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FORMATION OF THE MICROCLIMATE OF BUILDINGS IN THE CLIMATIC CONDITIONS OF THE REPUBLIC OF UZBEKISTAN

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Annotation
This article provides information on the climatic parameters of the winter and summer periods in the design of buildings, as well as their pros and cons and the fact that when designing thermal protection of buildings, great attention should be paid to increasing the thermal resistance of external walls and windows, as well as constructive-planning solutions for structures of various structures of residential.

Keywords: Microclimate, Heat Protection, discomfort, building, traditional folk house, temperature, condition.

Introduction

The microclimate of buildings is a set of meteorological processes that create certain conditions for human heat exchange with the environment. This definition connects two sides of the microclimate: Meteorological, objective characteristic of the environment in the house and physiological, that is, the effect of this environment on the human body. The main Meteorological elements of the microclimate are air temperature, humidity and speed, the surface temperature of obstacles and objects of the surrounding people. The physiological qualities of the microclimate can be characterized by the degree of physiological reactions of the human body [1].

The winter period of the year is relatively short on the territory of the Republic of Uzbekistan, rather unstable, but very cold, especially in the northern regions. The outside air temperature (B parameters) adopted for the calculation of heating systems varies from minus (8 ℃) in Surkhandarya region to minus (20 -26 ℃) in the Republic of Karakalpakstan [6]. The duration of the period with an average daily air temperature ≤ 8 ℃ (duration of the heating period) varies in the same places(from 80 - 90 to 163 - 174 days). At the same time, the average air temperature (4,5....From 5.4 ℃ (-2.4 ℃ - 0.6℃). One of the factors in the formation of the microclimate of buildings from the point of view of hygienists is the temperature difference between the air temperature of the room and the temperature of the inner surface of the external cladding structures. [2] According to, for example, for the walls of residential and public buildings, this value should not be much (6....7 ℃). In general, Heat Protection of buildings from the effects of the external environment is ensured by the use of appropriate external protective structures that have a normal value of resistance to thermal conductivity. In recent years, these values are determined by the GSSOP parameter. It is the product of the calculation period of the heating period for the internal air temperature difference (20 ℃) and the average temperature of the heating period [3].

The entire territory of the Republic of Uzbekistan is covered in the range of GSSOP values (from 1100 to 3900 days). [4]. Since October 2004, in order to ensure the highest energy efficiency in Uzbekistan, the following values \ u200b \ u200bof the given heat transfer resistance for the outer walls of residential and public buildings should be adopted:

Table 1.1 Calculated outside air temperature.

Calculated outside air temperature, ℃	℃/day	Above heat transfer resistance, (m2 * ℃) / vt
– 10	Up to 2000	2,1
– 15; – 20	From 2000 Up to 3000	2,4
– 25	Above 3000	2,8

It should also be noted that for this category of buildings, the temperature difference between the air temperature and the temperature on the inner surface of the outer wall(4.5 ℃) will be equal to or less. By this temperature difference, according to studies of hygienists, there is a normal heat loss by the human body [6].

In the climatic conditions of Uzbekistan, the summer microclimate of buildings has its own characteristics. If in winter the heating system eliminates external influences, then in summer the microclimate of buildings largely depends on external climatic factors (if there is no air conditioning).

The positive aspects of the Republican climate are the long duration of the hot period of the year and the low relative humidity of the air; the negative is due to the high level of solar radiation in a number of districts, mauvetry or high wind speed, high temperatures in summer, overheating of territories and buildings[7].

Low relative humidity of the outside air occurs due to a small amount of precipitation throughout the year. In summer, desert areas are heated in the center of dry air formation. In Tashkent, for example, the average annual relative humidity (58-60%), during the summer months (40-50%) at night and during the day (25-30%). This factor plays an important role in a person's emotions. At this relative humidity level, it is easier to tolerate high air temperatures.[8]

Discomfort in Tashkent (from 12-13 to 19-20 hours), in Southern cities, for example, in Termez, can be almost all light days. At the moment, the territory of development is very limited: only for business movement [10].

