
26. Khasan, N. (2024). Calculation of Cast Reinforced Concrete Frames of Multi-Story Buildings Taking into Account Dry-Hot Climate Conditions. *Miasto Przyszłości*, 49, 1215-1219.
27. Shavkatovich, N. X. (2022). ESTABLISHMENT OF TEMPERATURE AND HUMIDITY IN APARTMENTS AND HOUSES WITH THE HELP OF ARTIFICIAL PHASE ARTIFICIAL REGULATORY SYSTEMS. *Spectrum Journal of Innovation, Reforms and Development*, 10, 107-114.
28. Ravshanbek o'g'li, R. R. (2023). BAZALT FIBRALARI ORQALI BETON TARKIBNI OPTIMALLASHTIRISH. SO 'NGI ILMIY TADQIQOTLAR NAZARIYASI, 6(7), 37-44.
29. Ravshanbek o'g'li, R. R., & Zuxriddinovna, M. S. (2023). TO 'RT QAVATLI BINONI SEYSMIK KUHLAR TA'SIRIGA LIRA 9.6 DASTUR

YORDAMIDA HISOBLASH.: TO 'RT QAVATLI BINONI SEYSMIK KUCHLAR TA'SIRIGA LIRA 9.6 DASTUR YORDAMIDA HISOBLASH.

30. Nabiyev, M., Salimov, O., Khotamov, A., Akhmedov, T., Nasriddinov, K., Abdurakhmanov, U., ... & Abobakirov, A. (2024). Effect of external air temperature on buildings and structures and monuments. In E3S Web of Conferences (Vol. 474, p. 03011). EDP Sciences.

31. Umarov, S. A. O. (2023). UCH QAVATLI BINONI SEYSMIK KUCHLAR TA'SIRIGA LIRA 9.6 DASTUR YORDAMIDA HISOBLASH. GOLDEN BRAIN, 1(1), 224-230.

32. Ashurov, M., & Ravshanbek o'g'li, R. R. (2023). RESEARCH OF PHYSICAL AND MECHANICAL PROPERTIES OF BASALT FIBER CONCRETE. European Journal of Interdisciplinary Research and Development, 17, 12-18.

33. Numanovich, A. I., & Ravshanbek o'g'li, R. R. (2022). BASALT FIBER CONCRETE PROPERTIES AND APPLICATIONS. Spectrum Journal of Innovation, Reforms and Development, 9, 188-195.

34. Abobakirova, Z., Umarov, S., & Raximov, R. (2023). Enclosing structures of a porous structure with polymeric reagents. In E3S Web of Conferences (Vol. 452, p. 06027). EDP Sciences.

35. Dusmatov, A., Nabiyev, M., Baxromov, M., & Azamjonov, A. (2023). Influence of two-layer axisymmetric cylindrical shells on their physical and mechanical characteristics. In E3S Web of Conferences (Vol. 452, p. 06010). EDP Sciences.

36. Бахромов, М. М. (2020). Исследование сил негативного трения оттаивающих грунтов в полевых условиях. Молодой ученый, (38), 24-34.

37. Бахромов, М. М., Отакулов, Б. А., & Рахимов, Э. Х. У. (2019). Определение сил негативного трения при оттаивании околоствайного грунта. European science, (1 (43)), 22-38. Бахромов, М. М., & Рахманов, У. Ж. (2020). Проблемы строительства на просадочных лессовых и слабых грунтах и их решение. Интернаука, (37-1), 5-7.

