

Calculation of Cast Reinforced Concrete Frames of Multi-Story Buildings Taking into Account Dry-Hot Climate Conditions

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Abstract: The article provides information on the calculation of cast reinforced concrete frames of high-rise buildings taking into account dry-hot climate conditions.

Keywords: humidity, temperature, sun, radiation, air exchange, reinforced concrete, dry - hot, construction.

Introduction: In recent years, large-scale complex measures have been implemented in our country to develop the fields of seismology, seismic strength of structures and seismic safety, as well as to fundamentally increase the efficiency of the activities of industry organizations. Today, it is important to consistently continue reforms in these areas, to introduce new methods of ensuring seismic safety of the population. Based on the main tasks emphasized by such a source, modern production requires to find specific structural and volume-planning solutions for modernization of buildings and facilities, technical and technological re-equipment. Based on this task, in order to change the structural and dimensional-planning solutions of buildings and structures, taking into account that the selection of reinforced concrete structures operating in dry-hot climate conditions and reducing the amount of deformations under the influence of external loads are extremely urgent issues, in the scope of the master's thesis, reinforced concrete structures operating in dry-hot climate conditions issues of study of deformation-stress states, their research and conclusions are given.

In the Decree of the President of the Republic of Uzbekistan dated 13.03.2020 No. PF-5963, in order to further deepen reforms in the field of construction, reduce bureaucratic obstacles, widely introduce innovative ideas, developments and advanced information and communication technologies, as well as to ensure transparency at all stages of construction tasks are defined. Also, in Annex 1 of the Cabinet of Ministers Resolution No. 305 of August 5, 2000, Part III, the introduction of promising technologies in design and construction, the optimal selection of cross-sections of building structures in the processes of re-improvement and perfect repair of existing buildings and structures, their dry-hot ensuring that it works in climatic conditions is an answer in its own way to the given call. [2,3]

In the Decree of the President of the Republic of Uzbekistan dated 27.11.2020 No. PF-6119, the goals and objectives of further improvement of the construction industry, formation of mechanisms for the consistent development of architecture and construction bodies and institutions, ensuring the effectiveness of the state management system, and the advanced introduction of digital technologies into the field were determined. Based on these tasks, the re-improvement of the existing buildings and structures in our independent republic, learning how to ensure the working conditions of reinforced concrete structures in any climatic conditions during perfect repair work, creating calculation methods and using them in construction practice are considered to be one of the urgent issues.

According to the decree, the creation of a safe and comfortable environment for human living is the basis of the socio-economic development of the country.

The construction network plays an important role in creating the material and technical base of all sectors of the economy and in meeting the needs of the population for comfortable housing, social and engineering infrastructure services, as well as cultural entertainment.

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The state policy in the field of construction is aimed at increasing the capacity of the sector through innovations, investments, effective use of labor and material resources in order to ensure the successful implementation of programs for the socio-economic development of the country, regions and sectors. is relevant.

In this place, the task of modernization of production, technical and technological re-equipment and speeding up the implementation of network programs adopted according to international quality standards is being set. In turn, this allows us to maintain a stable position in the domestic and foreign markets of our country [1].

Materials and methods. The main task of the day is to make the construction cheap, effective and strong enough, and to design construction structures taking into account their actual work.

Durability, uniformity and durability are the main requirements for building structures. A builder-engineer should find such a solution of the structure, in which the structure meets the above requirements and is economical. This leads to the problem of cost-effective design.

Construction structures are designed taking into account operational, technical, economic, aesthetic and other requirements.

According to the operational requirements, any structure should be suitable for the purpose it is intended for and should ensure the convenience and safety of the technological processes carried out in the building or structure.

Technical requirements are to ensure the necessary strength, integrity and durability of the structure.

Important requirements for building constructions include economy in their preparation and use, industrialization of preparation and technology.

Prefabricated structures consisting of factory-made elements fully satisfy these requirements.

Economic requirements have a significant influence on the choice of construction material, its type (trusses or beams) and its main dimensions (for example, the height of the beam).

Constructive solutions should be selected based on the technical-economic feasibility of using structures under certain conditions, taking into account the maximum reduction of material and energy consumption, as well as labor and the cost of the construction object. This can be achieved by:

- use of efficient building materials and structures;
- reduce the mass of structures;
- full use of physical-mechanical properties of materials;
- use of local building materials;
- compliance with the relevant requirements for the economical use of basic building materials.

In the design, several options of solutions are created and indicators related to the materials, energy, labor consumption, construction cost and duration of construction preparation and construction are determined. In these options, the architectural beauty of the construction is considered.