With modern construction, the floors have increased. The buildings on the upper floors have lost the beneficial effects of soil, landscaping and irrigation, and have been directly affected by solar radiation. These factors significantly worsened the microclimate of the environment of human life in modern urban structures.

On the territory of the Republic of Uzbekistan, the air temperature inside civil (public buildings) is sometimes(2 - 3.5 ℃) higher than the average daily outdoor space in summer (33-36℃). In buildings that deviate from the requirements of building codes and regulations, it is possible to increase the internal temperature (38 – 40℃).

The summer microclimate of buildings is formed under the direct influence of the external environment and depends on various planning, constructive and urban planning factors. In the usual working conditions of housing in Uzbekistan, the night ventilation mode of apartments does not exceed the relative humidity of the air during the day (30-45%) and the air speed (0.30 m/sec). In such conditions, the upper limit of comfort(24-26°C). Relative humidity(20-36%) and double—sided apartments(0.30-0.50 m/sec) with ventilation of the room for hours when the upper limit comfort zone air speed (29-30°C) rises.

Due to the significant insulation of living spaces, their microclimate may differ from external conditions (34 – 40℃) at an external air temperature (8 – 10℃). In Tashkent, in apartment summer rooms that are insulated to a lesser extent from the external environment than residential ones, the daytime air temperature is only lower or even less than outside (3℃). In order to reduce the overheating of residential and public buildings in Uzbekistan, comprehensive measures are required to regulate radiation, air and temperature-humidity regimes. The most important principle for improving the microclimate of a residential environment is the orientation of buildings to the sides of the horizon, the use of reflective properties of finishing materials of external surfaces of fences and green areas, the use of sun protection for light holes, opaque structures and elements of the territory [11] .

Summer buildings oriented north and south (10 and 6°C) overheated respectively. The sun's rays help to significantly improve the microclimate of summer buildings in the western direction, and they can be used in the evening and night hours. However, the orientation of summer buildings to the West is unacceptable even with solar protection., they are located in front of the living rooms, as they slow down the cooling in the evening.

Selection of types of solar devices according to the geometric scheme (table.1.2) depends on the degree of adjustment of the solar device, the direction of the opening beam and the state of sun protection. In Uzbekistan, it is recommended to use only external solar structures with the highest efficiency between the interior and glass.

The correct assessment of the microclimate conditions at home, a complete check of the effectiveness of measures aimed at improving the summer microclimate are inextricably linked with hygienic regulation, which makes it possible to determine the most comfortable comfortable conditions in the house and identify permissible changes in individual elements of the microclimate. Thus, during the day, the upper limit of comfortable temperature conditions without ventilation of the room changes (24 – 26 ℃). Create favorable conditions at high temperatures (up to 30-31℃), reduce the relative humidity and air speed during the day observed around the clock in the room ventilation.

