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EFFECTIVE LIGHTWEIGHT CONCRETE BASED ON POROUS AGGREGATES

Rizaev Bakhodir Shamsitdinovich
Professor of Namangan Institute of Engineering and Construction
12, I.Karimov street, Namangan district, 160103, Republic of Uzbekistan

Mamadaliyev Adkhamjon Tukhtamirzaevich
PhD of Namangan Institute of Engineering and Construction
12, I.Karimov street, Namangan district, 160103, Republic of Uzbekistan

ABSTRACT

This article discusses the experience of using lightweight aggregates Due to the difficulty of producing expensive aggregates, this problem makes us turn to the use of new types of porous aggregates on local raw materials and coal waste in lightweight concretes.

Keywords: Reinforced concrete structures, expanded clay, building materials, porous aggregates, expanded clay gravel, industrial waste, wall panels, slabs

The development of modern construction is directed towards reducing the mass of objects under construction, the production and use of effective building materials, which include porous aggregates and lightweight concrete based on them.

The use of lightweight concrete makes it possible to reduce the weight of reinforced concrete structures by 30-35%, enlarge building elements, improve thermal and acoustic performance, reduce transport and installation costs and reduce construction costs. So, for example, replacement of exterior brick walls with panels of lightweight concrete on porous aggregates can reduce their weight by 6-7 times and reduce the reduced costs by 15-20%.

The production of lightweight concrete in Central Asia, including Uzbekistan, is based almost exclusively on expanded clay gravel.

However, raw material resources for the production of expanded clay gravel are very limited and do not allow to fully provide the construction industry with the necessary volume of porous aggregates and, accordingly, lightweight concrete.

To solve this problem, it is necessary to develop research work aimed at finding more accessible and widespread raw materials and industrial waste for the production of artificial porous aggregates and lightweight concrete based on them,

studying their physical and technical properties, design features, reliability and durability.

An important direction of technical progress in construction is to reduce the mass of objects under construction through the production and use of efficient building materials, which include porous aggregates and lightweight concrete based on them. The use of lightweight concrete makes it possible to reduce the weight of products and building structures by up to 35%, steel consumption by 20%, and cement by 10%. At the same time, the dimensions of structures and spans of buildings and structures increase, thermal and acoustic characteristics improve, and resistance to dynamic and seismic effects increases.

In recent decades, a large number of studies have been carried out on the selection of the composition, the development of technological parameters for obtaining, the theory of strength, physical and technical properties and durability of lightweight concrete on porous aggregates. Among these studies, the dominant place is occupied by the following works:

I.N.Akhverdov, A.A.Arakelyan, G.A.Buzhevich, A.I.Vaganov, G.I.Gorchakov, Yu.P.Gorlov, V.G.Dovzhik, I.A.Ivanov, S. M. Itskovich, I.A. Kornev, Yu.E. Kornilovich, A.A. Kudryavtsev, Yu.D. Natsievskiy, N.A. Popov,
I.E. Putlyaeva, B.G. Skramtaeva, M.Z. Simonov, N.Ya. others.

To obtain effective lightweight concrete, high-quality porous aggregates are required. It is known that at present the largest share in the total volume of production of artificial porous aggregates is occupied by expanded clay (70-75%) . To obtain expanded clay, highly plastic and easily expandable clays are needed - bentonite, kaolin, monmorllionite and others.

However, the absence of the above clays in many regions does not allow obtaining the most common expanded clay.

Recently, as noted by many researchers, scientific work has been carried out to find the possibility of developing porous aggregates using various industrial wastes and local raw materials (ash gravel, aggloporite, quartzporite, camporite, etc.), which allow expanding the range of porous aggregates and reducing the cost of raw materials. and energy costs for their production.

Quite a lot of experience has been accumulated in the CIS and far abroad in the use of structural lightweight concrete on various porous aggregates. At the same time, the following types of products and structures are most widely used: wall panels, slabs, ceilings and coatings, as well as trusses, beams, vaults and others.

At present, the production of high-strength expanded clay is usually associated with increased requirements for raw materials for its manufacture or the search for new methods of production, which often complicate the technology and are not always economically justified. Therefore, this problem makes us turn to the use of new types of porous aggregates on local raw materials and coal mining waste in lightweight concrete. We believe that the use of this filler, which has a compressive strength in a cylinder of 2.5-3.0 MPa, an average bulk density of 730-750 kg / m3, which makes it possible to obtain lightweight concrete of classes B10-B30, is quite acceptable and can be applied in our republic.

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