39. Бахромов, М., & Хасанов, Д. (2022). ТЎКМА ГРУНТЛАРДА ЗАМИН ВА ПОЙДЕВОРЛАР ҚУРИЛИШИ. Евразийский журнал академических исследований, 2(6), 353-360.
40. Бахромов, М. М., & Рахмонов, У. Ж. (2019). Дефекты при проектировании и строительстве оснований и фундаментов. Проблемы современной науки и образования, (3 (136)), 76-79.
41. Бахромов, М. М., & Рахмонов, У. Ж. (2019). Закономерности воздействия сил негативного трения по боковой поверхности сваи. Проблемы современной науки и образования, (12-2 (145)), 62-65.
42. Бахромов, М. М., Рахмонов, У. Ж., & Отабоев, А. Б. У. (2019). Воздействие сил негативного трения на сваю при просадке грунтов. Проблемы современной науки и образования, (12-2 (145)), 24-35.
43. Бахромов, М. М. (2022). Механические характеристики грунта и прогноз закономерности воздействия сил негативного трения по боковой поверхности сваи. PEDAGOGS journali, 10(3), 162-167.
44. Mamatkhanovich, B. M., & Malikov, S. S. (2022). Strength And Deformability Of Metal GlassPlastic Shells Taking Into Account Shear Rigidity. The Peerian Journal, 12, 79-86.
45. Dusmatov, A., Bakhramov, M., & Malikov, S. (2023). Interlaminar shifts of two-layer aggressive-resistant combined plates based on metal and fiberglass. In E3S Web of Conferences (Vol. 389, p. 01030). EDP Sciences.
46. Mamatkhanovich, B. M. (2022). CONSTRUCTION OF FOUNDATIONS IN GRUNTS WITH VARIABLE STRUCTURES. Spectrum Journal of Innovation, Reforms and Development, 10, 115-120.
47. Mamathanovich, B. M. (2023). CONSTRUCTION OF FOUNDATIONS ON DRY SOILS. Spectrum Journal of Innovation, Reforms and Development, 21, 294-297.
48. Mamatkhanovich, B. M. (2022). Construction of Grounds and Foundations on Bulk Soil. Miasto Przyszłości, 201-205.

49. Bakhromov, M. M., Rakmanov, U. J., & Otaboev, A. B. U. (2021). Problems of construction on insulated forest and weak soils and their solution. *Asian Journal of Multidimensional Research*, 10(10), 604-607.
50. Dusmatov, A., Nabiyev, M., Baxromov, M., & Azamjonov, A. (2023). Influence of two-layer axisymmetric cylindrical shells on their physical and mechanical characteristics. In *E3S Web of Conferences* (Vol. 452, p. 06010). EDP Sciences.
51. Дилшоджон оглы, З. Н. (2023). ПРИМЕНЕНИЕ КОМПОЗИТНЫХ МАТЕРИАЛОВ ДЛЯ УСИЛЕНИЯ ЖЕЛЕЗОБЕТОННЫХ КОНСТРУКЦИЙ. Журнал «Спектр» об инновациях, реформах и развитии, 22, 148-154.
52. BASALT FIBER REINFORCEMENT AND GLASS COMPOSITE ROD UNDER SHORT-TERM DYNAMIC LOADING” (*Spectrum Journal of Innovation, Reforms and Development* Volume 21, Nov., 2023) <https://sjird.journalspark.org/index.php/sjird/article/view/855/821>
53. Набиев, М. Н., Насриддинов, Х. Ш., & Кодиров, Г. М. (2021). Влияние Водорастворимых Солей На Эксплуатационные Свойства Наружные Стен. *Ta'lim va rivojlanish tahlili onlayn ilmiy jurnali*, 1(6), 44-47.
54. Shavkatovich, N. K. (2022). SYSTEMS OF ARTIFICIAL REGULATION OF THE AIR ENVIRONMENT OF APARTMENTS AND HOUSES. *Spectrum Journal of Innovation, Reforms and Development*, 9, 169-174.
55. Nabiyev, M., Salimov, O., Khotamov, A., Akhmedov, T., Nasriddinov, K., Abdurakhmanov, U., ... & Abobakirov, A. (2024). Effect of external air temperature on buildings and structures and monuments. In *E3S Web of Conferences* (Vol. 474, p. 03011). EDP Sciences.
56. Khasan, N. (2024). Calculation of Cast Reinforced Concrete Frames of Multi-Story Buildings Taking into Account Dry-Hot Climate Conditions. *Miasto Przyszłości*, 49, 1215-1219.
57. Shavkatovich, N. X. (2022). ESTABLISHMENT OF TEMPERATURE AND HUMIDITY IN APARTMENTS AND HOUSES WITH THE HELP OF

ARTIFICIAL PHASE ARTIFICIAL REGULATORY SYSTEMS. *Spectrum Journal of Innovation, Reforms and Development*, 10, 107-114.