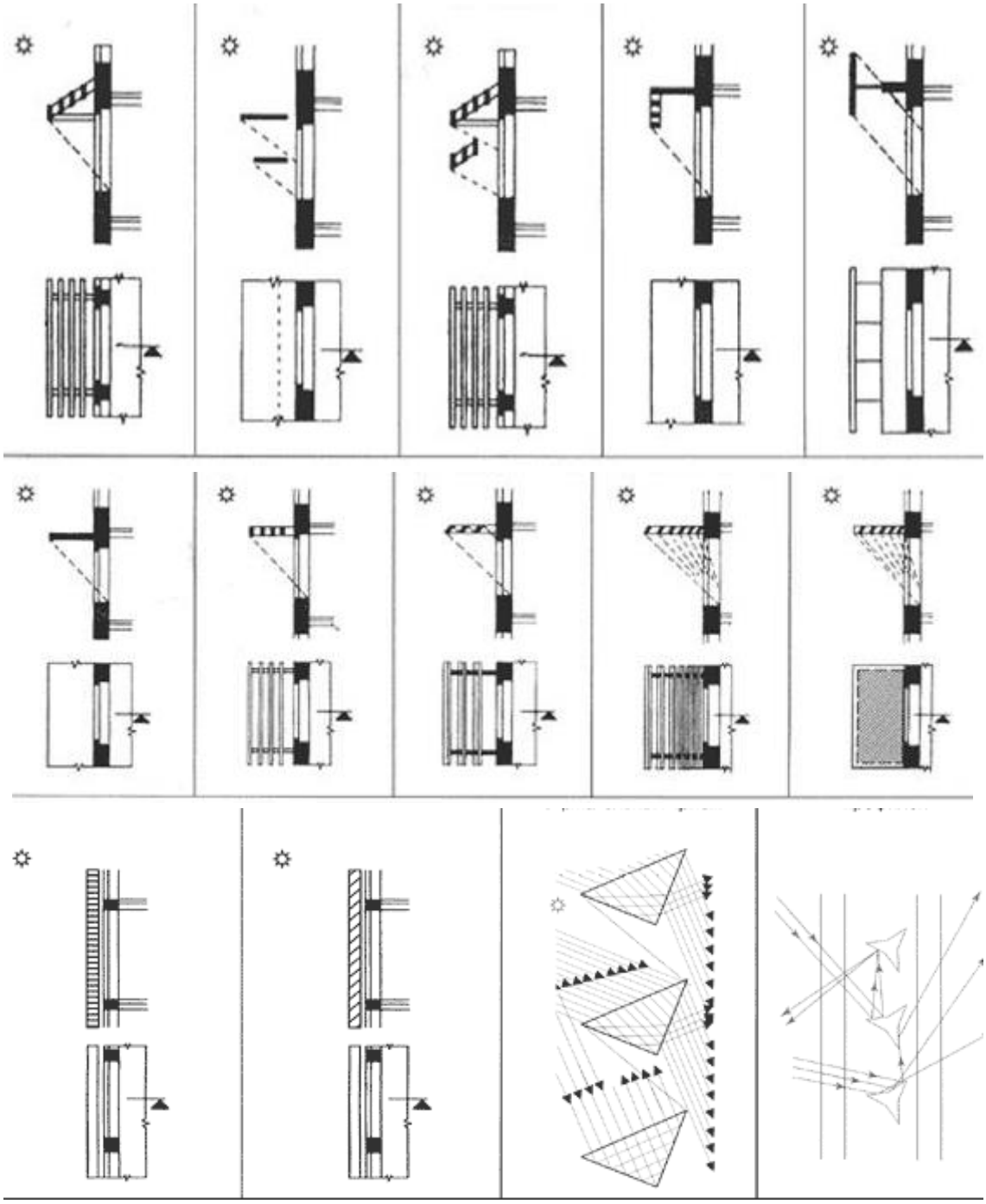

Figure 1. Fixed solar panels for Windows

There is an array of structures that have a great influence on the formation of the microclimate of buildings. In conditions of occasional hot days, most of the solar radiation heats a large surface of the building, as if impregnated with heat, the temperature reaches its maximum, and heat begins to enter the room. The heat accumulated during the day in large structures of the building significantly worsens the internal temperature regime at night. Thus, in the formation of the microclimate of buildings, there are not only external climatic parameters, but also a number of other factors that are considered by the following section. [12] The traditional folk house was created under the influence of economic, religious and natural-climatic conditions and at the same time responded to the needs, material capabilities and tastes of each family. The general principle of architecture and planning is the location of open and closed buildings around a closed courtyard. When building a house, the main attention was paid to its protection from overheating and the maximum use of the courtyard, which is included in the planning structure of the House. When developing model projects of civil buildings, very effective national planning techniques were taken into account. The summer room has high vertical ventilation, which ensures comfort even at outside air temperature (40°C). The intensity of vertical ventilation of the summer room was ensured by using a staircase and connecting to a common system for ventilation of a long closed passage on the first floor, the clay layer of which is constantly moistened.[13]

The standard sectional structures of apartment buildings used in the Republic are practically scarce by the methods of organizing a people's House. Over the past 20-30 years, many of the shortcomings of standard structures have been partially or completely eliminated. Thus, the ratio of installed or attached verandas (Lodges) has increased significantly; the mandatory surface of the Lodges allows them to be used more fully during the cold period of the year; the passage of the lodge is usually carried out through the kitchen and residential premises.