Economy of constructions is one of the main requirements for them. Cost-effectiveness depends on the cost of materials and costs related to the preparation of structures, transportation to the construction site, installation and their use.

In terms of material consumption, the most preferred construction is the construction of equal strength. All cross-sections in such a construction are selected under the condition of full use of the physical and mechanical properties of the materials used for it (in constructions that do not have equal strength, the strength of some large elements is not fully used).

The structure must be calculated for the forces acting on it. External forces, displacement of supports, temperature changes, intrusions and other similar phenomena are included in the forces affecting structures.



Constructive schemes should be drawn up when designing buildings and structures.

Such schemes ensure the necessary strength and priority of certain constructions in all parts of the building and structure, as well as at all stages of its construction and use.

In the projects, it is necessary to consider measures aimed at ensuring the long-term durability of structures, to choose cold-resistant and fire-resistant, corrosion-resistant materials, and to take measures to protect them from rotting.

Life and construction experience shows that reinforced concrete structures form the basis of modern capital construction. 1/4 of the funds allocated for capital equipment are spent on reinforced concrete structures[10-33].

Analysis of experimental results. So, before the builders there is an important task of improving the technical and economic indicators of reinforced concrete structures and reducing the cost of the products. These require continuous improvement of the calculation methods of the next building constructions. In addition to designing reinforced concrete structures, it is necessary to find cheap and convenient options. This, in turn, is the correct choice of the calculation algorithm, taking into account the actual work of reinforced concrete structures, and as a result, achieving optimal design.

In the current scientific work, to determine the state of stress-deformation of reinforced concrete frame elements working in dry-hot climate conditions, first - computer program was created, numerous examples were seen based on the block scheme of the calculation algorithm, second - recommendations were prepared based on the analysis of the obtained results.

Summary: The purpose of this research work is to determine the stress-deformation state of cast reinforced concrete structures operating in dry-hot climate conditions and to create a calculation algorithm based on this, as well as to analyze the results of numerical examples.

In order to find a solution to the problem, it was aimed to solve the following tasks:

- observation of stress-deformation state of reinforced concrete constructions from operation in dry-hot climatic conditions;
- the effect of temperature and humidity on reinforced concrete structures;
- taking into account the effect of temperature when creating an algorithm for calculating reinforced concrete structures;
- see numerous examples;
- analysis of examples and taking into account the influence of temperature and humidity in the calculation and design of reinforced concrete structures.
- Development of a calculation algorithm taking into account the effect of temperature and humidity in the calculation of reinforced concrete structures;
- Achieving optimal design based on the results of numerical examples.
- Taking into account the effect of temperature and humidity in the design of reinforced concrete structures;
- Achieving optimal design by analyzing the results of numerous examples based on the developed algorithm;
- Effective use of computer equipment in calculations based on the developed algorithm and reduction of calculation time based on this.

Literature.

1. Decree of the President of the Republic of Uzbekistan, Decree No. PF-6119 of 27.11.2020
2. Decree of the President of the Republic of Uzbekistan, Decree No. PF-6119 of 27.11.2020.
3. Resolution No. 305 of August 5, 2000 of the Cabinet of Ministers.



