NATURAL CLIMATE OF DRY HOT CLIMATE AREAS AND ITS EFFECT ON BUILDING MATERIALS

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https://doi.org/10.5281/zenodo.7336478

Abstract. *In this state, the natural climate of regions with a dry, bright climate and its influence on building materials are analyzed. V state privedeny svedeniya o deformations i naprajeniyax, vyzvannyx izmeneniem stroitelnyx materialov zavisimosti ot klimatecheskih zone, temperature i vlajnosti vodukha.*

Keywords: *Dry hot climate, climatic factors, cracking moment, strength, humidity, temperature, solar radiation, thermal inertia, singleness, shrinkage deformation, temperature stress.*

ВЛИЯНИЕ ПРИРОДНЫХ УСЛОВИЙ СУХИХ И ЖАРКИХ КЛИМАТИЧЕСКИХ ЗОН НА СТРОИТЕЛЬНЫЕ МАТЕРИАЛЫ

Аннотация. *В данной статье анализируется природный климат регионов с сухим жарким климатом и его влияние на строительные материалы. В статье приведены сведения о деформациях и напряжениях, вызванных изменением строительных материалов в зависимости от климатических зон, температуры и влажности воздуха.*

Ключевые слова: *Сухой жаркий климат, климатические факторы, момент образования трещин, прочность, влажность, температура, солнечная радиация, тепловая инерция, однородность, усадочная деформация, температурное напряжение.*

INTRODUCTION

Since the independence of the Republic of Uzbekistan, the restoration and further development of our great country, the improvement of the national education system, the strengthening of its national soil, and world standards and skills based on the harmonization with the requirements of the times many things are being done in order to bring it to the level. First of all, we will provide information about the climatic zones of the Republic of Uzbekistan. The warm climate region covers 1/5 of the Earth's surface and is located between the Tropics of Capricorn and Tropics of Capricorn. This area is about 1/3 of the world's countries. Under the term hot climate, it is understood that the average annual temperature is 20^0C and above. In the global classification, four zones are included in the warm climate region; equatorial, subequatorial, tropical and subtropical.

MATERIALS AND METHODS

The equatorial zone is characterized by unstable winds, strong heat (air temperature reaches 32^0C) and high air humidity (usually more than 75%). The daily and seasonal variation of air temperature does not exceed $3...8^0$ C, and the variation of air humidity is small. In the subequatorial zone, in summer, when the air temperature reaches 32^0C, equatorial monsoons blow, and in winter months, tropical monsoons blow. Average daily and seasonal variation of air temperature is $6...11^0$C, winter months are colder than summer months. Air humidity in dry

seasons is 20...55%, in rainy seasons air humidity is 55...100%.Tropical zones are divided into two regions; 3-A-dry hot climate (tropical deserts) and 3-V dry humid climate. Dry hot climate 3-a is described as follows: the relative humidity of the air is 8...12% in the dry season, 10...55% in the short rainy season and 55...95% in the rainy season; Summer is characterized by high daily temperature (50^0C and above) and strong solar radiation. Summer and winter temperatures are very different from each other. In winter, the air temperature drops below 00C, and the temperature difference between day and night reaches 20^0C. The geographical latitude of warm climates is between 15 and 30^0 north and south latitudes.Humid hot climate 3-V is characterized by high relative humidity (more than 90%) and average annual temperature equal to 23^0C. In summer, the temperature can rise to 38^0C. The daily and annual variation of the air is smaller than in the latitudes of dry hot climates. The moist warm zone is located between 15^0 north latitude and either side of the equator. The subtropical zone is divided into 4-A continental, 4-V Mediterranean, 4-S monsoon and 4- D warm climate regions with moderate humidity. Factors influencing the design of construction equipment In order to properly organize the design of reinforced concrete equipment in hot climates, it is necessary to take into account the climatic factors that change the physical and mechanical properties of concrete, reduce the safety of using reinforced concrete equipment, and cause the appearance and expansion of cracks in concrete. Affecting the long-term durability of reinforced concrete devices factors are solar radiation, air humidity and temperature changes. Solar radiation: - causes all phenomena that occur in the climate. Its influence. depends on the radiation from the sun. This energy is measured by radiation returned from the earth's surface, energy used for evaporation, and atmospheric radiation. As direct solar radiation passes through the atmosphere, it is partially trapped in it. The eclipse of solar radiation depends on the state of the air mass, the amount of ozone in its content, the amount of water and dust. The least loss of solar radiation occurs in the equatorial regions, which is directed almost perpendicularly.

RESULTS

The angle of propagation of direct solar radiation is determined by the position of the sun and depends on the latitude of the place, the time of year and day, and the length of latitude. As the angle of incidence of sunlight decreases, the thickness of the atmosphere through which sunlight crosses increases, so the loss of solar radiation increases. Clouds, smoke, dust. water droplets reduce the penetration of solar radiation, so the humid tropics receive less heat than the dry tropics. Diffuse solar radiation returning from the ground adds to direct solar radiation and becomes more important when the sky is covered by clouds. The amount of solar radiation returned from the earth depends on the direct solar radiation, the geographical location of the place, the amount of dust and smoke in the atmosphere, and the density of the cloud.

