

USE OF INNOVATIVE CONSTRUCTION TECHNOLOGIES IN DESIGNING PHTHISIAITRIA AND PULMONOLOGY HOSPITALS IN UZBEKISTAN

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Annotation. The article describes the basic principles for the application of innovative technologies in the design of hospitals for tuberculosis and pulmonology. The design of such facilities requires an integrated approach and takes into account many aspects of design and construction. The use of latest construction technologies in the design of hospitals for tuberculosis and pulmonology will allow a deeper study of theoretical and practical issues, as well as putting all these technologies into practice. All this will help to form a new model of a network of specialized hospitals for pulmonology. The introduction of modern technologies, and innovative developments is necessary for the integrated solution of problems in the construction of hospitals, as well as for the further development of hospital networks of phthisiology and pulmonology.

Key words: The network of hospitals for phthisiology and pulmonology; hospital; tuberculosis; hospitals; innovative construction technologies; environmental friendliness; nanotechnology; eco technologies; solar panels; comprehensive prevention; photovoltaic glass; concretes of various densities; medical institutions; model of a network of specialized hospitals; respiratory diseases.

Annotatsiya. Maqolada sil va pulmonologiya kasalxonalarini loyihalashda innovatsion texnologiyalarni qo'llashning asosiy printsiplari bayon qilingan. Bunday inshootlarning dizayni kompleks yondashuvni talab qiladi va dizayn va qurilishning ko'p jihatlarini hisobga oladi. Sil va pulmonologiya kasalxonalarini loyihalashda zamonaviy innovatsion qurilish texnologiyalaridan foydalanish nazariy va amaliy masalalarni chuqur o'rganishga, shuningdek, ushbu texnologiyalarning barchasini hayotga tatbiq etishga imkon beradi. Bularning barchasi sil va pulmonologiya bo'yicha ixtisoslashgan kasalxonalar tarmog'ining yangi modelini shakllantirishga yordam beradi. Zamonaviy texnologiyalarni, innovatsion ishlanmalarni joriy etish kasalxonalar qurilishidagi muammolarni kompleks hal qilish, shuningdek, ftiziatriya va pulmonologiya kasalxonalar tarmog'ini yanada rivojlantirish uchun zarurdir.

Kalit so'zlar. Ftiziatriya va pulmonologiya kasalxonalarini tarmog'i; kasalxona; sil kasalligi; kasalxonalar; innovatsion qurilish texnologiyalari; ekologik

toza; nanoSIM texnologiyasi; ekologik texnologiyalar; quyosh panellari; kompleks profilaktika; fotoelektrik shisha; har xil zichlikdagi betonlar; tibbiyot muassasalari; ixtisoslashtirilgan shifoxonalar tarmog'ining modeli; nafas olish yo'llari kasalliklari.

Аннотация. В статье изложены основные принципы применения инновационных технологий при проектировании больниц для туберкулеза и пульмонологии. Проектирование таких объектов требует комплексного подхода и учитывает многие аспекты проектирования и строительства. Использование современных инновационных строительных технологий при проектировании больниц для туберкулеза и пульмонологии позволит глубже изучить теоретические и практические вопросы, а также применить все эти технологии на практике. Все это поможет сформировать новую модель сети специализированных противотуберкулезных и пульмонологических больниц.

Ключевые слова. Сеть больниц фтизиатрии и пульмонологии; больница; туберкулез; больницы; инновационные строительные технологии; экологичность; нано технологии; эко технологии; солнечные батареи; комплексная профилактика; фотогальваническое стекло; бетоны различной плотности; лечебно профилактические учреждения; модель сети специализированных больниц; заболевания органов дыхания.

Introduction

In the constantly changing world of the 21st century, a modern network of phthiology and pulmonology hospitals serves as the basis for the comprehensive prevention of tuberculosis and lung diseases both in Uzbekistan and worldwide. As a rule, the network of medical and prophylactic institutions, which are aimed at treating tuberculosis, is a multi-level system of functionally related institutions located in a specific territory. Unfortunately, sometimes in the majority of countries this system seems fragmented and outdated.

In Uzbekistan, this network was formed, mainly in the second half of the 20th century and since then, it has remained practically unchanged. It should be mentioned that progress in the treatment of tuberculosis and other pulmonary diseases does not stand still. Many innovative medical technologies, which require the construction of modern hospitals for phthiology and pulmonology have been developed over several decades. In fact, as well as in major types of medical care system of hospitals, one of the most important issues of modern tuberculosis hospitals is the release of innovative construction technologies and, certainly, the development of new modern hospitals for phthiology and pulmonology is connected with modern design and construction technologies.

The total volume of preventive medical institutions, depending on the size of the population to be served, indicators that are for needs of various types, the capacity and the types of medical care determine the territorial planning level of a network. The hospital is one of the main structural units of any network of hospitals, including anti-tuberculosis one.

The treatment of tuberculosis patients with pulmonary diseases is a rather complicated and long process. Today, when almost everywhere in the world, there

is an unfavorable ecological situation, the statistics of morbidity are growing everywhere.

An important aspect in the treatment of this serious illness is the prevention of the spread of tuberculosis or other lung diseases. The introduction of new technologies, both in the treatment of the illness and in the design of the treatment system itself is the main driving force behind the process. Modern medical technologies are mostly aimed at the improvement of the treatment and stay of the patient in hospital. Now many tuberculosis hospitals are being built according to outdated projects that do not meet modern requirements.

