CONDITION OF CONCRETE AND REINFORCED CONCRETE STRUCTURES BUILT AND USED IN A DRY HOT CLIMATE

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Abstract: *This article analyzes the state of concrete and reinforced concrete structures built and used in dry hot climate conditions. Negative effects of climatic conditions on concrete and reinforced concrete structures have been studied through theoretical and experimental studies*

Key words: *Dry hot climate, climatic factors, cracking moment, strength, humidity, temperature, solar radiation, coolness, uniformity, shrinkage deformation, temperature stress.*

It was observed that the condition of concrete and reinforced concrete structures built and used in dry hot climate conditions is not the same.

Along with structures that have been in use for 20 years or more and are in satisfactory condition, some newly built structures require repair or rehabilitation.

Many concrete and reinforced concrete structures were found to be eroded and damaged when the constructions of the Tashkent textile plant, Tashkent textile machine-building plant, Golodnostepstroy irrigation system were inspected.

A.F. Milovanov, A.V. Nifontov, E.A. Mazo [1] studies show that high temperature causes early cracks to form and reduces the toughness of flexible reinforced concrete elements. According to the bans, when the temperature is heated up to 600C, the moment of crack formation is reduced by 30%. The reason for the early formation of cracks in flexible reinforced concrete devices is the temperature stress caused by the uneven distribution of temperature on the concrete section.

In their case, studies have shown that the cooling effect of thermal insulation alone, due to the effects of climatic conditions typical of hot dry climates, is 20% of the cooling effect of the entire load. The study of unwrapped reinforced concrete roofs

conducted at this institute shows that temperature-humidity deformations affect the crack resistance of concrete over time. It was also found out from the tests that the compressive strength of concrete panels used in dry hot climates 5 . . . It will decrease within 15 years, although the process of carbonation in concrete has a constructive character, and the density of the outer layers of concrete should have increased. Conducted experimental studies show that in reinforced concrete structures used in dry hot climates, normal oblique cracks are additionally increased due to climatic effects. The width of cracks in flexible reinforced concrete elements in dry hot climates increases by 1.2 times compared to normal conditions. A study of ribbed cladding panels shows that cracks develop early in installations that are not protected from solar radiation. The coolness of the closed plates, when determined according to the standards, was 20 to 40% compared to the coolness in their experiments. [2]
M.M. Selimov and Sh. The results of research by Nizamov [3] showed that in the flexible reinforced concrete elements prepared in dry and hot climates, there was a decrease in uniformity and insufficient crack resistance.

The actual strain of plate cracking is 12.3 compared to the control strain. . . It was 25.4%.

Reinforced-concrete sleepers on railways in Central Asia began to deteriorate after 7-9 years. Reservoirs made of reinforced concrete at the Salor water treatment plant in Tashkent region, reinforced concrete devices in the building of the Tashkent Textile Combine, have become irreparable due to cracks caused by temperature and humidity.

The concrete surface of some highways in our republic has been deteriorating for years. This phenomenon is also observed in foreign countries with dry hot climates.

The results of testing columns made of high-strength slag concrete with small particles are presented in the research.

The author came to the conclusion that when calculating the cracking moment of non-centrally compressed columns made of high-strength slag concrete with fine particles, it is indicated to take into account the stresses in the reinforcement caused by the strong settlement of slag concrete, which is very important for dry hot climate conditions. High shrinkage deformation of slag concrete causes cracks to exceed their width

When calculating the formation of cracks in columns, it is recommended to include stress formulas resulting from drying and settling of slag concrete.
As the temperature increases, the reinforcing steel expands and its thermal deformation is close to the thermal deformation of concrete.

Thermal expansion in the reinforced concrete element causes tensile deformation in the concrete and compression deformation in the reinforcement.

Because the rebar expands relative to the concrete, the rebar sometimes cracks through it. Cracks appear in concrete. When cracks appear, the tension in the concrete and reinforcement decreases, and the reinforced concrete element begins to stretch more, and its elongation approaches the elongation of the reinforcement

Calculation of thermal stress cracks is carried out when the difference between the thickness of concrete is more than 300 C in statically uncertain constructions and 500 C in static concrete constructions. Such temperature differences are less likely to occur in hot dry climates.

Therefore, it is allowed to calculate temperature deformations of reinforced concrete elements in dry hot climates like concrete elements.

When calculating the first heating of concrete and reinforced concrete elements, the temperature elongation and temperature curvature of the element axis in the warm months of the year are calculated according to the following formula:

$$\varepsilon_t = \Delta t_w \cdot \alpha_{bt} \cdot \gamma_{tt} \quad (1)$$

$$\left(\frac{1}{r}\right)_t = \frac{v_w \cdot \alpha_{bt}}{\gamma_{red}} \cdot \gamma_t \quad (2)$$

Changes in the axis of the element in the calculation of long-term heating and cooling of concrete and reinforced concrete elements $\varepsilon_{t,cs}$ and the curvature of its curvature $\left(\frac{I}{r}\right)_{t,cs}$, temperature deformation under the influence of temperature and shrinkage of concrete under the combined effect is calculated as follows: [3]

For the warmer months of the year

$$\varepsilon_{t,cs} = \left(\Delta t_w \cdot \alpha_{bt} - \varepsilon_{cs}\right) \cdot \gamma_t \quad (3)$$

$$\left(\frac{I}{r}\right)_{t,cs} = \left[\frac{\vartheta_w \cdot \alpha_{bt}}{h} \pm \left(\frac{I}{r}\right)_{cs}\right] \cdot \gamma_t \quad (4)$$

For the cold months of the year

$$\varepsilon_{t,cs} = (\Delta t_c \cdot \alpha_{bt} + \varepsilon_{cs}) \cdot \gamma_t \quad (5)$$

$$\left(\frac{I}{r}\right)_{t,cs} = \left[\frac{\vartheta_c \cdot \alpha_{bt}}{h_{red}} \pm \left(\frac{I}{r}\right)_{cs}\right] \cdot \gamma_t \quad (6)$$

(1-6) in formulas

Δt_w, Δt_c - element in the hot and cold months of the year average temperature in the section, ϑ_w, ϑ_c - temperature difference in the warm and cold months of the year.

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