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EFFECTS OF EARTHQUAKE MEASURES ON BRICK BUILDINGS ON THE EXTERNAL WALL PROPERTIES

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ANNOTATION

This article is devoted to the study of the effect of monolithic reinforced concrete elements on the temperature of the interior and exterior walls of brick buildings, as well as the development of recommendations for the prevention of condensate formation in the corners of walls.

АННОТАЦИЯ

Данная статья посвящена изучению влияния монолитных железобетонных элементов на температуру внутренних и наружных стен кирпичных стен зданий, используемых для повышения сейсмостойкости, а также разработке рекомендаций по предотвращению образования конденсата в углах стен.

ANNOTATSIYA

Ushbu maqola, zilzilabardoshlikni oshirish maqsadida qollaniladigan monolit temirbeton elementlarning gishtdan barpo etiladigan binolarning ichki va tashqi devorlarining temperatura rejimiga tasirini organishga, shuningdek devor burchaklarida kondensat hosil bo'lishini bartaraf qilish bo'yicha tavsiyalar ishlab chiqishga bag'ishlangan.

Ordinary baked bricks are now produced in almost all regions of the country by many limited liability companies in the amount of today's requirements. Therefore, in all cities and villages of the country, brick is widely used as the main wall material in low- and middle-rise residential and social buildings, which are built in public (Fig. 1).

Figure 1. One of the multi-storey residential buildings built of brick in Samarkand.

In order to increase the seismicity of such buildings, the method of monolithic reinforced concrete carcass and filling the space between the columns with baked bricks has become popular. Indeed, in areas with a seismicity of up to 9 points, it is recommended in the normative document (1) to use a constructive solution made of monolithic reinforced concrete carcass and filled with bricks in order to ensure the earthquake resistance of buildings. It states that the brick wall between the carcasses may be partially or not involved at all in receiving seismic load. If a filler wall made of brick is involved in the operation of the carcass, it is considered as a virgin diaphragm and a constructive solution is selected accordingly. In this case, the brick wall is placed between the rows of columns and must be fastened to the columns and crossbars. If the infill wall made of brick does not participate in the earthquake protection of the carcass, a gap of at least 20 mm must be left between the columns and crossbars of the carcass and the wall. In this case, it is necessary to take measures to prevent the brick wall from leaking during the earthquake. The gap between the carcass and the brick wall is filled with elastic material. The strength and priority of the infill brick wall is ensured by the addition of horizontal and vertical reinforcement to the brick assembly, the use of elements covering the sides, top and bottom of the wall, the installation of fasteners that ensure that the wall does not protrude slightly. Currently, the first method is used in monolithic reinforced concrete frame buildings, which are built of almost all bricks, that is, the option that works as a brick wall diaphragm. (Figure 1).

When using this method of increasing the seismicity, it is necessary to take into account the other side of the problem, that is, the fact that during the operation of the outer wall of the building may be formed unfavorable temperature regime in winter conditions. Theoretical and experimental studies conducted by many researchers on the organization of the temperature regime in the outer walls of buildings show that the surface temperature of the inner corner of the outer wall is 4-70 lower than the surface temperature at a distance (2). As a result, in many cases, in the corner of the outer wall of the building there are cases of dampness, pressure. To prevent this, measures such as adding additional thermal insulation to the corner of the outer wall, pilastering or installing the risers of the heating system in the corner are used (Fig 2).

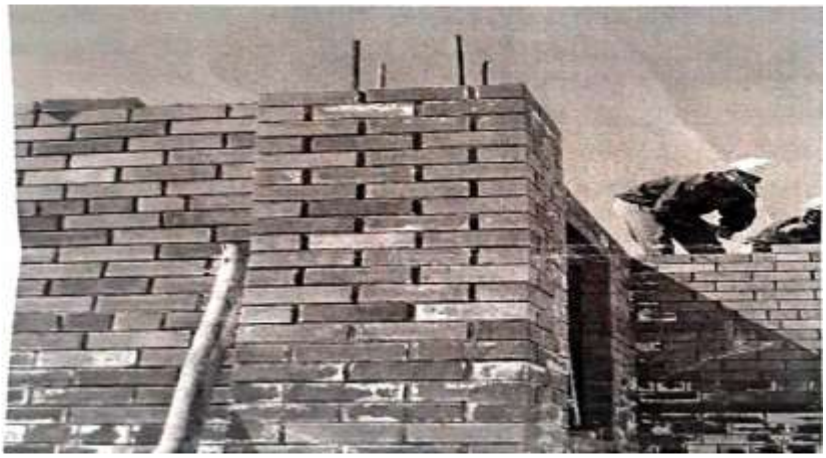

Figure 2. Exterior wall corner with monolithic reinforced concrete columns made of brick in a residential building (Navoi city).

It can be shown that the reason for the low surface temperature of the inner corners of the outer walls is the unevenness of the heat transfer surfaces in the wall. In addition, the convective flow of air in the inner corner is slow and the heat exchange in the form of light is reduced. As a result, the value of the surface heat transfer coefficient aB at the corner of the wall also changes with decreasing value (2).