58. Қодиров, Ф. М., & Мирзабабаева, С. М. (2022). Бетон ва темирбетон конструкциялар бузилишининг турлари ва уларнинг олдини олиш. *INTERNATIONAL CONFERENCE ON LEARNING AND TEACHING*, 1(6), 91-95.

59. Mirzajonovich, Q. G., & ToychiboyQizi, J. X. (2021). The determination of condensation precipitation on the inner surfaces of the limitation during the action of aerosols. *Asian Journal of Multidimensional Research*, 10(10), 132-137.

60. Sagdiev, K. S., Yuvmitov, A. S., & Qodirov, G. M. (2020). Assessment Of Seismic Resistance Of Existing Preschool Educational Institutions And Recommendations For Their Provision Seismic Safety. *The American Journal of Applied sciences*, 2(12), 90-99.

61. Mirzajonovich, Q. G., & Qizi, J. X. T. Y. (2021). Influence Of Hydrophobizing Additives On Thermal Properties Of Ceramzito Concrete In Agressive Environment. *The American Journal of Engineering and Technology*, 3(12), 26-33.

62. Mirzajonovich, Q. G., & Qizi, M. Z. A. (2021). Determination Of Condensation On The Inner Surface Of The Walls Of Canoe Buildings Under The Influence Of Aerosols. *The American Journal of Engineering and Technology*, 3(12), 14-19.

63. Қодиров, Ф. М., & Мирзабабаева, С. М. (2022). Бетон ва темирбетон конструкциялар бузилишининг турлари ва уларнинг олдини олиш. *INTERNATIONAL CONFERENCE ON LEARNING AND TEACHING*, 1(6), 91-95.

64. Ogli, A. U. A., Ogli, X. A. M., & Mirzajonovich, Q. G. (2020). Hazrati Imam Architecture The Complex Is A Holiday Of Our People. *The American Journal of Engineering and Technology*, 2(11), 46-49.

65. Gayradjonovich, G. S., Mirzajonovich, Q. G., Tursunalievich, S. B., & Ogli, X. A. M. (2021). Corrosion State Of Reinforced Concrete Structures. *The American Journal of Engineering and Technology*, 3(06), 88-91.

66. Momin, N., Mirzajonovich, Q. G., Tursunaliyevich, S. B., & Gayradjonovich, G. S. (2021). Reception of improving the microclimate in the houses of the fergana valley. *The American Journal of Engineering and Technology*, 3(06), 92-96.
67. Ogli, X. A. M., Ogli, A. U. A., & Mirzajonovich, Q. G. (2020). Ways Of Implementation Of Environmental Emergency Situations In Engineering Preparation Works In Cities. *The American Journal of Engineering and Technology*, 2(11), 108-112.
68. Мирзабабаева, С. М., & Қодиров, Ф. М. (2022). Биноларни ўрвчи конструкцияларини тузлар таъсиридаги сорбцион хусусиятини яхшилаш. *INTERNATIONAL CONFERENCE ON LEARNING AND TEACHING*, 1(6), 86-90.
69. Mirzajonovich, Q. G., Ogli, A. U. A., & Ogli, X. AM (2020). Influence Of Hydro Phobizing Additives On Thermophysical Properties And Long-Term Life Of Keramzit0betona In An Aggressive Medium. *The American Journal of Engineering and Technology*, 2(11), 101-107.
70. Кодиров, Г. М., Набиев, М. Н., & Умаров, Ш. А. (2021). Микроклимат В Помещениях Общественных Зданиях. *TA'LIM VA RIVOJLANISH TAHLILI ONLAYN ILMIY JURNALI*, 1(6), 36-39.
71. BINO TOM QISMIGA VERTALYOT QO'NISHI NATIJASIDA BINONING KONSTRUKSIYALARIDAGI O'ZGARISHLARI" 2023/10/5, "SCIENTIFIC BASIS OF APPLICATION OF INNOVATION AND ENERGY-SAVING TECHNOLOGIES IN THE CONSTRUCTION OF ENGINEERING COMMUNICATIONS" Authors: D.G'. G'ulomov, A.R. G'ulomov
72. Abduxodi o'g'li, A. A. (2024). TEMIRBETON KARKAS TIZIMLI XIZMAT KO 'RSATISH BINOSINI SEYSMIK KUCHLAR TA'SIRIGA HISOBLASH VA ULARNI SOLISHTIRMA TAHLILI. *Miasto Przyszłości*, 49, 627-630.
73. Davlyatov, S., Jakhongirov, I., Abdurakhmonov, A., Solijonov, F., & Abobakirova, Z. (2024, November). Determination of the stress-strain state of models of steel cylindrical tanks using the "ANSYS" program. In *E3S Web of*

