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THEORETICAL BASIS OF INCREASING ENERGY EFFICIENCY IN RESIDENTIAL BUILDINGS.

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Annotation: In order to improve the living standards of the population of our country, as well as to meet the energy needs of the buildings under construction and to improve the living conditions of homes using the outside air temperature, theoretical ideas were studied.

Introduction: Buildings are facing serious environmental challenges due to the over-consumption of energy and other natural resources as they are designed and used today. The close link between energy use in buildings and environmental damage arises because energy-intensive solutions seek to build a building and meet its requirements for heating, cooling, ventilation and lighting. It leads to a sharp decline in invaluable environmental resources. Energy efficiency in new buildings can be achieved through a comprehensive approach to building design.

Keywords: energy saving, alternative, consumption, green building, green economy, environmental, buildings and structures, resource, saving.

The main part: At present, the country pays great attention to the modern construction of buildings and structures and their provision with durable materials, as well as improving the energy efficiency of buildings. In order to design energy-efficient buildings, it is necessary to theoretically and physically substantiate them and external barrier structures. To do this, the initial thermal-physical calculations of the building and its external barrier structures are performed. In addition, the choice of energy-efficient building materials and devices is made as a result of thermal and physical calculations:

1. A normal microclimate environment is created for people in the rooms of the building;

2. Energy-efficient building materials are selected for the external barrier construction of the building;

3. Thermal insulation layer of the external barrier structure - physically, the optimal thickness is determined;

4. Energy efficient housing - the design of residential buildings is achieved;

5. Heat - as a result of physical calculations it is determined how much heat energy is saved for heating buildings;

6. The resistance of the external barrier structure of residential buildings to heat transfer is increased;

7. It is determined whether condensate moisture is formed in the outer barrier construction layers.

It is clear from the above considerations that, first of all, the climatic conditions of the construction site are taken into account in order to create a normal microclimate for people, especially in residential buildings. Climatic parameters of the construction site affect the following indicators in the rooms of residential buildings:

a) On the surfaces of the external barrier structure and the main of the room the temperature of the parts;

b) relative and absolute humidity of the air in the room;

c) Sanitary and hygienic condition (quality) of air in the room;

g) whether condensate moisture is formed on the inner surface of the external barrier structure of the room;

d) Thermo-physical improvement of the structure to increase the thermal protection of the external barrier structure of the room;

e) The indoor air environment is aggressive or proaggressive towards the barrier structure.

The air temperature depends on whether the barrier structure is aggressive or proagressive, not only whether the air contains chemical compounds, but also the temperature and humidity of the air environment.

The minimum and maximum (maximum) calculated values of temperature and humidity are of great importance even in the design of barrier structures, as they change the seasons over the years and affect the people inside the building. During the design process, the average values of temperature and humidity in the rooms of the building are often adopted. These indicators are hygienically responsible for the lower part of the building (room), depending on the type of building fit for purpose, in which moderate temperature and humidity environments are established. Due to the small amount of heat released in almost all residential buildings, they are heated to create a temperate climate. The amount of heat used to heat a building also depends on the climate of the construction site.

Atmospheric air always contains a certain amount of moisture in the form of water vapor, which is called air humidity. Humidity barrier

affects the thermal and physical properties of the structure.

When calculating the moisture state of external barrier structures, the partial pressure of water vapor or the elasticity of water vapor e (mm.sim.ust.) Is used. At the same temperature and borometric pressure of air, the greater the absolute humidity, the greater the partial pressure of water vapor. Hence, the partial pressure of water vapor is a quantity that indicates the humidity of the air. At a certain temperature and barometric pressure of air, the partial pressure of water vapor has an upper saturation limit and does not have a greater value. The partial limit of water vapor pressure is denoted by the letter E (mm.sim.ust.) As the upper limit value, the saturated water vapor pressure or the maximum elasticity of water vapor.

The higher the air temperature, the greater the saturated pressure of water vapor. The temperature dependence of the saturated pressure (elasticity) of water vapor is given in the appendix.

The absolute humidity of the air is determined from the following formula.

$$f = \frac{1{,}058 \times e}{1 + \frac{t}{273}} \qquad (1.)$$

where t is the air temperature, ^{0}c; e is the true elasticity of water vapor, mm.sim.ust. Often heat - relative humidity is used in physical calculations.

The relative humidity of air is the ratio of the elasticity of the actual water vapor to the maximum elasticity of the saturated water vapor and is determined from the following formula. $\varphi = \frac{e}{E} \times 100\%$ (2).

If the air temperature rises, its relative humidity decreases, because as the temperature rises, the pressure of saturated water vapor also rises. Conversely, as the air temperature decreases, the elasticity of water vapor does not change, and the humidity of the air rises due to the decrease in the elasticity of saturated water vapor.

The elasticity of saturated water vapor at a given temperature - E is equal to the elasticity of real water vapor - e and the relative humidity is 100%, i.e. the air is completely saturated with water vapor. The temperature of the air in this case is called the dew point temperature and determined.

If the air temperature decreases further than the dew point temperature, the elasticity of the water vapor decreases as the elasticity of the saturated water vapor decreases and excess moisture is formed and they turn into liquid water droplets. In nature, this phenomenon can be observed in the summer on the river bank, at sunset, when the fog falls or in the early morning when dew drops appear on the leaves of grass.

