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MODERN METHODS OF INCREASING THE FIRE RESISTANCE OF BUILDING MATERIALS

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ABSTRACT: - This research paper expresses opinions on the further deepening of economic reforms and the rapid development of a network in the building materials industry, special attention is paid to the production of new modern building materials, structures and products, modern methods for improving the fire resistance of building materials. Limiting the use of combustible materials reduces the likelihood of fire safety impact on people; from the practice of numerous experiments, it is known that hardly combustible and even non-combustible materials decompose under fire conditions with the release of smoke and toxic products. As the fire intensifies, the combustion of these materials intensifies, the flame spreads over the surface and generates additional heat, that is, the material acquires the properties of "non-combustible" and "slow-burning", and the disadvantages of the traditional standardization system must be justified from an economic or technological point of view.

KEYWORDS: Building materials, products, industry, cement, asbestos-cement slate, asbestos-cement pipes, wall materials (brick), lime, gypsum, window glass, soft covering materials, natural stone.

INTRODUCTION

At present, in the building materials industry, special attention is paid to deepening economic reforms and the rapid development of the network, the production of new modern building materials, structures and products. Expansion of the types of manufactured building materials, an increase in the share of production of modern, convenient and high-quality products based on a localization program and, in turn, a decrease in the share of imports, further development of the industry, and improving the quality of training specialists in this direction is one of the main issues of our time [1-3].

It is known that the building materials industry is an industry that produces building materials for the construction sectors of housing, industry, agriculture, etc. This field includes several sectors. Including cement, asbestos-cement slate, asbestos-cement pipes, wall materials (brick), lime, gypsum, window glass, soft facing materials, natural stone facing materials, ceramic (ceramic) tiles for decoration and floors, heating radiators and convectors, porcelain - faience sanitary construction products, linoleum, prefabricated reinforced concrete structures and parts, non-ferrous building materials (crushed stone, crushed stone, sand, gravel, sand and gravel mixture) are the main products of the building materials industry.

Currently, the demand for energy-efficient, cost-effective materials and products is increasing in the construction industry around the world. At the same time, building materials made from agricultural waste, firstly, save energy in the process of their production, and secondly, due to the use of agricultural waste, its cost is also partially reduced. At the same time, the use of secondary breeds for the rational use of depleted resources is a topical issue today. Comprehensive reforms that are being consistently implemented in all spheres of our country's life, I think, do not leave a single citizen unattended. Today, our country is implementing comprehensive measures aimed at building a legal democratic state, a strong civil society, developing an economy based on free market relations and the priority of private property, and creating conditions for a peaceful and prosperous life of the people. and take a worthy place of Uzbekistan in the international arena.

The use of production waste and secondary resources in the production of building materials and products allows us to solve the following urgent problems.

- solves the issues of ecological cleanliness, ecological system, reduces land use;
- saves energy sources and dramatically reduces consumption costs.

The process of using industrial and agricultural secondary resources in the production of building materials leads to the saving of a large amount of energy and stocks of raw materials. It is necessary to fulfill environmental, economic and technical requirements for the use of secondary resources. For this reason, the issues of classification according to their composition, degree of extraction, and ecological cleanliness are considered relevant.

Outside, it is affected by solar radiation, precipitation, changes in temperature and humidity, noise, and from the inside - heat flows, water vapor, noise. Therefore, when creating a building project, it is necessary to pay great attention to the choice of the location of the walls, their design scheme and type. In addition, it must be durable, stable, spatially homogeneous, correspond to the level of fire resistance corresponding to the class of the building, provide a certain temperature and humidity conditions in the room, provide sufficient sound insulation, be

technological and industrial in terms of installation. , be economical and cheap, and spend little effort on its construction. must comply with architectural requirements. As we all know, building structures form the basis of buildings and structures. In turn, the structures are made from building materials.

Today, at a time when humanity is making unprecedented progress in all areas, the construction industry is also developing radically. Including, thousands of types of building materials are open and serve humanity today.

At present, new modern materials are used in the construction of all components of buildings and structures [4-5]. The development of wall insulation materials and energy efficiency in recent years, environmental protection, new wall materials, especially new wall insulation materials, the production capacity is 20% per year. Traditional high-energy building materials are gradually being replaced by new building materials. Energy-saving insulation materials offer excellent development opportunities.