Analyzing the current solutions of brick walls, we can note that the thermal conductivity of reinforced concrete is several times higher than the thermal conductivity of the material used as a filler wall material between the carcasses, so the thickness and even if the surface is the same, more heat is lost from the reinforced concrete part of the wall when other conditions are the same in winter, the formation of condensate on the inner surface, the probability of moisture in the wall is very high.

As a result of the research, it was found that the temperature inside the outer corner of the outer wall could not be raised even with the help of pilastar with a thickness of 130 mm (120 mm brick and 10 mm mixture) around the reinforced concrete column. The results of thermophysical calculations performed using the method described for conditions where the indoor air temperature is +20 OC and the outdoor air temperature is -15 OC show that the temperature outside the inner corner of the wall can drop from 0 OC to a lower temperature. The temperature outside the inner corner of the wall would be even lower in the same indoor and outdoor environment if the uncasted, reinforced concrete column was only plastered on the outside. The reason for this can be explained by the fact that the pilaster, consisting of a mixture of half-brick and 10 mm, increases the heat transfer resistance of the wall by 25%, while the surface that heats the outside air in the corner of the wall increases by about 70%.

The normative temperature of indoor air for living rooms in residential buildings is set at +20 °C and relative humidity at 55%. For such an environment, the dew point temperature is +10.7 °C. This means that if the necessary measures are not taken in the corner of a brick-walled building with a reinforced concrete frame, not only condensate but also frost can form on the surface of the corner in the winter and in the vicinity.

In the corner of the wall as a pilaster, the temperature area in the brick wall structure was studied by gluing a 40 mm thick penoplex slab with the outside width equal to the width of the reinforced concrete column section and plastered with lime-sand mixture on top. The calculation scheme of the studied external brick wall angle is shown in Figure 3 and the results are given in Table 1.

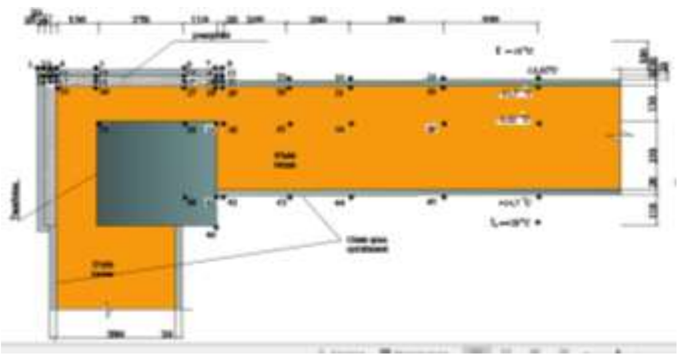

Figure 3. Calculation scheme of the corner of a brick wall with a reinforced concrete frame made of 40 mm thick foamed and plastered pilasters:

146- points where the temperature of the wall is calculated.

Table 1

The calculation point	Tempera-ture, ^{0}C	The calculation point	Tempera-ture, ^{0}C	The calculation point	Tempera-ture, ^{0}C	The calculation point	Tempera-ture, ^{0}C
1	-14,92	13	-14,20	25	-3,20	37	-1,79
2	-14,82	14	-12,75	26	-1,35	38	-2,64
3	-14,79	15	-12,62	27	-0,22	39	-3,02
4	-14,70	16	-11,92	28	-2,79	40	-7,99
5	-14,59	17	-9,80	29	-3,07	41	+10,07
6	-14,51	18	-7,84	30	-10,73	42	+11,51
7	-13,68	19	-7,22	31	-11,50	43	+14,49
8	-13,88	20	-7,85	32	-11,64	44	+14,59
9	-14,80	21	-7,96	33	+0,81	45	+14,69
10	-14,66	22	-12,41	34	+2,88	46	+13,01
11	-14,50	23	-12,88	35	+2,39		
12	-14,32	24	-12,97	36	+2,00		

The results of the study show that the monolithic reinforced concrete column in the corner of the brick wall is watered to a thickness of 20 mm from the outside so that it covers both sides. it is possible to prevent the formation of condensate from water vapor in the room air on the surface.

LITERATURES

1) 2.01.03-96. Construction in earthquake zones / State architectural structure of the Republic of Uzbekistan: - Tashkent: TNMB named after Ibn Sino, 1996-59p.
2) Fokin K.F. Stroitelnaya teplotexnika ograjdayushix chastey zdaniy texst: Uchebnik / K.F.Fokin; izd-e 5-e, prerab.-Moskva :ABOK press, 2006-270 c.
3) Maxmudov M.M. Calculation of temperature areas in complex nodes of external barrier structures of buildings. Samarkand, SamSACI2016.-87p.
4) Mahmudov M.M. Influence of monolithic reinforced concrete carcass on the temperature field at the corner of a brick wall./ M.M. 5. Mahmudov, G.R. Marupova, K.X. Khaydarova // Architectural construction science and period: materials of the republican scientific-practical conference / Tashkent, 2017-P.65-68.