The body of building materials and external barrier structures naturally contains a certain amount of moisture. The amount of moisture affects the density, heat - physical and other properties of these building materials.

It is known that the higher the moisture content of a building material, the greater its thermal conductivity. Therefore, in the design of external barrier structures should take measures to protect them from the effects of natural external moisture, and in addition to the use of building materials with low humidity, ie low moisture absorption, take into account not only heat - physical and even humidity.

Building materials with high humidity are also considered sanitary and hygienic. First of all, this material, along with increasing the humidity in the building, creates wet spots, mold on the surface of the walls or roof coverings. This leads to food spoilage and the spread of various diseases. Second, the strength of this building material is low, it is not resistant to external influences and and is durable for a long time.

To increase the thermal protection of external barrier structures,

they must perform an engineering calculation of the moisture state. This

In the process of using construction materials, in order to ensure the state of moisture, it is necessary to determine the causes of the state of moisture in them. The causes of moisture in building materials are:

1. Technological humidity in construction is the moisture formed during the preparation of building materials during the restoration of a building or equipment;

2. Moisture passing through the ground. This moisture passes through capillary suction from the soil to the walls. This moisture can rise to 2 to 2.5 meters above ground level in the wall.

3. Humidity passing through the atmosphere. This moisture, along with the effects of wind due to snow and rain, affects the external barrier structures. To prevent this moisture effect, it is necessary to build a protective layer of moisture-proof or moisture-proof material on the outer surface of the external barrier structures.

4. Humidity under the influence of the operating environment. This moisture is generated during the operation of the building and mainly affects the walls and floors in the wet and watery state in the workshops of industrial buildings, domestic service buildings. It protects the wall and floor surface with a layer of ceramic and glass tiles to prevent the effects of moisture.

5. Hygroscopic humidity. This moisture is formed as a result of the hygroscopic properties of this material in the composition of the building material. Hygroscopic

means the ability of a building material to absorb moisture from the air (sorption). All building materials are more or less hygroscopic.

6. Condensate moisture. The process of formation of condensate moisture is inextricably linked with the thermal-physical state of the external barriers. Condensate moisture is often the cause of increased humidity in exterior barrier structures and their building materials.

One of the conditions for the formation of condensate moisture is that, as observed in nature, the actual elasticity of water vapor in the body and surfaces of the structure also changes as the outside air temperature changes. As a result of these abrupt changes, the actual elasticity of water vapor is also equal to the maximum elasticity of water vapor at a given temperature point, during which dew drops appear. These water droplets increase the moisture content of the structure. The temperature in the period of time during which water droplets are formed is called the dew point temperature. If the surface temperature of any building material is drastically lowered and the surface temperature is below the dew point temperature without air humidity change, dew-like water droplets will form on the surface of that material. This condition is called condensate moisture state. Condensate moisture formed on the surfaces of building materials and external barriers is gradually absorbed into the body of building materials over time, increasing the relative humidity of this structure. This condition can be observed at the corner of the outer wall, at the cornice, at the junction of the walls with the plinth and at the joints of the panel walls with each other, and at the junction of the walls with the window. The process of formation of condensate moisture on the surface of external barrier structures depends on:

1) $\tau_и < \tau_ш$ - condensate moisture is formed on the surface of the external barrier;

2) $\tau_и > \tau_ш > \tau_Б$ - if condensate moisture is formed only at the corner of the external barrier structure;

3) $\tau_и > \tau_ш > \tau_{мин}$ - if the temperature of heat-resistant structures

in cases of decreased - from time to time condensate moisture is formed;

It is often possible to observe the formation of condensate moisture on the outer surface of external barrier structures in winter.

The main reason for this is that after a severe cold, the air heats up sharply or the warm air cools down sharply. This condition can be observed on the outer surface of unheated building structures, on the surface of columns, bridge structures and statues.

The temperature of the inner surface of the barrier, taken into account the engineering condition of the moisture content of the external barrier structures, should not be less than the temperature of the dew point. In order to prevent condensation from forming on the inner surface of the external barriers, it is necessary to sharply increase the indoor air exchange and reduce the air humidity. In addition, the temperature of the inner surface of the barriers must be greater than the dew point temperature. This is done by increasing the thermal conductivity resistance of the outer barrier or by reducing the thermal conductivity resistance of its inner surface.

Especially in increasing the energy efficiency of buildings, it is important to determine in a graphoanalytic method whether condensate moisture is formed in the layers of non-homogeneous external wall structures.

Conclusion: The construction industry in Uzbekistan is one of the largest economic activities. As the construction industry is currently evolving, environmental protection poses many challenges and at the same time creates opportunities for professionals involved in the field.

Sustainable construction -it is the creation of a healthy, resource-saving environment based on environmental processes and the rational use of them. It pays special attention to resource efficiency, environmental protection and waste reduction. Energy efficiency is one of the simplest, fastest, cheapest and cleanest ways to solve energy and environmental problems. The use of simple energy-saving technologies in buildings can significantly reduce energy consumption.

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