Many countries of the world are dealing with the problems of thermal protection of residential buildings and energy efficiency in the housing stock. As a result of the implementation of measures for energy saving and thermal protection, the relative consumption of energy consumed in the housing stock in industrialized countries has decreased by 2 or more times over the past 10 years. One of the most decisive directions in solving this issue was to increase the resistance to heat transfer of the outer walls and windows of residential buildings. In technically developed countries, most wall structures are made multilayer. Multi-layer external walls with efficient heating in the total volume of large-panel walls:

In Norway - 100%, in Hungary - 95%, in Finland - 94%, in Romania - 91%, in the UK - 75%. At the same time, this figure was 5-10% in the CIS countries until about 2000. Various technical solutions are proposed based on the creation of multilayer structures with sufficient heat-shielding and operational qualities to meet the energy saving requirements of the external enclosing structures of existing and newly built buildings.

METHODS OF RESEARCH

The main process of fire protection is to ensure the safety of people in the event of a fire and achieve minimal losses. But in practice, such materials are used that threaten the life and health of people, increase the development of a fire and increase the loss of materials. At the same time, fireproof materials are used in construction - concrete, reinforced concrete, natural and artificial stone materials, as well as polymer-based materials with high fire safety. The use of plastics is justified from an economic point of view. In addition, plastics have decorative, technological and other positive properties. These factors encourage design and construction organizations to ignore the understudied fire properties of these materials. Ignoring these factors leads to unfavourable fire statistics. Separately, it should be noted that the widespread use of expanded polystyrene, polyurethane foam and other polymeric heat-insulating materials in enclosing structures is a negative consequence on a scale of all countries. The production and use of plastics is growing from year to year in all countries, and the number of fires is slowly decreasing. The large-scale use of plastics is compensated by complex fire prevention measures, in which the presence of a fire control system is of the greatest importance. For many years, all fire safety standards for the safe use of materials in construction have been collected in our republic, and fire safety standards for a single

high-quality material - combustibility groups and restrictions on the area of partial use or "combustible" material were adopted. Such a system of fire assessment is outdated and fundamentally flawed. The first drawback is non-compliance with fire safety. Fire statistics show that up to 70-84% of people die in fire conditions as a result of the combined action of smoke and toxic gases, that is, as a result of the factors provided for by regulatory enactments.

Limiting the use of combustible materials reduces the likelihood of human exposure to fire safety. From the practice of numerous experiments, it is known that slow-burning and even non-combustible materials decompose under fire conditions with the release of smoke and toxic products. As the fire intensifies, the combustion of these materials intensifies, the flame spreads over the surface and releases additional heat, that is, the material acquires properties that have the concept of "non-combustible" and "slow-combustible". The disadvantage of the traditional standardization system is that it is not economically and technologically justified.

The third drawback is the impossibility of using mathematical modelling of the occurrence and development of a fire from the combustibility group. The physical meaning of the concept of "combustibility group" has a dubious practical meaning. Despite the fact that a large “data bank” has been collected on the combustibility group of materials, this information is not published or used anywhere.

In 2004, the normative document ShNK 2.01.02-04 "Fire safety of buildings and structures" was issued. Along with the combustibility group, 2 fire safety indicators of building materials are included - the smoke generation coefficient and the toxicity index of combustible products. But for many years, the numerical value of these indicators was not regulated by the KMK chapters related to the network. In addition, in the fire safety indicator for the classification of materials, 2 more indicators have been newly created, i.e. the combustibility group and the surface combustibility group.

Since the 1960s, the first publications based on a new approach to assessing the fire safety of materials (primarily polymer-based materials) have appeared abroad. The impetus for this was the production of new materials and the development of new industries.

By the 1970s, it was ensured that scientific developments in this direction would be carried out in our country as well. Based on the methodology for assessing the fire safety of materials, it is necessary to learn how to monitor the real fire situation at a particular facility where this material is used. To do this, it is necessary to determine the fire safety of materials, which can be compared with the possible energy impact on the material; combustion energy, temperature of self-ignition, ignition and combustion of materials, i.e. ambient temperature according to these indicators, the temperature of the heated surface can be compared with the energy of the lightning charge.

