GRAPHOANALYTIC METHOD OF DETERMINING THE FORMATION OF CONDENSATE MOISTURE IN EXTERNAL WALLS.

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Abstract: *In this article, it is considered important to determine the temperature of its optional layer in the thermal-physical calculation of external barrier structures, in addition to the heat transfer resistance, because the temperature line in the structure is of great importance in the engineering calculation of its moisture condition.*

Keywords: *thermal-physical, temperature, construction, condensate, humidity, graph analytical, relative humidity, water vapor, elasticity*

With the help of the temperature curve, it is possible to determine whether or not condensate moisture is formed in the layers of the outer walls using the graphoanalytical method. Determination of the temperature in the structures is performed as follows:

1) The amount of heat that passes through the body of 1m^2 structure during 1 hour is determined according to the following formula:

$$Q_1 = \frac{t_u - t_T}{R_y},$$

where $t_н - t_т$ is the difference between internal and external temperatures.

2) The amount of heat that passes through the inner surface of 1m^2 construction in 1 hour can be determined using the following formula.

$$Q_2 = \alpha_И (t_И - \tau_Н) = \frac{t_u - \tau_u}{R_u},$$

where $\tau_и$ = temperature of the internal surface of the structure.

If Q_1 and Q_2 in the formula are assumed to be conditionally equal to each other, it takes the following form:

$$\frac{t_u - t_m}{R_y} = \frac{t_u - \tau_u}{R_u} \text{ ,}$$

From this formula, we determine the temperature of the inner surface of the structure.

$$\tau_{II} = t_{II} - \frac{t_u - t_m}{R_y} \cdot R_{II}$$

The temperature in an optional layer of the external barrier structure is determined using the following formula:

$$\tau_n = t_u - \frac{t_u - t_m}{R\,y} \cdot \left(R_{II} + \sum_{n-1} R \right)$$

where τ_n – is the structure, n is the surface temperature of the th layer.

The numbering order of the layers starts from the inner surface of the structure;

$\sum_{n-1} R$ – the sum of the thermal heat transfer resistance up to the n-1th layer.

It is necessary to know the internal and external air temperatures to calculate the moisture condition of the external barrier structures. Indoor air temperature and relative humidity are selected based on the suitability of the building. For example, for residential buildings, the relative humidity of the indoor air = 50-60% and temperature $t_и$ = +18˚C - 20˚C are accepted. For external air temperature and relative humidity, the average temperature and humidity of the coldest month from ShNQ 2.01.01-22 are taken based on the construction region.

With a constant flow of water vapor, the calculation of the moisture condition of external barrier structures is performed in the following order:

The presence or absence of condensate moisture in the external barrier structure is determined graphically. Based on the temperature line, the maximum elasticity line of water vapor in the barrier structure is determined. After that, the real elasticity of water vapor is determined and drawn in this construction. If the maximum elasticity line of water vapor E and the actual elasticity line e do not cross each other, condensation moisture will not form in the barrier structure, otherwise, there is a possibility of condensation moisture formation. To fully express the physical meaning of this method, let's consider the following example:

example Calculate the moisture content of a homogeneous wall made of lightweight concrete 30 cm thick**.**

Construction site Samarkand $t_и$ = 18 ^oC, $\varphi_и$ = 55% ; E = 15.48 mm.sim.ust, $\varphi_т$ = 61%

E = 1.47 mm.sim.up, from which $e_т$ = 2.72 mm.sim.up. Density of concrete is 1200 kg/m^3; λ = 0.44 Vt(m.^oC).

E = 1.47 mm.sim.ust, bundan $e_т$ = 2.72 mm.sim.ust. Yehgil betoning zichligi 1200 kg/m^3; λ = 0.44 Vt(m.^oC).

Heat transfer resistance:

$$R_y = 0.114 + \frac{0.30}{0.44} + 0.043 = 0.838 \left(m^2 \cdot^o C\right) Vt$$

The method for calculating the humidity regime of external barrier structures at a constant flow of water vapor is simple and understandable and allows you to get unambiguous answers to the following questions:

As a result of calculations, it was established that condensate moisture does not form in the barrier structure; moreover, condensate moisture does not form in this structure.

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