Thus, it is necessary to know what kind of radiation will affect it: direct or scattered solar radiation, in which place a structure will be built from reinforced concrete elements. The most direct or diffuse radiation affects the horizontal or vertical surfaces of devices facing south, and the least affects the vertical surfaces of devices facing east or west. But in tropical countries, the eastern and western vertical surfaces are more exposed to direct solar radiation than others. Scattered solar radiation ensures approximately uniform heating of all external surfaces of buildings and structures. The maximum value of solar radiation corresponds to $30...45^0$ latitudes. Concrete heats up by absorbing up to 70% of solar radiation. The surface of the concrete element facing the sun is $30...40^0$ higher than the peak summer air temperature. Therefore, in

calculations, it is necessary to distinguish devices that are directly exposed to solar radiation and devices that are protected from solar radiation. Temperature: The regions with the greatest solar radiation are the hottest regions. These are the countries located on the equator. The temperature of the air is mainly determined by the contact between the air and the ground. The same high temperatures are observed in places with low air humidity, and places with lower temperatures are considered to have high humidity. Dry surfaces heat up twice as fast as a similarly wet surface. Lower temperatures are observed in the summer seasons, higher in the regions with large water bodies and temperatures are observed in the flat latitudes of the land. In the winter season, it is the opposite. During the day, the air temperature reaches its maximum value between 14□16 hours, when the heated air movement and direct solar radiation are added. Above all, horizontal and vertical concrete surfaces oriented to the south and south-west heat up more. The highest daily temperature on the concrete surface can be observed 1-2 hours after the sun reaches its zenith, and the lowest low temperature is observed 1-2 hours before sunrise. The daily variation in temperature causes the daily temperature variation across the cross-sectional thickness (height) of the device. During the day, due to the external air temperature and solar radiation, the highest temperature is observed on the sun-facing surface of the concrete element, while the lower temperature is in the middle of the section. At night, when there is no solar radiation and as a result of the rapid cooling of the air temperature, a large temperature is inside the concrete section. and a small temperature is on its surface. Thus, the temperature of the outer surface of concrete changes during the day, and the temperature difference across the thickness of the element constantly changes its sign.

The annual changes of the external air temperature change the temperature difference on the thickness of the element cross-section in a larger value. To calculate the change in temperature of the outer surface of the concrete, it is necessary to know the highest outdoor air temperature in the hottest months and the lowest outdoor air temperature in the coldest months. Now we will give information about humidity. The amount of humidity in the air varies over large intervals and mainly depends on the air temperature. The higher the air temperature, the more moisture it can absorb. Absolute humidity is the amount of moisture in the air and is measured in g/kg of dry air. Air pressure is measured in kilopascals (kPa), a unit also used to measure air humidity, which is called water vapor elasticity. Relative air humidity - the ratio of the measured vapor pressure to the highest possible pressure (saturation level) is expressed in percent. If the air cannot absorb moisture, it is considered saturated; in which the maximum possible elasticity of steam at a given temperature is achieved.

DISCUSSION

The degree of air saturation with moisture increases with increasing temperature. Relative humidity varies from 10 to 100% and, like air temperature, varies throughout the day and throughout the year. During the day, as the air temperature increases, the air humidity decreases, and the opposite happens at night. In the summer months, the humidity is less than in the winter months. Since concrete has a porous structure, it can absorb moisture. When moisture is not evenly distributed across the cross-section of the element, moisture begins to flow from the porous concrete to areas with low moisture content, from wet zones, this phenomenon is called moisture transfer. Moisture transfer in concrete is not only a result of external wetting or drying, but is related to its ability to chemically bind large amounts of water during curing. Daily and seasonal changes in air humidity lead to changes in concrete moisture content over the height

(thickness) of the element section. Moisture deformations and stresses occur in concrete due to changes in concrete moisture and moisture differences across the cross-section of the element, which are less than deformations and stresses caused by changes in concrete temperature.

When determining the relative humidity of the air, the physical and mechanical properties of concrete, it is calculated based on the average monthly humidity of the outdoor air, determined at 13 pm of the hottest month or received from meteorological data. In addition, when calculating reinforced concrete devices, it is necessary to take into account the bending deformation or drying deformation of concrete. Precast and semi-integrated reinforced concrete products play an important role in increasing the number of magnificent, beautiful modern buildings that are rising in the Republic of Uzbekistan in recent years. The weather climate of our republic is strongly continental, in the summer months the temperature reaches from +40°C to +45°C, and the relative humidity decreases by 10-15%. Due to the impact of solar radiation on the surface of concrete and reinforced concrete structures in such climatic conditions, its temperature can rise up to 70-80^{0}C. In heated structures, large shrinkage deformations occur, causing cracks to form and expand.

CONCLUSION

Changes in air temperature and humidity during the day, in seasonal periods (summer and winter) have a negative effect on the formation during concrete hardening. Rapid water leakage from concrete at high temperature and low air humidity causes its strength and modulus of elasticity to decrease. The difference in daily temperature changes causes uneven distribution of thermal stresses in the concrete section. Designing and building equipment without taking into account deformations and stresses caused by changes in high temperature and low humidity in dry hot climates can cause early cracks in concrete, their expansion, and large deformations in structures. In conclusion, it can be said that one of the main factors to ensure the durability and reliability of the buildings and structures being built in our Republic is to improve the method of calculation based on their real working conditions. Therefore, researching the physical and mechanical properties of heavy concrete under the unfavorable influence of dry hot climatic conditions is one of the urgent problems.

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