ON A COLUMN MADE OF FIBROCONCRETE DISTRIBUTION OF TEMPERATURE AND RELATIVE HUMIDITY

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Annotation: *The types of temperature deformations of concrete are studied and analyzed in the article. According to the results of the analysis, the penetration deformations increase in the hot season, and in the cold and high humidity periods, the growth decreases and gradually turns into the expansion deformation. The influence of the dimensions of the concrete section on the initial deformation plays a major role in the initial periods of construction operation.*

Key words: *temperature, value of deformations, Reinforced concrete structures, formation of cracks in concrete*

Constructions operated under the influence of direct solar radiation are considered to be in unfavorable conditions due to the influence of climatic conditions. The results of observing the kinetics of the temperature change of the concrete in the reinforced concrete element show that the temperature on the surface of the slag concrete reaches 450C when the ambient temperature is 400C and the relative humidity of the air is 20% [1].

From 1100-1200 hours, the air temperature begins to lag behind the air temperature by 1-20C. The surface of concrete on the sunny side heats up faster than on the cool side. At 1400 hours, this difference is 2-30S. From 14 to 21 hours, the inner layer of concrete is heated (Fig. 1). The maximum temperature determined on the surface of the elements at 1400 in July is 43-450C, which is 8-90C higher than the air temperature (Fig. 1). In the autumn months, the side of the candle facing the sun is warmer. This can be explained by the lower horizon of the sun in autumn. During the day, from 900 to 1400, the temperature rises from 170C to 270C] [2,3,4]. From 21:00 at night to 9:00 in the morning, the temperature of concrete decreases from 210C to 170C, the temperature difference is 40C. Thus, for reinforced concrete structures used in dry hot climates, the most unfavorable time of the environment in terms of temperature and humidity is between 14 and 24 hours. As a result of observation with the naked eye, it was determined that no cracks were formed in the slag concrete as a result of the temperature difference. The temperature in the reinforcement can be assumed to be the same as the temperature of the surrounding concrete. The temperature deformations formed in the reinforced concrete element are calculated by the following formula [6,7].

(1)

here: □ bt – temperature coefficient of concrete.

t□b and tb – the temperature of the concrete at the hottest and coldest moments, respectively.

As evidenced by the experiments, it can be noted that as a result of the temperature increase, the reinforced concrete element stretches by some value, but this value is less than the elongation of the reinforcement. Under these conditions, the deformation of the reinforced concrete element is close to the deformation of concrete. According to the recommendations for constructions designed in a hot climate, the elongation of the axis of the element and its curvature are determined by the following formulas, respectively [8,9].

$$\varepsilon_t = \Delta t_w \cdot \alpha_{bt} \cdot \gamma_t \qquad (2)$$

$$(1/r)_t = \frac{\upsilon_w \cdot \alpha_{bt}}{\quad} \gamma_t \qquad (3)$$

In the calculation of reinforced concrete structures, the change in the length of the axis of the element and its curvature as a result of the initial deformation due to heating to the summer temperature and cooling to the winter temperature are determined by the following formula [10].

For the warm season of the year

$$\varepsilon_{t,cs} = (\Delta t_w \cdot \alpha_{bt} - \varepsilon_{cs})\gamma_t \qquad (4)$$

And in the cold season of the year

$$\varepsilon_{t,cs} = (\Delta t'_w \cdot \alpha_{bt} - \varepsilon_{cs})\gamma_t \qquad (5)$$

here: Δt_w - changes in temperature during the hot season of the year along the section of the element,

$\Delta t'_w$ - the same change in the cold season of the year,

α_{bt} - temperature deformation of concrete,

ε_{cs} - reduction of concrete axis due to penetration deformation.

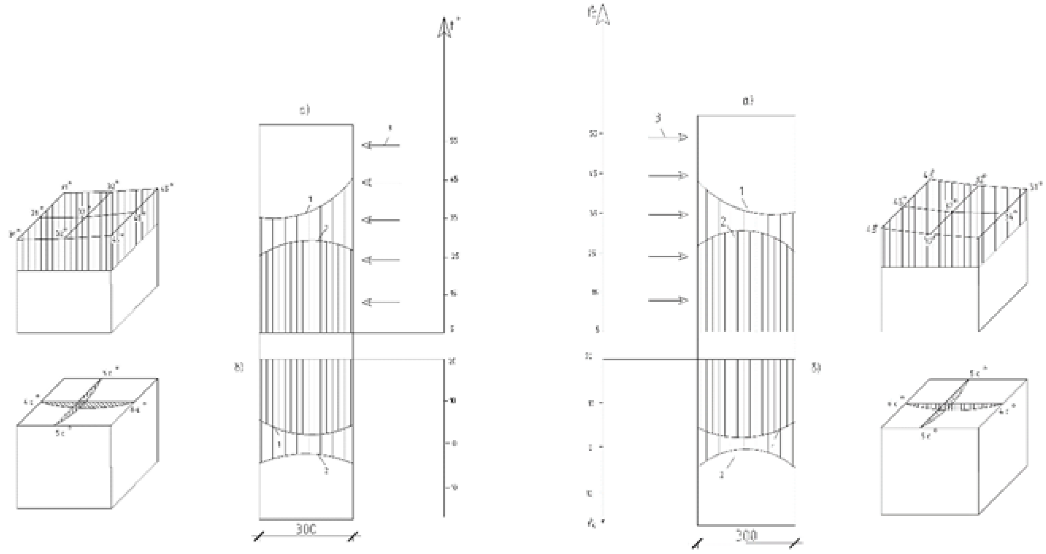

Figure 1. Distribution of temperatures during the hot (a) and cold seasons of the year when the solar radiation is directed to the stretching zone of the column.

