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IMPACT OF LOW-RISE BUILDING ROOF STRUCTURES ON BUILDING ENERGY EFFICIENCY

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Abstract: *The article analyzes the current state of problems arising in the design of roofs of low-rise buildings. For this purpose, various design concepts are considered, based on which roof structures are created. As one of the elements of the implementation mechanism of these plans, specific examples of energy-efficient roof design are given.*

Key words: *energy-efficient, energy-saving, energy-saving roofs*

Energy saving is becoming one of the urgent issues from year to year. The limited energy resources, the high cost of energy, the negative impact of its production process on the environment, all this requires saving energy and finding a solution to the problem in the conditions of limited resources. In this direction, scientific and practical work is being carried out on the reduction of energy consumption in the world, effective use of new, alternative energy sources.

From November 4, 2016, the Paris Agreement on global climate change will enter into force, which aims to ensure that the average temperature of the planet Earth does not exceed 2ºC, move to the stage of carbon-free cities, and reduce CO2 emissions.

According to UN data, in 1950, 30 percent of the population lived in cities, and in 2015, this figure increased to 54 percent. Forecasts show that by 2050, 66-70 percent of the population will live in cities.

Currently, about 15,964 million (51%) of the population of Uzbekistan live in cities, and the remaining 15,612 million (49%) live in rural areas. According to the data, Tashkent is the leading city in terms of population among large cities in Uzbekistan, with 2 million people. 353 thousand people live there.

49% of all energy consumed in Uzbekistan in one year or 17 million tons of oil equivalent corresponds to the contribution of buildings.

Energy saving issues are neglected in the design and construction of buildings, which leads to excessive energy consumption.

It is known that the majority of our population, i.e. 76.8 percent, lives in low-rise houses. This means almost 24.6 million people. Unlike high-rise buildings, the heat energy system delivered to low-rise private residential buildings is decentralized, and the variety of design solutions leads to an increase in the factors affecting their energy consumption.

Rapidly growing urbanization processes, a sharp increase in the number of people in cities cause a shortage of construction land.

For this reason, today, many state and non-state design organizations offer to design a cozy and comfortable mansard floor at the stage of designing low-rise residential buildings. This is definitely an acceptable architectural-artistic solution. However, in the territory of our republic with dry heat and severe continental winter conditions, turning the attic part into a living room has the effect of increasing energy consumption several times.

Increasing the energy efficiency of the roof structures of low-rise buildings, reducing the energy consumption of the attic part, and in this direction, the thermal-physical solutions used in the conditions of Uzbekistan, the use of solar panels in this regard, and their economic efficiency have not been thoroughly studied.

In the design of modern low-rise residential buildings in dry hot climates due to the limited and increasing cost of traditional energy sources, especially during the period of operation, the energy efficiency issues of the attic roof structure, in which the economic efficiency indicator of solar energy solutions are carefully considered. requires learning.

By increasing the energy efficiency of the roof structure of a low-rise building, it is possible to increase the overall energy efficiency of the building and thereby save energy consumption.

To achieve the above goal, it is necessary to perform the following tasks:

- to study and analyze world experience in designing, constructing and using energy-efficient buildings;

- to study the effect of attic roof structures on the energy efficiency of the building and to choose design and construction solutions, to study and justify the technical and economic indicators of the selected materials;

- development of a mathematical model of the heat loss from the building in the initially constructed state of a low-rise residential building and calculation and analysis of heat loss for different conditions;

- comparing the energy consumption of the roof construction with the total energy consumption of the building and choosing appropriate solutions, evaluating their energy efficiency indicators, analyzing the results of mathematical calculations;

- choosing the proposed alternative solution for increasing the energy efficiency of the roof construction and calculating the annual energy consumption of the building, as well as comparing it with the previous annual indicators, justifying its economic efficiency, etc.

From a number of studies carried out in this direction, it became known that the main aspect in the energy efficiency of the roof is the location of the thermal insulation material. Incorrect selection of the mutual location of the layers of the roof structure has a direct impact on the non-reduction of heat loss, and requires alternative solutions for the temperature and humidity regime.

In 1983, Tashkent was the first in the former Soviet Union to achieve a reduction in energy consumption by 40-50% per year as a result of experimental experiments with a heating system using solar water heaters placed on the roof.

"Designing energy-efficient buildings under the conditions of Uzbekistan" covers the issues of energy saving in the design of social sector buildings and residential houses. Traditional and non-traditional energy sources, their use in the conditions of Uzbekistan, ways to increase the energy efficiency of buildings, the technical and economic basis of choosing their options, and the issues of energy saving and energy efficiency of buildings were separately investigated.

In the book "Fundamentals of physical and technical design in the design of buildings", the issues of energy saving in the design of buildings are covered in depth, climatological effects in the conditions of the Republic of Uzbekistan, ways to reduce them, the effect of seasonal changes on buildings or in the design of new buildings. Here are some points to note.

In conclusion, it can be said that creating comfort conditions on attic roofs in dry and hot climates, improving the technology of assembling building materials that make up the roof structure, implementing measures to reduce the energy consumption of structural elements of the building, and improving the energy efficiency of the roof structure and this way with increasing the general energy efficiency indicators of the building. This provides an opportunity to use new energy-efficient design and technological solutions in construction practice.

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