

UDC 691

ADDITIVES TO CONCRETE

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Modern modified concrete, taking into account the set of ideas embedded in its structure, may be called the “philosopher’s stone” of building science, while the quintessence and tool for implementing these ideas are modifier additives. The use of modifier additives allows consciously controlling the processes of structure formation and creating concrete with a given functionality. Such artificial composites have high strength (more than 100 MPa), frost resistance (F400 and above), water resistance (W12 and above), high bio- and chemical resistance. The predicted life span of such concrete reaches 500 years [1]. Plasticizers of concrete mixtures began to be widely used in the 40–50s, and today they occupy a leading position among the chemical additives used in concrete technology. As plasticizing additives, surfactants are widely used. They are often obtained from secondary products and waste products of the chemical industry.

Complex additives combine several types of effects on the concrete mix. In addition, complex additives save concrete producers from searching for several different components to obtain the desired properties. After all, these components should work in the same mixture, without entering into any undesirable reactions with each other [2].

Most additives produced abroad are of complex action. However, the results of numerous studies conducted by special laboratories have shown that no matter how good the additive is, no matter how well it is advertised, no matter how well it has recommended itself in the west, this does not mean that it will show good results on our inert materials and cement. It should be borne in mind that the quality of cement and other concrete components is very high abroad. In particular, much attention is paid to the grain composition of crushed stone and even sand there. For example, in Germany, graded sand at a concrete production is divided into separate piles, and each consumer receives concrete with the grain composition that he/she ordered. This means that additives in such concrete will work 100 %.

The experience of manufacturers has shown that in some cases imported additives do not work well both with domestic types of cement and in combination with domestic additives. For example, some Swedish superplasticizers are incompatible with those domestic ones that provide concrete frost resistance. That is, having chosen one additive from a foreign company, as a rule, manufacturers have to use other additives from the same manufacturer. However, this is not profitable from an economic point of view, because there are analogues of domestic production that are much cheaper.

In our country, the range of modifiers proposed for use is quite extensive (the number of modifiers only included in the list of the building catalog CK-4 “Chemical additives for concrete and mortar” exceeds 80 items).

Various additives are used to adjust the properties of concrete, concrete mix and saving cement. They are divided into two types: chemical additives introduced into concrete in a small amount (0,1–2 % by weight of cement) and changing the properties of the concrete mixture and concrete in the right direction, and finely ground additives (5–20 % or more) used to save cement, obtain dense concrete at a low cost of cement and increase the resistance of concrete. The use of chemical additives is one of the most versatile, affordable and flexible ways to control concrete technology and adjust its properties. If earlier, individual chemical products and modified industrial waste were most widely used in construction in the form of additives, now additives specially prepared for concrete (superplasticizers, organo-mineral and others) predominate. Plans for the development of the construction industry involve a significant expansion of the production of concrete mixtures using effective additives and the use of new types of additives [1].

Conclusion. Thus, the use of additives from domestic manufacturers in construction, which are not inferior to imported analogues, and their cost is much less than similar imported ones, is relevant, and reduces the cost of producing ready-mixed concrete and structures, supports the economy.

References

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