Conferences (Vol. 508, p. 04002). EDP Sciences.

74. Abdukholiq, A., & Golibjon, A. (2023). CALCULATION OF REINFORCED CONCRETE SLAB STRUCTURE UNPROTECTED FROM SUNLIGHT IN NATURAL CLIMATE IN LIRA PK PROGRAM. Spectrum Journal of Innovation, Reforms and Development, 21, 245-250.

75. Goncharova, N., Abobakirova, Z., Davlyatov, S., Umarov, S., & Mirzababayeva, S. (2023, September). Capillary permeability of concrete in aggressive dry hot climate. In E3S Web of Conferences (Vol. 452, p. 06021).

76. Y Karimov, I Musaev, S Mirzababayeva, Z Abobakirova, S Umarov, Land use and land cover change dynamics of Uzbekistan: a review, E3S Web of Conferences 421, 03007

77. Akramov, X., Davlyatov, S., Umarov, S., & Abobakirova, Z. (2023). Method of experimental research of concrete beams with fiberglass reinforcement for bending. In E3S Web of Conferences (Vol. 365, p. 02021). EDP Sciences.

78. Mirzababayeva, S., Abobakirova, Z., Umarov, S. Crack resistance of bent concrete structures with fiberglass reinforcement, E3S Web of Conferences, 2023, 452, 06023.

79. Strength and uniformity of composite reinforced columns, Akramov, K., Davlyatov, S., Kimsanov, B. E3S Web of Conferences, 2023, 452, 06012.

80. Comparison of current and expired norms for the development of methods for checking and monitoring the seismic resistance of buildings. Shodiljon Umarov, Khusnitdin Akramov, Zebuniso Abobakirova and Saxiba Mirzababayeva, E3S Web Conf., 474 (2024) 01020, DOI: <https://doi.org/10.1051/e3sconf/202447401020>.

81. Analytical calculation of bending elements with basalt fiber and glass composite rod reinforcement under short-term dynamic loading, Akramov, K., Davlyatov, S., Nazirov, A., E3S Web of Conferences, 2023, 452, 06006.

82. Abdulkhaev, Z., Madraximov, M., Abdujalilova, S., Mirzababayeva, S., Otakulov, B., Sattorov, A., & Umirzakov, Z. (2023, September). Flow trajectory analysis and velocity coefficients for fluid dynamics in tubes and holes. In E3S Web of Conferences (Vol. 452, p. 02010).

83. Goncharova N. I., Abobakirova Z. A., Mukhamedzanov A. R. Capillary permeability of concrete in salt media in dry hot climate //AIP Conference Proceedings. – AIP Publishing LLC, 2020. – Т. 2281. – №. 1. – С. 020028.

84. Comparability of estimates of the impact of gunpowder and gas-dynamic explosions on the stability of buildings and structures, Tojiev, R., Yunusaliev, E., Abdullaev, I., E3S Web of Conferences, 2021, 264, 02044

85. The Significant Technical Mantle of AI in the Field of Secular Engineering: An Innovative Design Akhmedov, J., Jurayev, U., Kosimova, S., Tursunov, Q., Kosimov, L. 2024 4th International Conference on Advance Computing and Innovative Technologies in Engineering, ICACITE 2024, 2024, страницы 601–606.