4. "Primenenie sovremennykh sapr proektirovaniy zdaniy i sooruzheniy" A.T.Mirzaahmedov, Kh.Nasriddinov scientific-practical conference of professors-teachers dedicated to the 22nd anniversary of the Independence of the Republic of Uzbekistan. Fergana Polytechnic Institute May 15, 2013.
5. "Calculation of reinforced concrete constructions taking into account the effect of temperature and humidity" A.T. Mirzaahmedov, Kh. Nasriddinov "Talented students, graduate students, senior researchers - researchers and independent researchers" scientific conference. Fergana Polytechnic Institute April 22-23, 2014. III- branch.
6. "Algorithm for calculation of reinforced concrete structures taking into account the influence of temperature and humidity" A.T. Mirzaahmedov, Kh. Nasriddinov "Professor - teachers" conference. Fergana Polytechnic Institute May 22-23, 2014. III- branch.
7. Systems of artificial regulation of the air environment of apartments and houses. NKShavkatovich Spectrum Journal of Innovation, Reforms and Development #9, 169-174
8. Nabiev MN, Nasriddinov Kh. Sh., Kodirov GM Vliyanie Vodorastvorimyx Soley Na Eksploatatsionnye Svoystva Narujnye Sten //Online scientific journal of education and development analysis. - 2021.-Т. 1.–No.6.–S. 44-47
9. Nasriddinov Khasan Shavkatovich 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 Dec., 2022 S 107-114.
10. Дусматов, А. Д., Ахмедов, А. У., Маткаримов, Ш. А., & Мамажонов, Б. А. У. (2022). Междуслоевые сдвиги двухслойных комбинированных бетоностеклопластиковых плит. *Universum: технические науки*, (1-1 (94)), 78-82.
11. 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).
12. Abobakirova, Z., Umarov, S., & Raximov, R. (2023, September). Enclosing structures of a porous structure with polymeric reagents. In *E3S Web of Conferences* (Vol. 452, p. 06027).
13. Management of Innovative Working Behavior, Lesnikova, E.P., Jakhongirov, I.J., Sadykova, K.V., Zakharova, T.I., Santalova, M.S.Lecture Notes in Networks and SystemsЭта ссылка отключена., 2021, 198, страницы 1008–1016.
14. 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
15. 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.
16. Goncharova, N., Abobakirova, Z., Davlyatov, S., Umarov, S., & Mukhamedzanov, A. (2023). Polymer reagent in construction practice. In *E3S Web of Conferences* (Vol. 365, p. 02024). EDP Sciences.
17. Mirzababayeva, S., Abobakirova, Z., Umarov, S. Crack resistance of bent concrete structures with fiberglass reinforcement, *E3S Web of Conferences*, 2023, 452, 06023.
18. Abobakirova, Z., Umarov, S., Raximov, R. Enclosing structures of a porous structure with polymeric reagents *E3S Web of Conferences*, 2023, 452, 06027
19. Strength and uniformity of composite reinforced columns, Akramov, K., Davlyatov, S., Kimsanov, B.*E3S Web of Conferences*, 2023, 452, 06012.



20. Smart-City Ecosystem Using Block-Chain Technology Davlyatov, S. 2023 *3rd International Conference on Advance Computing and Innovative Technologies in Engineering, ICACITE 2023*, 2023, страницы 1077–1080
21. Artificial Intelligence Techniques: Smart Way to Smart Grid, *Davlyatov, S. 2023 International Conference on Artificial Intelligence and Smart Communication, AISC 2023*, 2023, страницы 838–842
22. Salimov, O. M. (2020). Abduraxmanov UA Rare Devonbegi Madrasah in Samarkand (restoration and repair) Architecture. Construction. Design Nauchno-prakticheskiy journal. Tashkentskiy arxitekturno stroitelnye Institute, 1.).
23. 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>.
24. Abobakirova Z. A., Bobofozilov O. Ispolzovanie shlakovykh vyajushix v konstruktsionnykh solestoykix betonax //international conferences on learning and teaching. – 2022. – T. 1. – №. 6..
25. Abobakirova Z. A., Bobofozilov O. Remont betonного пола–vidы povrejdeniy i меры po ix ustraneniyu //international conferences on learning and teaching. – 2022. – t. 1. – №. 10. – s. 32-38..
26. Abobakirova, Z. A. (2021). Regulation Of The Resistance Of Cement Concrete With Polymer Additive And Activated Liquid Medium. *The American Journal of Applied sciences*, 3(04), 172-177.
27. Asrorovna A. Z. Effects Of A Dry Hot Climate And Salt Aggression On The Permeability Of Concrete //The American Journal of Engineering and Technology. – 2021. – T. 3. – №. 06. – S. 6-10.
28. Abobakirova Z. A. Regulation Of The Resistance Of Cement Concrete With Polymer Additive And Activated Liquid Medium //The American Journal of Applied sciences. – 2021. – T. 3. – №. 04. – S. 172-177.
29. Akhrarovich A. X., Mamajonovich M. Y., Abdugofurovich U. S. Development Of Deformations In The Reinforcement Of Beams With Composite Reinforcement //The American Journal of Applied sciences. – 2021. – T. 3. – №. 5. – S. 196-202.
30. Goncharova N. I., Abobakirova Z. A., Kimsanov Z. Technological Features of Magnetic Activation of Cement Paste" *Advanced Research in Science //Engineering and Technology*. – 2019. – T. 6. – №. 5.
31. Kimsanov Z. O., Goncharova N. I., Abobakirova Z. A. Izuchenie texnologicheskix faktorov magnitnoy aktivatsii sementnogo testa //Molodoy uchenyy. – 2019. – №. 23. – S. 105-106.
32. Goncharova N. I., Abobakirova Z. A. RECEPTION MIXED KNITTING WITH MICROADDITIVE AND GELPOLIMER THE ADDITIVE //Scientific-technical journal. – 2021. – T. 4. – №. 2. – S. 87-91
33. 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. – T. 2281. – №. 1. – S. 020028.

