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"IMPROVEMENT OF THERMAL PROTECTION DURING THE CURRENT REPAIR OF EXISTING APARTMENT BUILDINGS"

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Abstract: *This article outlines the development of effective ways to apply energy efficiency measures to current and capital repairs of existing residential buildings.*

Key words: *energy efficiency, energy saving, construction, electricity, current and major repairs, thermal protection.*

INTRODUCTION

Energy efficiency is the rational use of energy resources, the use of a minimum amount of energy to cover the same degree of energy supply of technological processes or buildings and structures. Unlike energy saving, which is focused on reducing energy consumption, energy efficiency means efficient (expedient) use of energy.

In the world, special attention is paid to determining the energy efficiency of public and other types of buildings, developing methods for monitoring and analyzing energy consumption of buildings, creating energy-saving technical means and technologies. In this direction, the implementation of targeted research, in particular, on the development of methods for assessing and comparative analysis of energy consumption of various types of buildings, on the development of systems for modeling, forecasting and monitoring energy consumption, on the development of energy-efficient means to ensure the internal climatic indicators of the building, on improving regulatory requirements are among the important tasks.

A number of measures are being implemented in our republic to assess and improve the energy efficiency of residential and public buildings, standards for energy efficiency indicators of buildings are being revised, energy-saving technologies are being widely introduced [1]. The Strategy of Actions for the Further Development of the Republic of Uzbekistan for 2017-2021 defines the tasks of "... reducing the energy intensity and resource intensity of the economy, widespread introduction of energy-saving technologies into production, expanding the use of renewable energy sources, increasing labor productivity in economic sectors, implementation of these provisions, including the determination of energy efficiency indicators both at the system level and at the individual object, development of methodology, methods, algorithms and software tools for monitoring and analyzing energy consumption are very relevant and are considered one of the most important tasks.

Saving energy resources is impossible without obtaining the necessary information about where and how they are spent. Without detailed accounting and collection of information on the consumption of energy resources, it is impossible to control and organize their effective use. Therefore, one of the main directions in the field of energy saving and improving the energy efficiency of buildings is the organization of accounting for consumed energy resources, as well as the collection and analysis of these data [2]. At the same time, such systems of accounting, collection and analysis of energy consumption data are an integral part of the overall energy management system of management facilities.

Unlike from the initial moment of construction of a residential building, its current actual condition is characterized by an excess amount of energy loss due to a violation of the design tightness of the building. Below, the article discusses the impact of the violation of the tightness of

an unheated stairwell and the tightness of antisysmic seams on the level and structure of energy consumption by the building.

The methodology presented in the document for energy calculations is based on EN standards – mainly ISO 13790:2008, EN 15 316-x-x and other auxiliary standards and documents [3, 4].

This methodology is compiled according to the quasi-stationary state method (described in the EN ISO 13790 standard), which calculates the thermal balance with a calculated step of one month, which allows taking into account the dynamic effect using the utilization coefficient, which is determined empirically.

And the importance of the energy-saving measures taken in the process of current repairs. The object of the study was the Object of the study: A large-panel 4-storey 72-apartment residential building No. 42 on Chilanzar district, 19th quarter of Tashkent. Temperature measurements during the period of abnormal cold from January 10 to January 24, 2023. the average temperature value for 14 days that according to ISO comply with international rules for energy monitoring of buildings.

