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## CHEMICAL ADDITIVES IN MONOLITHIC CONSTRUCTION

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*Application of precast concrete construction gives more flexibility in a variety of architectural design projects under construction. Designing of objects in this case is carried out taking into account the actual operating loads, which allows us to differentiate the class of concrete reinforcement and height of the building. But to continuous use subject to stringent requirements for concrete mixes, the properties of which can be controlled by inputting various chemical additives.*

Today the main material for the construction of high-rise buildings is a reinforced concrete. The potential of reinforced concrete as an excellent structural material allowing to build bright buildings with sophisticated architecture, not used to the full.

Over the years the way of constructing buildings using precast concrete could not compete with precast concrete on the two most important indicators - labor costs and construction time. An important problem is the management and the concrete work on the construction site in winter. Now there are developments that give the opportunity to build solid houses with rates comparable to or even greater than, the use of precast concrete. Construction of monolithic concrete advisable for individual projects for buildings and complexes that perform the role of urban accents, the historic center, for buildings in the complex development of monolithic houses neighborhoods in cities and towns, as well as for the building of combined systems that provide a combination of monolithic structures with teams, brick and others. Possibilities of implementing complex plans depend on the structural formwork systems. Thanks to the advent of various formwork systems of the building, constructed in situ reinforced concrete, are becoming increasingly complex architectural outlines. One could argue that developed the formwork system can solve a variety of tasks.

Effective methods of curing concrete in winter conditions, allows to erect concrete and reinforced concrete structures in virtually all outdoor temperatures without compromising their quality.

Compared to the precast concrete monolithic concreting has several advantages. The advantages of this technology is the high pace of construction works. Designing of objects in this case is carried out taking into account the actual operating loads, which allows us to differentiate the class of concrete reinforcement and height of the building. No need for inserts and lifting lugs for mounting designs. This allows to reduce material of construction, in particular to reduce the consumption of concrete and metal. Preparation of concrete at the construction site to reduce transport costs to a minimum. The area does not include the building of special areas foreseen for equipment and storage of concrete products and is limited to the construction site. One of the advantages precast concrete is a good job on the dynamic and alternating loads.

However, reinforced concrete has its drawbacks. For a continuous supply and laying of concrete mix requires precision and highly skilled workers. Tough requirements apply to concrete mixes that, on the one hand, need to be easily moldable, and on the other - have a sufficiently rapid fixation patterns for rhythmic lifting sealed, light and mobile formwork. Mark used concrete, usually well below the factory due to the smaller capacity of improvement of production technology.

The main problems associated with the expansion of the construction of monolithic buildings can be classified:

- danger of technology cracks in the monolithic structures of temperature and shrinkage deformation of concrete in the process of curing, depending on the composition of the concrete, curing conditions and the size of plots concrete structures;
- a reliable estimate of the strength of hardening concrete at the time of stripping and transfer the load from the overlying elements in the design, in which the concrete has reached its design strength;

- the need to develop design rules to establish the permissible intermediate strength of the concrete removal and rearrangement of the formwork on the floors for different types monolithic structures (floors, walls, columns) in terms of fracture toughness and strength of structures during the construction of precast buildings, as well as inclusion in the plan of works measures to accelerate the curing of concrete;
- effective quality control of monolithic structures.

According to with the state program of innovation development of the Republic of Belarus in the construction industry planned to develop and implement high-speed technology of monolithic construction of buildings and structures by permanent formwork, use of energy-saving technologies, including heat recovery systems, the creation of new types of building materials and protective polymer coatings.

Terms of construction of monolithic reinforced concrete structures are limited to temperature and humidity conditions of the environment.

Feature winter concreting is primarily concerned with the transition of water into ice, and the termination of the hydration reaction of cement - the main process provides the desired strength of artificial stone. There are many obogrevnyh bezobogrevnyh and methods to ensure the safety of the liquid phase and allowing the concrete to gain strength at subzero temperatures. One of them, which does not require expensive energy, proven effective by many years of use - the use of antifreeze additives - antifreeze [1-3].

It is found that the cost of concrete works without heating with antifreeze additives compared to the cost of production in summer conditions is increased by 8-12 % in while using elektrik heating and steam heating at 20-40 %.

The degree of temperature reduction depends on the chemical composition and concentration of the additive solution from which the effect is enhanced by increasing. One of the most effective supplements does not cause corrosion of the reinforcement is potash (potassium carbonate), allowing to obtain a solution, which is the freezing temperature of minus 30 degrees.

Studies have shown that the introduction of additives potash causes an acceleration of setting time the mixture [3] and the formation of a relatively defect structure of artificial stone [2]. Additional introduction plasticizer SDB, as experiments have shown [3], helps to slow down the setting, the formation of a dense structure and, as a consequence, improve the durability and reduce the permeability of cement stone.

In the context of the summer concreting technology of concrete work should take into account the low humidity and high air temperature. The process of cement hydration accelerates dramatically reduces the viability of the concrete mix, a rapid loss of workability and its possible occurrence of deformation of cracks on the surface of concrete structures and coatings, reducing their performance properties and durability as a whole. In the latter case, the risk is amplified due to the large area of the evaporating surface of the roadway. The problem is solved by water evaporation cover concreted surfaces, for example, film material. Handling workability of concrete mix can be achieved by increasing the cement content at a constant  $w/c$  or by increasing the water flow at constant cement content. In the first embodiment, will increase the heat, shrink deformation, the second, due to the content of the "extra" water not participating in the hydration reaction, the porosity will increase, and consequently, lowering strength, frost resistance and waterproofness.

The use of additives superplasticizer, particularly C-3, which has been shown [1], provides a viable, highly mobile, cohesive concrete mixture without bleeding and loss of concrete strength in the normalized time - 28 days [2]. Introduction superplasticizer usually slows the setting and hardening of concrete during the initial period. The degree of effectiveness of superplasticizers concrete workability depends on the type of superplasticizer, its quantity, the time of input into the concrete mix - directly with the mixing water or to the second portion after premixing, water-cement ratio, the amount and type of filler and the ambient temperature. Superplasticizers are organic substances of colloidal size with a large number of polar groups in the chain, they provide hydrophilicity. Adsorbed on the surface of the cement additive promotes the formation of water of solvation shells around the cement grains causing decrease in the limiting shear stress dispersing repellent effect and as a consequence, increase the plasticity of the mixture and its deceleration setting [1].

Consequently, the use of chemical additives in a monolithic concreting solves these very important goals as reducing energy consumption and reducing costly components of cement and rebar.

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