

THE PROCESS OF MOISTURE TRANSMISSION IN CONCRETE IN DRY HOT CLIMATE CONDITIONS

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ABSTRACT

The article examines the properties of concrete in dry hot climates and the specific properties of moisture transfer control in concrete. Equipment for studying the properties of concrete in dry hot climates will be introduced.

Keywords: *dry hot climate conditions, concrete, moisture, porosity.*

Cement-based concretes are the most popular, widespread and unmatched building materials in the construction industry today. The basic properties of concrete can be controlled by controlling the porosity structure. Another of the most important properties is the process of moisture transfer in the concrete structure.

The study of the properties of concrete used in the construction process is a very important factor. Like other Central Asian countries, our country requires construction work in dry hot climates. This in turn includes factors that need special attention.

It is known that when concrete hardens in dry hot climates, the water in it evaporates. This results in porosity in the concrete. The porosity in concrete is in both open and closed forms, which directly affects its important properties. The passageway between open and closed pores is called a capillary.

In dry hot climates, there is an increase in tensile deformation in concrete, which depends on the properties of the reinforced concrete used, rapid increase in strength in the early hardening stage and the occurrence of micro-disturbances in the concrete structure. They are about 1.5 times larger than in normal condition. In natural dry hot climates, the hardening of concrete does not have a flat appearance, the decrease in the rate of deformation over time is characteristic of constant temperature and humidity conditions.

Tolerance deformation in dry hot climates often develops more during the hot, time of year. The curvilinear deformation of concrete is more pronounced with more or less step-by-step characteristic growth. The greater the difference in temperature and humidity during the hot and cold seasons of the year, the more pronounced the nature of the gradual growth of the tensile deformation.

In the absence of data on the composition of the concrete mix, the specific value of the tensile deformation of the concrete depends on the compressive strength class of the concrete and is determined by the mobility of the concrete mix and the standard cone sediment.

In the process of solidification in dry hot climates, the interaction of two opposite constructive and destructive processes occurs. The more structural processes, the deeper and denser the hydration of the cement, the more intense the physicochemical process of hardening, the faster the strength of the concrete, and the more stable the concrete in hot climates. If the concrete is not cared for properly, dehydration will result in fresh (poured) laid concrete. Concrete begins to harden during the first day in hot weather and loses 50 ... 70 % of water. Moisture from freshly laid concrete evaporates rapidly, causing the plastic to penetrate the concrete, and the volume of hardening concrete changes, creating a state of moisture penetration. Once the concrete mixture has formed at the plastic entrance, it begins to penetrate at a rapid rate before it has already hardened, causing cracks to form at the entrance. Therefore, to prevent water from evaporating in the concrete, it is necessary to take care of its moisture content after the concrete is formed. Any delay of more than 20-30 minutes, regardless of the care

of the concrete from the beginning, will allow the plastic penetration of the concrete to increase and cracks will form on the concrete surface.

In dry hot climates, the minimum duration of initial maintenance was 6...7 hours in order to obtain the least plastic input concrete from freshly laid concrete. Further maintenance of the concrete will not have a significant effect on the growth of plastic deformation in the concrete, but a dense composite formation is required for the concrete and the accumulated strength under compression should be 50-70 %. Wrap the concrete well with a waterproof or damp material and keep the concrete moist for 8-10 days to prevent it from drying out.

Under natural conditions, in a dry hot climate, moisture penetration deformation of concrete develops under the influence of several curved curves, cyclically extinct temperatures and seasonal changes in the outside air.

During the hot dry periods of the year, the greatest development of entry deformation is observed. During the cold humid times of the year, it gradually stops growing and undergoes foam deformation. However, the deformation of the foam is less than the deformation of the concrete. The cyclical amplitude of the moisture deformation of the penetration and the multiplication decrease over time, but eventually the moisture penetration deformation remains in the concrete.

The lower the moisture penetration deformation of the concrete element section, the greater the moisture penetration deformation and the lower the relative humidity of the air. The effect of the cross-sectional dimension of the element on the initial deformation of the concrete is most pronounced at the initial times of use of the structure. The greatest value of the moisture penetration deformation of concrete is observed in the prepared element during the dry hot seasons of the year. The calculated value of the concrete deformation is calculated using the hyperbolic relationship at the time of commissioning.

Management of moisture transfer processes in concrete is the most pressing issue in all dry hot climates. To date, moisture transfer processes in concrete are a little-studied practice. From the pouring of concrete used in the construction of buildings and structures to its hardening and use as a structure, there are certain problems in the process of moisture transfer in dry hot climates. There are two perspectives on how to solve these problems:

1. Control of the process of moisture transfer in concrete during the pouring of concrete used in buildings and structures under construction in a dry hot climate zone.
2. Control of moisture transfer in concrete structures used in buildings and structures under construction in the dry hot climate zone.

These two perspectives can be considered inextricably linked.

The first, in view, promotes the various additives that are added to the concrete to control the passage of moisture in it during the preparation process. At the same time, during the hardening of concrete, efforts are made to minimize the transfer of moisture, and chemical additives are added to its composition. Rapid hardening of concrete in dry hot climates leads to an increase in porosity in the composition. An increase in porosity weakens the load-bearing capacity of the structure. Scientists from around the world have been working on this issue for many years.

Second, in terms of concrete and structures used in construction as a finished product, methods of studying the absorption of moisture under the influence of external and internal moisture and the movement of

moisture through the capillaries inside the concrete are shown. This, of course, affects the strength, load-bearing capacity and longevity of reinforced concrete structures used in buildings built in dry hot climates.

Important properties of concrete, like other building materials, are directly related to their capillary-porous structure. Moisture transfer in concrete means that the distance between the pores of the capillary is $1.5 \cdot 10^{-8}$ millimeters, which indicates how difficult this process is. This, in turn, necessitates the identification of defined and separate application difficulties in the process of moisture transfer in concrete. Therefore, the diffusion coefficient in the case of concrete, moisture and moisture transfer coefficient is usually used as the moisture transfer in the disperse medium.

The complexity of the moisture transfer mechanism in concrete does not preclude the diffusion coefficient from being reflected on the basis of any model, so mathematical models are reflected on the basis of experimental data. Depending on which factors are applied, general unconnected (soaking, drying) processes that differ from each other on the basis of empirical factors are proposed. Using this data, the diffusion coefficient is measured by a coefficient that is close to the fixed life method and accepted.

In general, the urgency of finding a solution to the problem increases due to the complexity and lack of research on this topic.

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