86. Aerodynamic study of the characteristics of the nest one skyscraper under wind load Akhmedov, J., Madaliev, M., Yunusova, M., Kurbonova, N., Fayziyev, A. E3S Web of Conferences, 2023, 452, 06018.

87. Metodology for checking the seismic strength of buildings based on existing norms Abobakirova, Z., Umarov, S., Davlyatov, S., Nasriddinov, H., Mahmudov, A. BIO Web of Conferences, 2024, 105, 05014.

Improving the thermal properties of lightweight concrete exterior walls.

88. Improving the thermal properties of lightweight concrete exterior walls Goncharova, N., Abobakirova, Z., Davlyatov, S., Umarov, S., Mirzababayeva, S. E3S Web of Conferences, 2024, 508, 05002.

89. Operation of reinforced concrete beams along an inclined section under conditions of one-sided heating, Umarov, S., Mirzababayeva, S., Abobakirova, Z., Goncharova, N., Davlyatov, S. E3S Web of Conferences, 2024, 508, 05001.

90. Mirzaakbarovna, M. S. (2023). INTEGRATION IS THE BASIS OF QUALIFIED PERSONNEL TRAINING. *Journal of Innovation in Education and Social Research*, 1(4), 233-239.

91. Mirzababaeva, S. (2023). OPERATIONAL RELIABILITY OF RECONSTRUCTED BUILDINGS-STRUCTURES. *Spectrum Journal of Innovation, Reforms and Development*, 21, 235-239.

92. Mirzababaeva, S. M. (2021). The influence of elevated and high temperatures on the deformability of concrete. *Anal. Educ. Dev*, 1(6), 40-43.v
93. Mirzababayeva, S. M. (2023). DETERMINATION OF STRENGTH CHARACTERISTICS OF HEAT-RESISTANT CONCRETE ON ALUMINA CEMENT. *Web of Scholars: Multidimensional Research Journal*, 2(11), 34-38.
94. Asrorovna, A. Z., & Abdug'ofurovich, U. S. (2023). ISSUES OF RATIONAL USE OF WASTE IN THE PRODUCTION OF BUILDING MATERIALS. *Spectrum Journal of Innovation, Reforms and Development*, 22, 94-100.
95. Abdug'ofurovich, U. S. (2023). INVESTIGATION OF CROSSBARS WITH REINFORCED CONCRETE AND COMPOSITE REINFORCEMENT. *Spectrum Journal of Innovation, Reforms and Development*, 22, 77-84.
96. Abdug'ofurovich, U. S., & Asrorovna, A. Z. (2023). THE ROLE OF BINDERS AND FILLERS IN THE STUDY OF CONCRETE PROPERTIES. *Spectrum Journal of Innovation, Reforms and Development*, 22, 101-109.
97. Madraximov, M., Abdulkhaev, Z., Ibrokhimov, A., & Mirababaeva, S. (2024, June). Numerical simulation of laminar symmetric flow of viscous fluids. In *AIP Conference Proceedings* (Vol. 3119, No. 1). AIP Publishing.
98. Ayupov, G. A. T. X., & Abobakirova, Z. A. (2023). ZILZILAGA CHIDAMLI QURILISHNING ASOSIY TAMOYILLARI. *GOLDEN BRAIN*, 1(1), 244-245.
99. Абобакирова, З. А. (2023). ПРОЕКТИРОВАНИЕ ФУНДАМЕНТОВ ЗДАНИЙ И СООРУЖЕНИЙ В СЕЙСМИЧЕСКИХ РАЙОНАХ С РАЗЛИЧНЫМИ КОНСТРУКТИВНЫМИ РЕШЕНИЯМИ. *GOLDEN BRAIN*, 1(1), 152-154.
100. UMAROV, S. A. (2021). STRENGTHENING AND DEFORMATION OF GLASS COMPOSITE ARMATURES MANUFACTURED IN UZBEKISTAN. *THEORETICAL & APPLIED SCIENCE Учредители: Теоретическая и прикладная наука*, (11), 829-835.