АРХІТЕКТУРА І МІСТОБУДУВАННЯ, ДИЗАЙН І ОБРАЗОТВОРЧЕ МИСТЕЦТВО

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OPTIMIZING FUNCTIONALITY IN AUTONOMOUS MOBILE HOMES: A FOCUS ON INTELLIGENT SYSTEMS

Kushnir I.[1], Student
Sientific supervisor: **Volkova V.[2]**, *Dr. Sc. (Tech.), Prof.;*
Language consultant: **Shashkina N.**, *Cand. Sc. (Philol.), Assos.Prof.*
Prydniprovska State Academy of Civil Engineering and Architecture
[1] Kushnir27@gmail.com; [2]drvev09@gmail.com

Housing has been one of the most important and acute problems since ancient times. The shortage of new residential buildings and the lack of time for long-term capital construction influence the proposition on the construction market. New requirements for the mobility of buildings have arisen, and energy supply and autonomy of residential buildings have also become a pressing issue, especially in places with destroyed infrastructure or remote recreational locations. Today, it can be noted that in construction technologies, the scope of use not only capital buildings and structures, but also quickly assembled and mobile structures is expanding.

The active development of the types and assortment of mobile housing, along with the change in the social and professional composition of consumers, is associated with the period of industrialization, the development of scientific and technical progress, and the need for a more mobile lifestyle [1]. Mobile homes have become affordable housing in many countries. In modern conditions, the concept of integrated environmental and energy-efficient assessment (landscape and urban planning environmental approach, building materials, projected operation of buildings, etc.) is embodied in architectural and construction activities throughout the world [3].

The optimal sets of technologies for managing a mobile home to ensure its maximum autonomy have to be determined. Important technical and economic parameters will speed and low cost of manufacturing the house. The building should be ergonomic and have an aesthetic appearance. It is necessary to achieve autonomy and implement the philosophy of a “smart digital house”. A list of important functional characteristics of mobile autonomous buildings, which satisfies the needs for intelligent control, but at the same time ensure the optimal cost of the building should be formed

Sets of functional characteristics will be investigated of mobile autonomous houses, which ensures their comfortable and safe used. In particular, the characteristics that apply to such systems as development of a life support system that guarantees autonomous water supply, drainage, heating, ventilation, and power supply; development of a security system that protects the house against fire, burglary, and other dangers; development of an information technology system that ensures comfortable use of the house and its management should be worked out.

The latest approaches to the formation of sets of functional characteristics and technologies for the construction of mobile autonomous houses will allow to creat new types of houses that will be more comfortable, safe, and economical to use.

This information can be used to develop new standards and specifications for mobile autonomous homes. It can also be useful for manufacturers and consumers of mobile autonomous homes.

The focus on the use of innovative technologies within the framework should be used to identify the life support technologies, that allow benefits for the building owner. The use of renewable energy sources, such as solar panels and wind turbines, allows for the power supply of a mobile autonomous house. Innovative water supply and drainage systems make it possible to reduce water consumption and increase the efficiency of its use. Sensors for monitoring energy consumption, water supply, temperature, humidity, and air quality are used to intelligently manage energy use. An optimal heating and air conditioning system will ensure smart use of resources and independence from external factors [5].

A home ecosystem should be created, that must include three types of devices for intelligent building management. A hub (also called a controller, a central unit, a bridge, a gateway, etc.) is a device that combines all the elements of an autonomous house into a single unit and allows you to control remotely the operation of the system, including from anywhere in the world through the Internet. Sensors are components that provide the ecosystem with information about external conditions, including air temperature, the presence of movement or smoke, light levels, and airtight closing of windows and doors. Executive devices (actuators) will be the most numerous groups of devices, which will be responsible for the execution of various commands and control of specific home appliances. Actuators include smart sockets, switches and dimmers, valves for pipes, various relays, climate controllers, and others.

New types of houses can be developed using innovative technologies. Such houses will be more comfortable, safe, and economical to use, as well as to meet the challenge of modern times - the need for mobility combined with comfort.

Determining the optimal combination of the latest smart technologies in the field of intelligent management of buildings (intelligent management, building ecosystem) and their integration into a ready-made module will help to form a serial product with a set of necessary characteristics that will satisfy such modern needs of the population of Ukraine in the context of housing, such as speed of construction, mobility of the building and owners, autonomy of the building and reduction of construction costs.

References

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