From the developed measures of this concept, it is known that this method is self-explanatory. When a material, especially a polymer, is used on a large scale, it does not increase the possibility of ensuring safety conditions in practice. In the future, related work continued to expand, such as the above parameters, a list of hazardous factors that characterize the dynamics of fire development and affect people. At present, this concept is being successfully developed by specialists from different countries and tends to introduce major changes in the fire research methodology.

As a result of the development in the United States of two large programs "Textile" and "Plastic", a data bank was compiled, which contains information on the fire characteristics of several thousand substances and materials used. The indicators include: low calorific value, oxygen index, smoke formation index and toxicity of combustion products. The information available is computerized and the information can be accessed by the fire department or other organizations at any time via the Internet.

It can be seen that the increase in the number of fires, deaths of people and the increase in material damage in subsequent years is not only an increase in the number of fire loads in the building, but also the current level of fire protection. does not correspond to the scientific and technical development of construction. Therefore, the greatest attention is currently paid to scientifically based fire safety standards. Gradually they are abandoning unified solutions and instructions, they are moving to standardized necessary information that easily solves the specific fire safety tasks of the facility being designed. To this end, the basic principle of fire regulation is to ensure the safety of people in fire conditions based on targeted processes.

In addition, the development of fire regulations is carried out for the following purposes:

- The maximum required level of fire safety in construction;
- providing the design process by creating a choice for the designer with a wide range of alternative solutions;
- enable a quantitative analysis of the fire safety of objects.

Currently, work is underway to create a comprehensive methodology for assessing the level of fire safety of a building, taking into account the likelihood of fire, evacuation time, smoke density, toxicity of combustible products, the physical ability of people, fire safety indicators and the amount of materials in the fire load.

The numerical value of such factors includes conditional coefficients established as a result of the analysis of statistical data. The National Bureau of Standards has determined that the most effective methods for assessing the fire safety of buildings are the rate of fire and the duration of evacuation of people from the building. Here it is necessary to take into account not only constructive and dimension-planning solutions, but also organizational measures of engineering and technical protection against fire.

The basic fire rating process can also be applied to building materials. But the solution of the process is an unfinished stage of fire regulation, which is very general. Its specific application is characterized by the transition to the criteria for the fireproof use of materials in construction. Rationing of their use in terms of combustibility of materials and flame propagation speed is carried out in different countries by type of room, taking into account the type of material, the functional orientation of the room, the presence of fire engineering systems, the method of attaching materials to the structure, the direction of the structure.

The main disadvantage of this exposure is the need for precise control of the state of materials under fire conditions for buildings with different fire loads. At present, much attention is paid to the study of the dynamics of fire development and their forecasting using the methods of system analysis and probability theory.

The need for this type has a great influence on the development of a fire and the evacuation of people. The state of gypsum and gypsum concrete products during heating depends on

the state of the gypsum stone under the influence of temperature, as well as the type and amount of filler used. Gypsum and gypsum-fiber boards are non-combustible if they consist of 8% organic matter by weight, and more than 8% are slow-burning. According to the state of hardening gypsum stone during heating, the following conclusions can be drawn: elements of gypsum and gypsum concrete structures are considered to be highly fire resistant in terms of heating and low fire resistant in terms of bearing capacity. High fire resistance due to temperature is explained by the porosity of the composition, low fire resistance of load-bearing structures - by a rapid decrease in the strength of gypsum, which hardens due to dehydration. So, using gypsum as a binder, it is used for the manufacture of heat-insulating structural elements, metal and other structures used for fire protection. But we should not forget that at temperatures above 300 0C, cracks form in the surface layer of gypsum products, which lose their integrity and destroy the heat-insulating layer. Therefore, it is expedient to develop special requirements for the tight bonding of a heat-insulating product to the surfaces of structures.

The strength properties of ceramic materials and mineral alloys practically do not change under fire conditions. Their strength does not change at temperatures of 900-1300 0C, which is the calculated firing temperature of ceramic materials. For mineral alloys, the temperature range is close to their melting point. This temperature cannot be reached under fire conditions. The state of materials of this group in fire conditions depends on the fact that all processes occur as a result of the first heating, that is, at the temperature of their cooking, physical processes (temperature deformation and capillary moisture release) occur as a result of secondary heating. heating. Dense ceramic materials tend to disintegrate and lose their integrity as a result of rapid heating.

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