Concrete temperature

Temperature during the hot time of the 1st day;

The temperature during the cold time of the 2nd day;

3-direction of solar radiation Figure 2. Distribution of temperatures when solar radiation affects the compression zone in the hottest and coldest seasons of the year

The temperature during the hot time of the 1st day

The temperature during the cold period of the 2nd day

3-direction of solar radiation

The main reason for this is that under the influence of direct solar radiation, it heats up to 700C on hot summer days, and the relative humidity of the air decreases to 20%. Heating of concrete to 60...800C and hardening reduces its strength and modulus of elasticity [11,12,13,14].

When the relative humidity of the air decreases from 70% to 20%, the sliding deformation of slag concrete increases by 1.5 times, and the penetration deformation by 2 times.

LITERATURE:

1. Ageev D.N., Krasnovsky R.O., Pochtovik G.Ya., O normirovanii prochnostnykh i deformativnykh kharacteristik konstruktivnykh keramzitobetonov (Beton i jelezobeton - 1962. - No. 1. - S. 17-21).

2. Aleksandrovsky S.V. Uchet temperature-humidity vozdeistvii pri raschete betonnyx i jelezobetonnyx konstruktsiy (Pod ed. A.A. Gvozdeva. - M.: Stroyizdat, 1964- S.47-61).

3. Askarov B. A., Mirzaev P. T. Vliyanie regime dlitelnogo nagruzheniya na prochnost, jestkost, treshchinostoykost prednapryajennyx sborno-monolitnyx

keramzitobetonnyx balok. (Sbornik nauchnyx trudov TashPI. Vyp. 286 Tashkent 1979. S 37-44

4. Askarov B.A. Khodjaev A.A. Iron beton column from light concrete and osnobe lessovidnyx sulinkov armirovannyx vysokoprochnoy stalyu. Architecture and construction in Uzbekistan. 1990g #5. S 32-34

5. Askarov B.A., Mailyan D.R., Khasanov S.S. Mekhanicheskie svoystva betonov posle predvaritelnogo objatiya v usloviyakh suhogo jarkogo klimata.-Tashkent.: TashPI, 1985. - S.42-45.

6. Askarov B.A., Rakhimov B.Kh., Nuritdinov H.N. Three local prestressed concretes with gravity filling in a dry, hot climate during the calculation of the strength of reinforced concrete structures prednznachennyx for operation in a dry, hot climate. - Tashkent: TashPI, 1985. - P.90-92.Ашрабов А.Б., Нарзуллаев Ф.Н. Нарастание прочности обычного и керамзитного бетона в местных условиях Узбекистана. Труды САЗПИ, Вып.11.- Ташкент, 1959. - С.57-64.

7. Mansurov Mukhtorjon Tahirjonovich, Akhunbaev Adil Alimovich, Abdukadirov Nurzod Shavkatjon Ogli Researching the process of longitudinal mixing of material in a drum dryer // Mechanics and technology. 2022. #9. URL: https://cyberleninka.ru/article/n/barabanli-uritichda-materialning-b-ylama-aralashish-zharayonini-tad-i-ilish

8. Abducodirov N., Okyulov K. IMPROVEMENT OF DRUM DRYER DESIGN // Ekonomika i sotsium. 2021. #4-1 (83). URL: https://cyberleninka.ru/article/n/improvement-of-drum-dryer-design

9. N.Sh. Abdukodirov, M.T. Mansurov, S.S. Akhtambaev Sushka zerna v konvektsionnyx sushilkax // Science and Education. 2023. #2. URL: https://cyberleninka.ru/article/n/sushka-zerna-v-konvektsionnyh-sushilkah.

10. Mirzaahmedov, A. T. (2020). Algorithm For Calculation Of Multi Span Uncut Beams Taking Into Account The Nonlinear Work Of Reinforced Concrete. The American Journal of Applied sciences, 2(12), 26-35.

11. Mirzaahmedov, A. T. (2020). Accounting For Non-Linear Work Of Reinforced Concrete In The Algorithms Of Calculation And Design Of Structures. The American Journal of Engineering and Technology, 2(11), 54-66.

12. 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

13. Ashurov, M., Sadirov, B. T., Xaydarov, A. M., Ganiyev, A. A., Sodikhonov, S. S., & Khaydarova Kh, Q. (2021). Prospects for the use of polymer composite fittings in building structures in the republic of Uzbekistan. The American Journal.

14. Ogli, X. A. M. (2021). Construction Of Flexible Concrete Elements In Buildings. The American Journal of Engineering and Technology, 3(06), 101-105