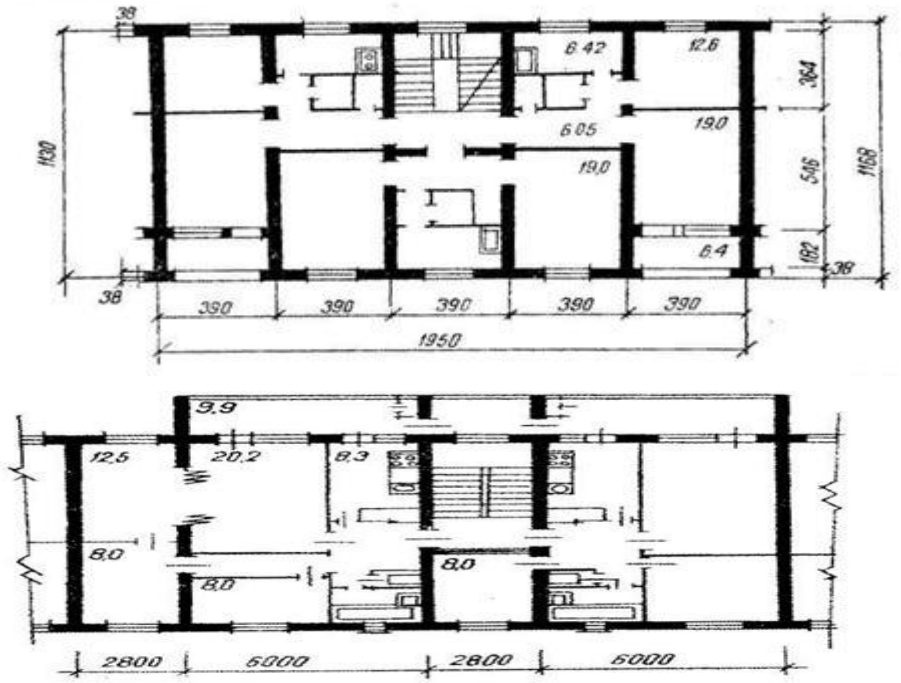

Figure 2. Sample section of four-story houses of the series "77".

Figure 3: plan of the section of the experimental four-story residential building (1970).

Modern housing, built since the late 90s of the last century, is characterized by great comfort, large areas of the main and auxiliary rooms. However, issues of summer heating, ventilation of premises, increasing the energy efficiency of buildings in general require their further permission.[14]

Conclusions

When designing buildings, it is necessary to take into account the climatic parameters of the winter and summer periods, as well as their pros and cons at the same time.

− When designing thermal protection of buildings, it was determined that great attention should be paid to increasing the thermal resistance of external walls and windows.

− In the planning structure of the building, the following should be applied: to ensure additional vertical ventilation of the building, it is recommended to provide Lantern devices, containers for cooling and humidifying the air in the summer in order to evenly distribute air masses at the level of the first floor in height, mainly applying the open layout of the premises.

-Residential buildings of the Republic of Uzbekistan have constructive and planning solutions for structures of various structures. Studies have shown that external fences do not meet heat protection standards. External barriers the potential to reduce the energy consumption of residential buildings through economically justified additional heating is 30-65%.

− The main share of the housing stock in Uzbekistan was built when the old normatives were in force, and this housing stock is the main consumer of energy resources, therefore, for the Government of the Republic, the chromestroitelstvia of energy-efficient housing is relevant to the descriptions of modern buildings through thermal modernization.

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