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WAYS TO IMPROVE ENERGY EFFICIENCY IN LARGE PANEL HOUSES DURING RECONSTRUCTION

Abstract: *This article examines methods for improving the energy efficiency of buildings when reconstructing residential buildings from large panels. The causes of energy loss in buildings and structures are also considered. The results obtained are compared with European countries and methods for improving energy efficiency are outlined.*

Key words: *buildings, large panels, reconstruction, energy efficiency, energy consumption, growth dynamics, housing construction, foreign methods, causes, methods of elimination.*

Introduction

In the years of independence, extensive work was carried out in the field of architecture and construction, as well as in all other fields, to improve the

infrastructure of the cities and villages of our country, and to raise the beautification works to a higher level.

Currently, buildings are being built according to outdated building codes and regulations, energy efficiency and energy conservation are neglected in the design and construction of buildings, and this process is contributing to excessive energy consumption and the total volume of toxic gases being released into the air across the country.

By 2030, taking into account the task of halving the energy capacity of the gross domestic product compared to 2017, there is a need to set clear target parameters for reducing energy consumption for enterprises and organizations.

Conducted Research

- Determination of temperature-humidity characteristics of the internal environment of residential buildings operated in the city of Jizzakh;

- to study the effect of microcracks in the wall and cracks in the seams between the walls on the thermal and technical properties of the external barrier;

- Design of rational thermal renovation of the outer walls of residential buildings in operation in the city of Jizzakh;

- development of recommendations on the organization of thermal protection of the external walls of residential buildings in long-term operation.

The doubling of energy consumption in the world in the last 30 years [1] proves how high the demand for fuel energy resources will be in the near future. Therefore, the issue of energy saving is one of the urgent problems due to the increase in the amount of energy consumed in the world in such sharp pictures.

According to the information of the International Energy Agency and the Center for Economic Research, the population, gross domestic product, etc. taking into account the growth, the amount of energy consumed in Uzbekistan by 2030 will be from 60 million t.n.e. to 150 million t.n.e. can increase. Taking into account the sharply continental climate of Uzbekistan (dry-hot in summer

and cold in winter), cooling in summer and heating in winter alone lead to energy consumption of 24.5 million tons of oil equivalent (mln.t.n.e.) in 1 year.

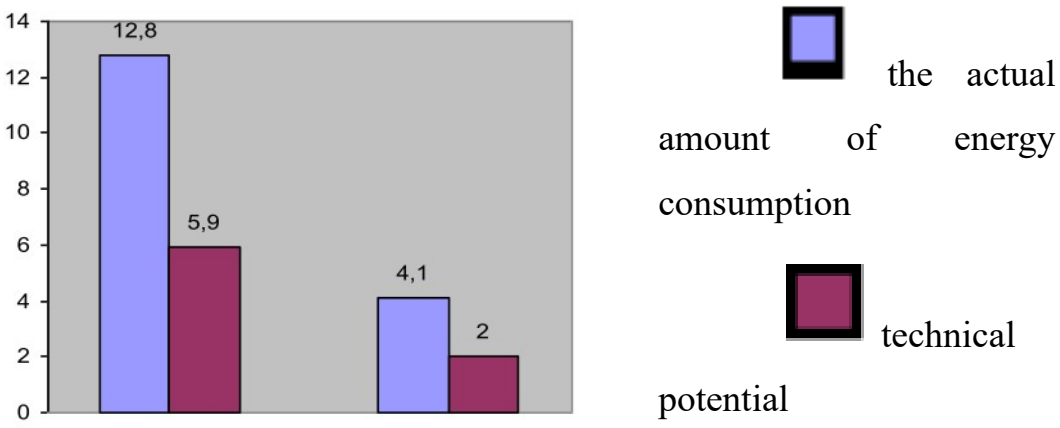


Figure 1.1. Energy saving potential of civil buildings (mln.t.n.e.)

The main opportunities for energy saving in Uzbekistan are related to the field of operation of civil buildings, and a large amount of energy consumption falls on residential buildings with insufficient external thermal insulation. According to experts, it is possible to save more energy in the housing stock than in public buildings by applying energy-saving measures (Figure 1.1).

Due to the aging of residential buildings and engineering networks in Uzbekistan, the relative amount of energy consumed in these buildings is 390 kWh per 1 m² per year, while in the countries of the European Union this figure is equal to 150 kWh (Figure 1.2).

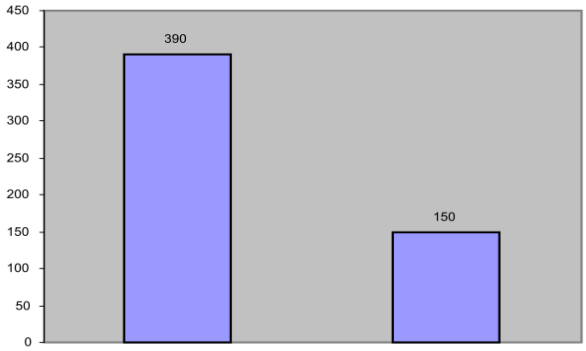


Figure 1.2. Relative energy consumption per year per 1 m² area (kWh/ m²)

Also, the normative value of the heat transfer coefficient given in the QMQ valid in Uzbekistan is considered low compared to the index in developed foreign countries (table 1.1).

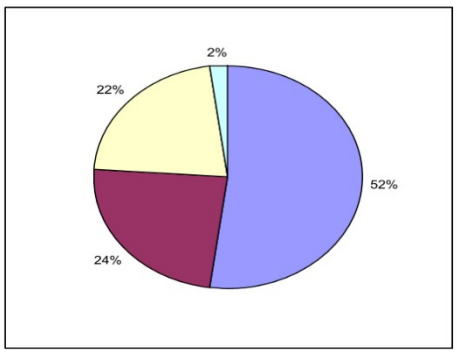
Table 1.1

Standard values of the heat transfer coefficient (W/(m 2 0S))

Name of States	For external walls	For attic roofing	For windows and doors
Germany	0,5	0,3	1,6
Finland	0,28	0,22	1,9
Belarus	0,5-0,4	0,33	2,0
Uzbekistan	0,71-0,45	0,6-0,4	2,56-2,38

The main reason for the above cases is that more than 90% of residential buildings in Uzbekistan were built 25 years ago and do not meet modern energy efficiency standards. As a result, on average, 35% of energy resources are lost through external walls, 25% through roof covering, and 10% through windows and doors, designed on the basis of technologies and standards that do not meet energy-saving requirements, and not constructed based on modern materials [2]. To prevent these losses, it is necessary to apply certain measures for designing and reconstructing residential buildings in an energy-efficient manner. According to experts in the field, the effectiveness of the measures used is presented in the diagram (Figure 1.3).

The diagram shows that it is possible to save more than 50% of energy only by improving the external thermal insulation coating of the building. Also, 22% can be saved by modernization of engineering networks, and 24% by using heat energy accounting system [2].



1. 52% due to thermal insulation;
2. 24% due to thermal energy accounting;
3. 22% due to the modernization of engineering networks;
4. 2% due to renewable sources.

Figure 1.3. Measures to ensure energy efficiency of civil buildings

It is necessary to follow the following main architectural and constructive principles of energy-efficient residential buildings [1]:

- optimization of the architectural-compositional form of the building;
- optimal placement of the building in relation to the setting of the sun;
- increase the thermal resistance of the external barrier structure of the building;
- increasing the thermal resistance of light-transmitting structures, which are considered transparent structures of the building;
- improvement of ventilation structure in buildings, etc.

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