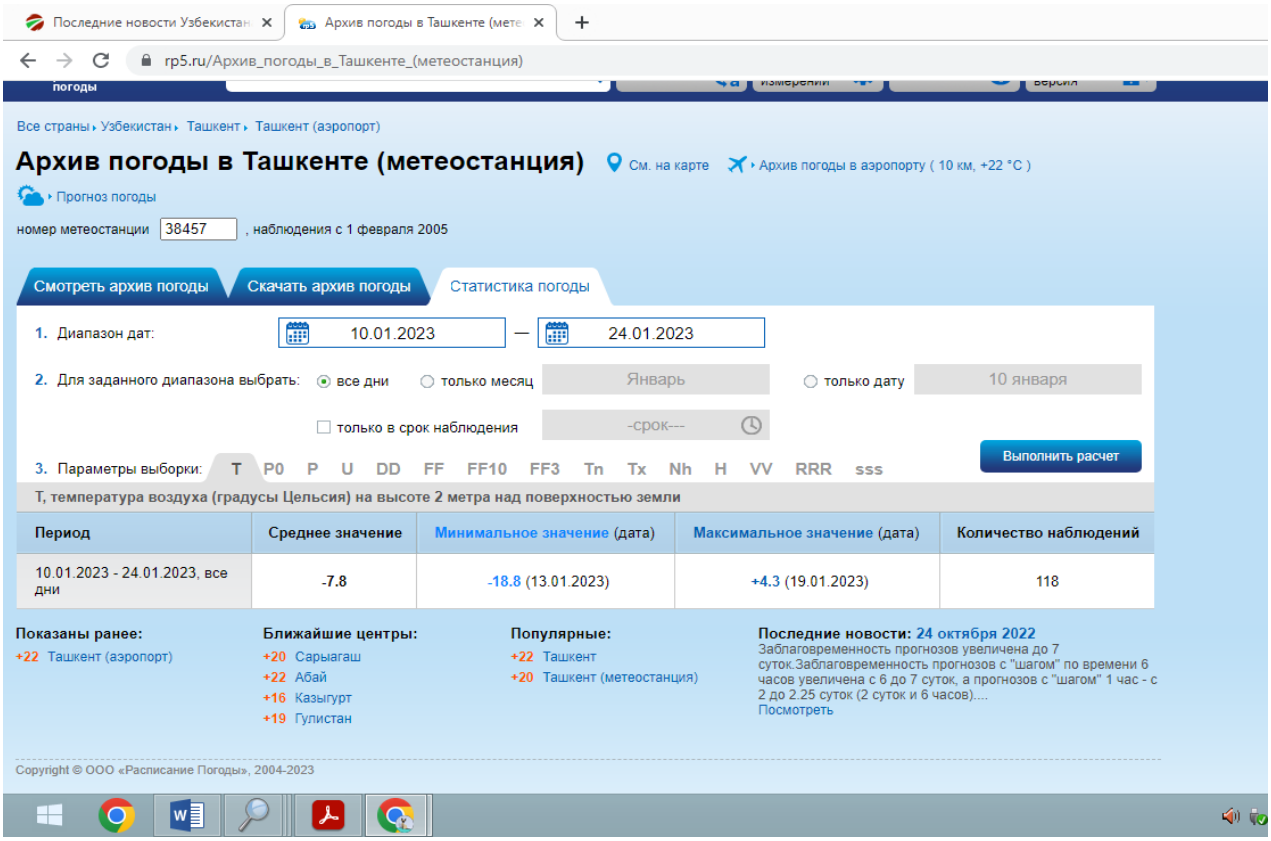


Fig. 1. Weather statistics during the period of abnormal cold from January 10 to January 24 with an average temperature of 7.80 C.

Fig. 2. The actual condition of the building at the time of the experiment.

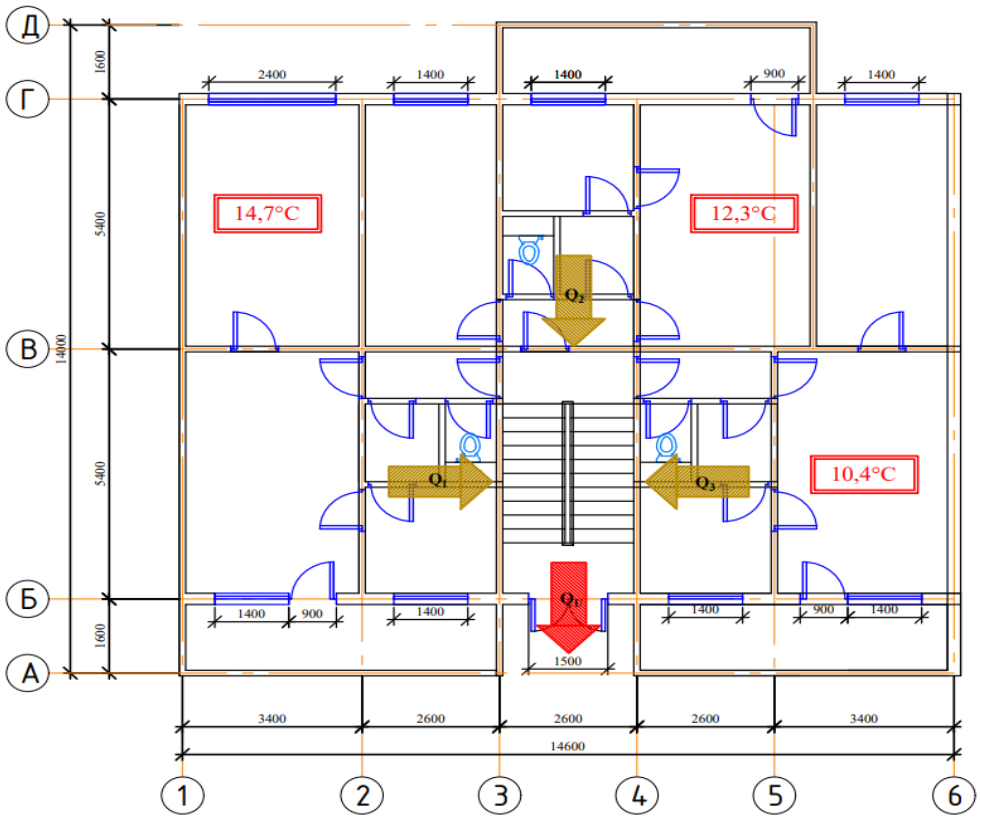


Fig. 3. Average temperature values and heat flows during the period of energy monitoring.

