THE USE OF SOLAR ENERGY IN IMPROVING THE ENERGY EFFICIENCY OF A LOW-RISE RESIDENTIAL BUILDING

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Ushbu maqolada insolyatsion passiv quyoshli isitish tizimlarida ularning shaffof to'sig'ining pastki asosiga sharnirli biriktirilgan o'zgaruvchan yassi nur qaytargichni hisoblash va parametrlarini optimallash uslubini ishlab chiqish va passiv quyoshli isitish tizimini afzalliklari keltirilgan.

Kalit so'zlar: passiv quyoshli isitish tizimi, energiyasamarador bino, quyosh issiqlik energiyasi, passiv va aktiv isitish tizimlari.

Аннотация: В этой статье описывается разработка метода расчета и оптимизации параметров регулируемого плоского отражателя света, шарнирно прикрепленного к основанию нижней части их прозрачного барьера в инсоляционных пассивных солнечных системах отопления, а также преимущества пассивного солнечного отопления.

Ключевые слова: пассивная солнечная система отопления, энергоэффективное здание, солнечная тепловая энергия, пассивные и активные системы отопления.

Abstract: This article describes the development of a method for calculating and optimizing the parameters of an adjustable flat light reflector pivotally attached to the base of the lower part of their transparent barrier in insolation passive solar heating systems, as well as the advantages of passive solar heating.

Keywords: passive solar heating system, energy-efficient building, solar thermal energy, passive and Active Heating Systems.

Introduction. Passive solar design uses the principles of natural air and heat circulation to create a comfortable temperature inside the building. This is achieved through the use of factors such as the orientation of the building, the size of the windows, the thickness of the walls and roof, as well as the use of natural materials. In buildings designed with passive solar design in mind, orientation plays an important role. They should be oriented to the south in order to receive the maximum amount of sunlight. In addition, buildings must have the right size of windows to maximize the use of solar heat. The thickness of the walls and roof is also an important factor for passive solar design. They should be thick enough to keep warm in winter and cool in summer. Finally, using natural materials such as wood and stone can help keep the building warm and cool. # Passive solar heating and cooling Passive solar heating and cooling are used to maintain a comfortable temperature inside the building without using additional sources of heat and cold. In winter, passive solar heating can be used to heat rooms, and in summer - for cooling. Passive solar heating is based on the fact that solar heat penetrates through the windows and heats the air inside the building. This heated air rises and circulates through vents located at the top of the walls and roof. This creates a natural air circulation and maintains a comfortable temperature inside the building. Passive solar cooling is used in the summer to reduce the temperature inside the building. It is based on the fact that cool air enters the building through open windows and passes through ventilation ducts in the walls and roof. This creates a natural air circulation and maintains a comfortable temperature inside the building. # Passive Solar Energy Systems for Homes Passive solar energy systems for homes are used to generate electricity and hot water. They are based on the use of solar panels that convert solar energy into electrical energy. Solar panels can be installed on the roof of the building or on special racks.[1-2]

Methods of research. Passive solar design is a design strategy that maximizes the use of the sun's energy to heat and cool homes. Passive solar design is based on the principle of using the sun's energy to naturally heat and cool a building, without the need for mechanical heating or cooling systems. Passive solar design is a sustainable and cost-effective approach to building design, as it reduces a building's energy consumption, resulting in lower energy bills and reduced carbon emissions. Passive solar design offers a range of benefits, including reduced energy costs, improved comfort, and increased durability. By using the

sun's natural energy to heat and cool buildings, passive solar design reduces the need for mechanical systems, which are expensive to install and maintain. This means that homeowners can save money on energy costs while enjoying a more comfortable living space.[3]

Passive solar design also improves the durability of buildings. By reducing the reliance on mechanical systems, passive solar design reduces the wear and tear on these systems, which can extend their lifespan. Additionally, passive solar design often includes features such as shading devices and natural ventilation, which can protect buildings from the elements and reduce the risk of damage from weather events. Passive solar design works by taking advantage of the sun's natural energy. The design of the building is optimized to capture the sun's heat and light, and then distribute it throughout the living space. The key elements of passive solar design include orientation, insulation, glazing, and thermal mass.

Orientation is critical to passive solar design. The building is designed to maximize its exposure to the sun, with windows and other openings facing south in the northern hemisphere and north in the southern hemisphere. This allows the sun's rays to enter the building during the winter months, when the sun is lower in the sky, and be blocked during the summer months, when the sun is higher in the sky.