It is obvious that as a result of innovative solutions in the construction sector, a new model of a network of specialized hospitals for phthisiology and pulmonology can be formed. The introduction of new technologies, and innovative developments is necessary to reform the general network of phthisiatric hospitals.

According to the decree of the President of the Republic of Uzbekistan No PP-4191: "On measures to improve the system of providing specialized phthisiatric and pulmonological care" dated February 13, 2019 [1], measures to counter the spread of tuberculosis and nonspecific lung diseases in 2019-2021 were approved.

The set of the measurements is targeted at carrying out continuous analysis and monitoring of the existing epidemiological situation, and also contributes to the prevention of tuberculosis and different lung diseases through the implementation of innovative methods. [1]

In this regard, an active introduction of modern construction technologies is needed, which in turn determines an entire range of creative ideas based on such factors as environmental friendliness, aesthetics, durability and many others. Also, it is essential to tackle these problems from the point of view of the major criteria influencing the approach of applying inventive technologies in the structure of tuberculosis hospitals. All the construction technologies which are being introduced should be considered in conjunction with certain criteria. The most important of which are the ones that determine the use of sustainable, environmentally friendly, energy efficient and hypoallergenic technologies.

In Uzbekistan, such criteria as seismic and related constructive solutions of buildings come to the fore. Additionally, in such specialized institutions, issues of the fire safety and fire resistance of buildings should be resolved.

Regarding these two aspects, innovation, probably, plays the key role. One or more criteria must be met by the innovative building technologies and materials used in the design and construction of tuberculosis and pulmonary hospital network. Additionally, inventive technologies should make the construction process easier and faster, as well as reducing the cost of construction, and significantly increasing the energy efficiency and environmental friendliness of the facility.

In the design process, a set of tasks covers the use of modern technologies and materials, the development of new design methods and the subsequent construction of tuberculosis and pulmonary hospitals based on the above principles. The introduction of modern technologies is the key factor in the process of reform of the general network of hospitals for phthisiology and pulmonology.

Such technologies, developed in the form of innovative projects, are designed to enhance the organization of the hospital network. Architectural organizations of phthisiology and pulmonological medical institutions should be interconnected with innovative technologies that significantly increase the quality and quantitative indicators of the building maintenance. Modern science has invented many unique technologies and materials which can be successfully used in the design and construction of networks of tuberculosis hospitals.

It should be noted that it is important to apply not only construction technologies, but also those that are successfully used in other spheres of activity. The introduction of such technologies in construction will reduce the cost of construction, improve work performance and the operational characteristics of hospital premises, and increase their energy efficiency. Which of the technologies is the most expedient to introduce in order to improve the quality of service in phthisiatric hospitals?

As time has witnessed, the most productive technologies in terms of their application in the design and construction of hospitals are nanotechnologies and eco-technologies. Nanotechnologies are included in all new types of building materials, including various types of concrete. In addition, other types of technologies and materials, shall we say, not from the field of construction, can be successfully applied in construction.

Let us consider some of the technologies that were previously used in other fields of science, but are still successfully applied in the construction of tuberculosis hospitals. For example, an innovative material is carbon fiber, which is a material consisting of thin filaments with a diameter of 5 to 15 microns, formed mainly by carbon atoms. Carbon fibers are characterized by high tensile force, low specific gravity, and chemical inertness. This material undoubtedly fits the definition of an innovative eco technology, since it is one of the best thermal insulation materials. In general, it significantly saves energy resources for heating buildings.[8]

In addition, the so-called “nano concrete” can be used in construction. This is, in fact, concrete with nano particles of polycarbonate, silicon oxide, carbon nanotubes or titanium dioxide fibers. This material has improved characteristics and can be successfully used in conjunction with composite rebar.

Composite rebar consists of non-metallic rods made of glass, basalt, and carbon fibers, impregnated with a thermosetting or thermoplastic polymer binder. [3] The rebar made from glass fibers is called fiberglass, from basalt fibers - basalt plastic, from carbon fibers - carbon fiber. For adhesion to concrete, special ribs are formed on the surface of the composite rebar during the production process or a sand coating is applied. [3]

Another technology that is more appropriate for the definition of eco technology is the use of solar cells [8] based on photovoltaic glass [7]. Solar panels enable the production of energy for life and activity. Photovoltaic glass uses a technology that converts light into electricity. Specific glass technology converts sunlight into electricity. To do this, the glass uses transparent semiconductor

photovoltaic cells, also known as solar cells, whose cells are sandwiched between two sheets of glass.

Photovoltaic glass [7] is not completely transparent, but allows some light to pass through. A photovoltaic system uses solar panels, each of which contains many solar batteries that generate electrical energy. And again, returning to high technologies in the field of construction, it should be noted that in the seismic conditions of Uzbekistan, the priority direction is the use of new structures and technologies that can repeatedly withstand natural and man-made phenomena caused by earthquakes. The methods of passive and active self-isolation can be considered as innovative technologies for protecting buildings from seismic effects.

These technologies are mostly focused on saving energy resources through the use of renewable energy sources. In addition to these technologies, other technologies that have proven themselves excellent in other areas can also be used. These include wind turbines, piezoelectric elements, and many new high-tech construction materials. Why is it necessary to use such technologies? Because, at the present stage of development, the approaches and solutions to medicine and hospitals in general have definitely changed. The conditions for the existence of such institutions have changed, which in turn changes the concept of design and construction of specialized hospitals.

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