Heat flows Estimated heat losses through unprotected hermetic not closed stairwells are 2295.9 Wh/°C, which occupies the 2nd place in the overall structure of heat losses of the calculated apartment. Consequently, the importance of sealing the stairwell is of paramount importance compared to increasing the thermal protection of the walls [5,6].

The second area of research is the study of the impact of the violation of the design tightness of seismic seams on the heat loss through these seams and their importance in choosing priorities for energy-saving measures when performing routine repairs.

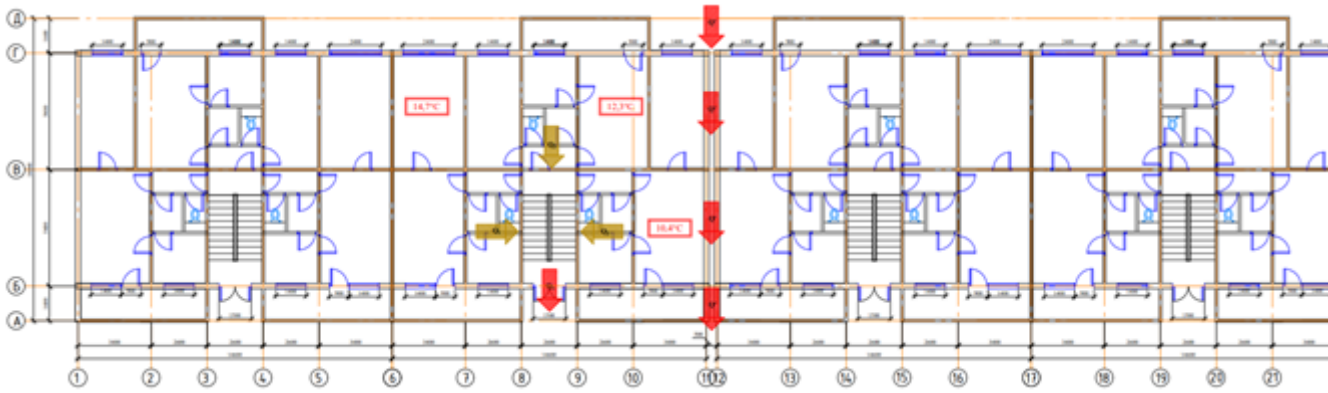


Fig. 4. Heat losses occurring through hermetically unprotected seismic seams.

During the long-term operation of the building, the tightness of seismic seams is often violated.