Insulation is also an important element of passive solar design. The building is designed to be well insulated, which reduces the loss of heat in the winter and the gain of heat in the summer. This helps to maintain a comfortable living space throughout the year.[4-5]

Glazing is another key element of passive solar design. The building is designed with large south-facing windows, which allow the sun's rays to enter the building and warm the living space. The windows are often double or triple glazed to ensure that heat is retained in the building.

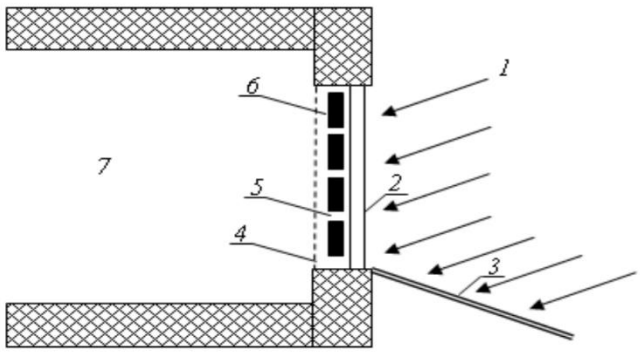
Thermal mass is the final element of passive solar design. This refers to the use of materials that can store heat, such as concrete, brick, or stone. These materials absorb the heat from the sun during the day and release it slowly into the living space at night, helping to maintain a comfortable temperature. The audit of energy spent on heating country houses using passive solar heating systems according to the current state was carried out for a residential building intended for construction on the territory of the Tashkent region. As a result, the demand for energy spent on heating this residential building in the winter season has significantly decreased. Most importantly, when the heating stove is turned off, the ham building will maintain the necessary level of comfort in itself for a long time, and there will be no demand for additional electric heaters. (Figure 1.)

Figure 1. Home project using passive solar heating system

A large number of researchers have only taken into account what orientation houses in such a system are located when calculating the heat regime. One of the main indicators of insolation passive solar heating systems is the thermal efficiency of the wall on which the beam falls. In insolation passive solar heating systems, the main purpose of applying sharnir-driven flat light reversers is to increase the surface density of the solar radiation current falling on the frontal surface of their transparent barriers. It is of practical importance to determine the optimal slope angle of the beam reversers of this type with respect to the horizon, depending on the current times of the year or the annual deviation of The Sun.[6]

Figure 2. The principle scheme of the insolation passive solar heating system with a short-term heat accumulator, embodied by a movable flat radiation reducer and internal heating equipment of the room.

1-sunlight; 2-transparent barrier with two layers; 3-movable glass beam reflector; 4-sliding barbell; 5-pulley; 6 - Heat jammer; 7-experimental heated room.



Passive solar energy examples include a range of technologies that allow homeowners to harness the sun's energy for heating and cooling. These include solar water heaters, solar air heaters, and solar chimneys. Solar water heaters use the sun's energy to heat water, which can be used for domestic hot water or space heating. Solar air heaters use the sun's energy to warm air, which can be used to heat the living space. Solar chimneys use the natural movement of air to create a flow of warm air that can be used to heat the living space. Passive solar energy systems for homes are an effective way to reduce a home's energy consumption and carbon footprint. Passive solar energy systems for homes utilize the sun's energy to provide electricity and hot water, without the need for mechanical systems.

Passive solar energy systems for homes can include solar panels and solar water heaters. Solar panels convert the sun's energy into electricity, which can be used to power a home's electrical systems. Solar water heaters use the sun's energy to heat water, which can be used for hot water and space heating. Passive solar energy systems for homes are a sustainable and cost-effective way to reduce a home's energy consumption and carbon footprint. In addition to reducing energy bills, passive solar energy systems for homes can also increase the value of a home.

Buildings designed to partially heat rooms by passive solar heating rely on the sun's energy to warm the living space, with minimal additional heating required. These buildings are designed to optimize their exposure to the sun, with windows and other openings facing south in the northern hemisphere and north in the southern hemisphere.

Conclusion. Passive solar design is an effective way to reduce energy consumption and save on energy costs. By harnessing the sun's natural energy, passive solar design reduces the need for mechanical systems, which are expensive to install and maintain. Passive solar design also improves the durability of buildings, reduces the risk of damage from weather events, and creates a more comfortable living space. With the use of passive solar energy systems for homes, homeowners can further reduce their energy consumption and save on energy costs.

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