PLANNING OF CONSTRUCTION OF CIVIL BUILDINGS IN A DRY, HOT CLIMATE

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Abstract: *This article discusses the issue of planning the construction of civil buildings in a dry hot climate, the choice of appropriate building materials and structures for the enclosing parts of buildings, the use of sun protection devices, as well as mechanical means for creating an artificial microclimate of premises. Issues when choosing a construction site, methods of using all the natural possibilities of lowering temperatures, reducing radiation intensity, protection from harmful winds are considered.*

Keywords: *planning, climate, wind, temperature, radiation, construction, construction site, microclimate, relief, method.*

ПЛАНИРОВАНИЕ СТРОИТЕЛЬСТВА ГРАЖДАНСКИХ ЗДАНИЙ В УСЛОВИЯХ СУХОГО, ЖАРКОГО КЛИМАТА

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Аннотация: *в данной статье рассматривается вопрос планирования возведения гражданских зданий в условиях сухого жаркого климата,*

выбор соответствующих строительных материалов и конструкций для ограждающих частей зданий, применение солнцезащитных устройств, а также механических средств для создания искусственного микроклимата помещений. Рассмотрены вопросы при выборе места строительства, методы использования все естественные возможности снижения температуры, уменьшения напряжённости радиации, защиты от вредных ветров.

Ключевые слова: *планирование, климат, ветер, температура, радиация, конструкция, место строительства, микроклимат, рельеф, метод.*

A hot, dry climate is a type of climate that is included in the climate classification (by temperature and humidity) and has a mixed class (estimated by both temperature and humidity).

Areas of hot, dry climate include territories with average annual temperatures equal to or above 200. The characteristic features of this climate are: high levels of solar radiation and insolation, high air temperatures, uncomfortable humidity and wind conditions that negatively affect human well-being and require special measures to protect people from the adverse effects of all these factors. The hot climate has a negative effect on materials, building structures, equipment and mechanisms.

In summer, daytime temperatures in such areas can range from 27 to 45 degrees Celsius, and at night from 15 to 24 degrees Celsius. Daytime temperatures are lower in winter. These natural and climatic features of areas with a hot, dry climate require a closed indoor environment, reliable protection of humans from external adverse effects. Additional costs are required during the construction of buildings, so it is very important to make the most accurate assessment of the specific climatic conditions of the construction area.

The linear structure assumes a linear layout of the city with a longitudinal compositional axis of development. For a hot, dry climate, a closed type of

settlement with compact, wide-body, and mostly low-rise buildings comprising alternating enclosed and open spaces of varying heights is most acceptable. The city center, residential, industrial, communal and warehouse, transport, sanitary protection and park areas should have the location of buildings and structures in a closed composition. The use of a closed composition for a dry, hot climate has been historically considered since the emergence of the peristyle courtyard. The courtyard, shaded on all sides and surrounded by a gallery, forms a deep shadow that cools the walls and the dwellings located behind it. A water spring located in the center of the courtyard and green spaces gradually give off coolness and moisture to the surrounding area during the hot day.

According to experts in communal hygiene, in the southern regions, the optimal height of residential buildings not equipped with sun protection devices should be 3.2 - 3.5 m. As is known, the influence of the height of a room on its microclimate is related to temperature, radiation temperatures and cubic capacity of air per person, and air mobility. In rooms with a high altitude, the air temperature is usually lower than in rooms with a lower altitude. However, this difference, as studies conducted in Uzbekistan show, is small. In experimental studies, the difference between the average daily indoor air temperatures of 3.8 and 2.5 m was only 0.7 °C with night ventilation, and only 0.2-0.3 °C with round-the-clock ventilation. At the same time, such an increase in the height of the premises causes an increase in the cost of the building by about 10%. In general, practice shows that a decrease in room temperature is achieved not so much by increasing its volume as by air mobility. The shape of rooms in hot climates plays an essential role in maintaining a favorable microclimate. However, if in a hot, humid climate we strive to ensure the widest possible outlet of the room to the facade of the building in order to provide the best ventilation conditions, then in a hot, dry climate there is a desire to reduce the surface of the enclosure of the room facing the facade of the building, pull this room inside, hide it from the effects of scorching sunlight and reduce the

possibility of penetration of external hot air. The process of forming a modern urban environment in hot climates naturally leads to a composition of residential complexes in which their surrounding spatial environment is an extension of their own homes. This feature of urban planning is a reflection of national and historical traditions for construction in hot climates. In this regard, for areas of hot climate, projects should provide conditions for protection from overheating of streets and squares, ensuring maximum shade, effective aeration and favorable natural lighting conditions.

Solar exposure or insolation of the territory and premises is measured by the amount of direct exposure time in hours and minutes. The minimum solar exposure for apartments, living rooms in hotels and dormitories, children's institutions and playgrounds, etc. is 3 hours on the days of the autumn and spring equinox. Ensuring the necessary insolation is achieved by the appropriate orientation of buildings and reducing the time and area of shading of buildings and territories by neighboring buildings. For houses in which all rooms of apartments face one side (houses of limited orientation), orientation of living rooms to the northern sector of the horizon in the range from 310 to 50 ° is not allowed. To ensure the necessary insolation, houses of limited orientation (meridional) are located in the building only meridionally. For houses with apartments with a two-sided orientation (houses with unlimited orientation are latitudinal), any location in the building is possible under the conditions of insolation. For houses with partially limited orientation (some apartments have one-sided and some have two-sided orientation), a meridional and latitudinal location in the building is possible (with one-sided apartments facing south).

The recommended orientation of the living rooms is to the southeast. The eastern, southern and southeastern orientation is also recommended for the main premises of children's institutions and schools. This orientation, while ensuring the required duration of insolation, eliminates overheating of the premises under the influence of solar radiation. In order to avoid overheating of the premises in

the southern regions, orientation to the southwestern sector of the horizon (from 200 to 290 °) of living rooms of one-sided apartments and the main premises of children's institutions and schools is not allowed. Openings of windows and balcony doors facing the horizon from 200 to 290° must be equipped with sun protection devices. Semi-open staircases and outdoor open staircases are allowed in these areas.

In modern multi-storey construction in hot, dry climates, the following types of houses are used: sectional towers, galleries and corridors. When designing and erecting them, they strive to take into account all the requirements for ensuring a favorable microclimate and creating maximum amenities: central interior halls; rooms of various heights; compact apartments; landscaped loggias, galleries, balconies; roof gardens; providing an independent ventilation line and insulation of kitchens and bathrooms; providing apartments with rooms on two levels.; construction of paired buildings connected by stairwells and buildings with rooms with a depth of the entire width of the building; the use of transformable enclosing structures and various sun protection devices.

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