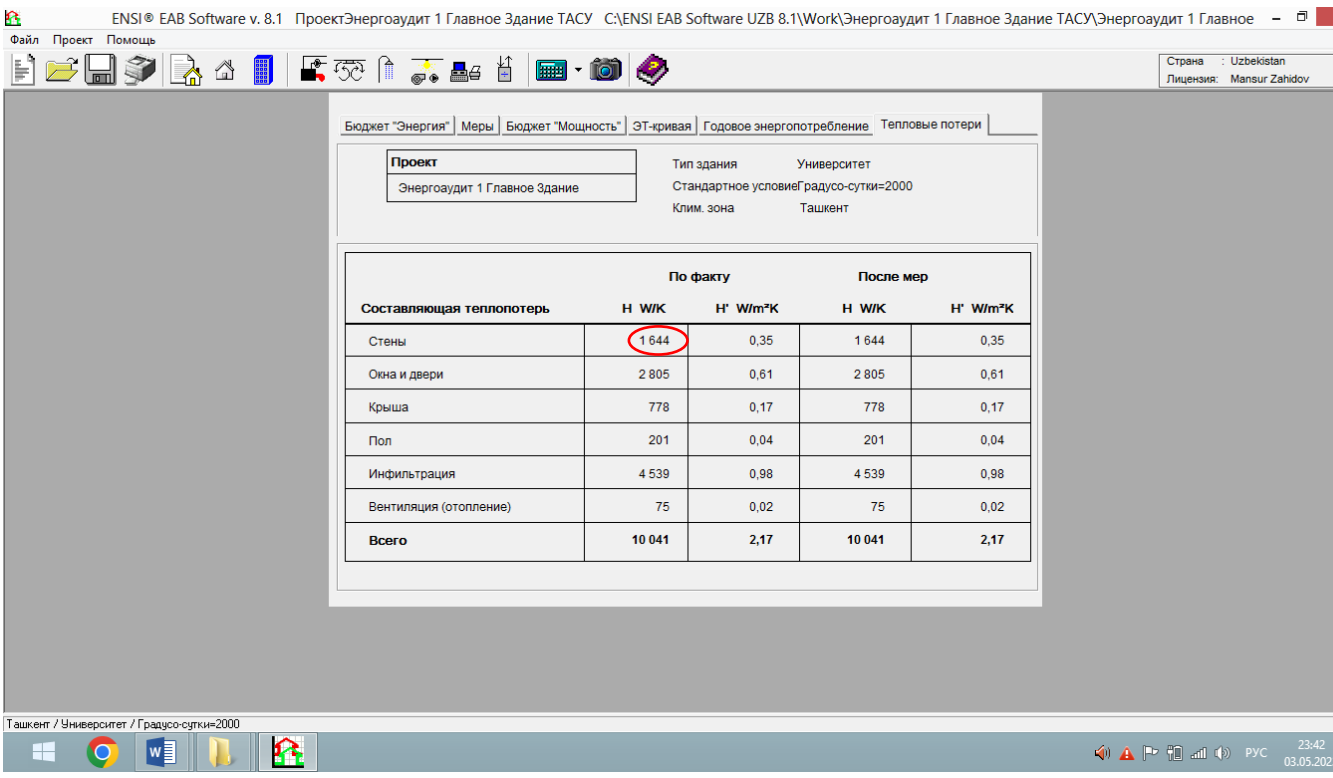
With a normal arrangement of seismic seams, the air temperature of the seismic seam is equal to the average value of adjacent rooms. And a through violation leads to a decrease in the air temperature in the seismic seam closer to the outside air temperature by a few 3-5 degrees exceeding its value.

The walls of the seismic seams, exactly like the internal load-bearing walls, are made of heavy reinforced concrete with a thickness of 140 mm. In case of abnormal cold and with a maximum through violation of the tightness of the seismic seam, heat losses can be:

$$R=R_в+\delta/\lambda + R_н= 0.115+0.14/1.92+0.043=0,125 \text{ м2 } {}^0\text{C/ Вт.}$$

Heat loss through the area of paired seismic walls is equal to:

$$Q = 2x[(5,4+5,4)x13,0]/0,125(14.7-5.0)24x131 = 113184,0 \text{ кВт ч/год.}$$



The heat loss through all the walls of the building is:

1644 Вт/К х 20 х 24 х 131= =103 374,7 кВт ч/м2 год [7,8].

With a through breach of the tightness of the seismic seam, heat loss through the seismic seam is almost equivalent to heat loss through all the walls of the building.

Conclusions

The repair of existing houses in accordance with the requirements of CMC 2.04.01-18 will not lead to the desired result of energy savings, since most of the energy in the current actual condition is lost by the loss of the design tightness of the building.

In apartment buildings of large-panel construction, first of all, during the current repair, it is necessary to include work aimed at restoring the design tightness of the building shell. Namely, the work aimed at restoring the design tightness of the stairwell of the entrances and seismic seams between the individual compartments of the building.

The next stage of the current repair project should include works that significantly reduce energy consumption for heating at minimal cost.

In the abnormal cold, the air temperature in houses with the loss of the design tightness of the stairwell and the through violation of the tightness of the seismic seam quickly descend and reach values of 10-120C, creating thermal discomfort to residents of an apartment building.

REFERENCES

1. Resolution of the President of the Republic of Uzbekistan dated October 21, 2016 "On the Program for the construction of affordable residential buildings on updated standard projects in rural areas for 2017-2021". Press Service of the President of the Republic of Uzbekistan. [Electronic resource] / mat. Site http://press-service.uz/ru news 5354.
2. Zakhidov M.M. Actual problems of energy saving in construction. conference materialary. Tashkent 2015. - 197-200p.
3. Zakhidov M.M., Norov N.N. Energy-efficient building. M. Housing construction. No.3.2003, p.81.
4. Energy audit of buildings, ENSI methods and tools (manual adapted to the conditions of Uzbekistan) Tashkent 2014.
5. Belyaev V. S., Khokhlova L. P. Designing energy-efficient and energy-active civil buildings: Textbook for students. universities on spec. "Industrial and civil construction". – M.: Higher School, 1991. – 255 p.: ill.
6. Energy Efficiency Trends in Buildings in the EU. Lessons from the ODYSSEE MURE project. ADEME. September 2012.