THE USE OF MONOLITHIC REINFORCED CONCRETE STRUCTURES ON THE TERRITORY OF THE REPUBLIC OF UZBEKISTAN

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https://doi.org/10.5281/zenodo.7445906

Abstract. *This article presents the influence of various factors on the structural safety of monolithic reinforced concrete structures, as well as the results of experimental studies on the study of the properties of concrete of various strengths and the corresponding conclusions.*

Keywords*: deformation concrete, stress moisture, temperature, reinforced concrete, shrinkage.*

ПРИМЕНЕНИЕ МОНОЛИТНЫХ ЖЕЛЕЗОБЕТОННЫХ КОНСТРУКЦИЙ НА ТЕРРИТОРИИ РЕСПУБЛИКИ УЗБЕКИСТАН

Аннотация. *В данной статье представлены влияние различных факторов на конструктивную безопасность монолитных железобетонных конструкций, а также результаты экспериментальных исследований по изучению свойств бетонов различной прочности и соответствующие выводы.*

Ключевые слова: *деформация бетона, стрессовая влажность, температура, железобетон, усадка.*

INTRODUCTION

Until the end of the twentieth century, prefabricated reinforced concrete took the main place in the construction of buildings and structures on the territory of Uzbekistan. In 1998, the relevant decision of the Cabinet of Ministers of the Republic of Uzbekistan on the development of monolithic reinforced concrete was adopted. After that, along with prefabricated reinforced concrete, the application of monolithic reinforced concrete increased. The reason why prefabricated reinforced concrete was considered the main focus during the former Union was due to the climate.

RESEARCH MATERIALS AND METHODOLOGY

A cold climate is characteristic of a large area of the former Union. In some regions of Russia, winter lasts almost six months, and the application of prefabricated reinforced concrete is considered more effective[1] . Since all regulatory documents were developed in the center of the former Union, and the priority areas of research were also planned in the center, research was carried out mainly on prefabricated reinforced concrete. Research on monolithic reinforced concrete was carried out very little and was not enough to ensure the structural safety of

buildings. After Uzbekistan became an independent state, a sharp increase in the construction sector began, and the use of monolithic reinforced concrete increased more than ever. Hence, one of the urgent tasks is to develop recommendations and introduce them into practice by researching the strength-deformability properties of monolithic reinforced concrete structures.

One of the distinctive features of monolithic reinforced concrete is that the formation of their properties is carried out at construction objects, and not in factory conditions. The hardening conditions of concrete and reinforced concrete are not stable, it can have a positive or negative effect on the strength and deformability properties of concrete [3]. Therefore, the study of the influence of the conditions of hardening reinforced concrete structures on their load-bearing capacity is one of the urgent tasks. With the development of cities, multi-storey residential buildings began to appear. The growth of the city's population, the efficient use of the territory, the attempt to reduce urban communications caused the increase in the number of floors in apartment buildings and later in them. In the early days, high-rise residential buildings were restored to be load-bearing brick-walled, after the problems of industrializing construction appeared, it was decided to solve these problems with the help of prefabricated steel structures. Focusing on foreign experiments, it can be seen that in Great Britain and Germany, prefabricated reinforced concrete structures are practically not used, and in countries such as the United States and France, the share of prefabricated reinforced concrete does not even reach 40%, depending on the climatic conditions of each country, deciding the use of monolithic reinforced concrete. Before researching some of the disadvantages of prefabricated reinforced concrete, let's consider the amount of energy consumption using the following table (Table 1)

Table 1

The amount of energy spent on the preparation and installation of building materials

Material for the item	$1м^3$ учун сарфланадиган энергия (квт/соат)
Sand	89
Cement	223
Gravel	89
Water	2,2
Prefabricated reinforced concrete	2226
Monolithic concrete	488
Steel rolling	8740
Fittings	8736
Brick	986
Mixing	421
Window	3570
Aluminum structures	72243

Concrete blocks	311

RESULTS OF THE STUDY

Currently, the exploited residential buildings were built in the 70-80s of the last century, they have two different structural schemes: load-bearing walls for residential buildings are panel buildings of transverse orientation, as well as reinforced frame panels for public buildings. The wide application of prefabricated reinforced concrete would force the design depending on the item produced. The large energy consumption for prefabricated reinforced concrete, the implementation of project work depending on the size of the manufactured item, gradually led to the design of other structural schematic buildings. In connection with the transition of the construction industry to the private sector, a huge number of construction firms appeared, which, according to the order, began to restore buildings and structures on projects of various original structural solutions. In this regard, buildings in a constructive solution are currently being designed as follows:

-all load-bearing structures are made of monolithic reinforced concrete;

- vertical load-bearing structures from monolithic reinforced concrete;

- load-bearing carcass and orayopma from monolithic reinforced concrete.

The design and construction of buildings in such a constructive solution requires the study of the premises for Real conditions under which the premises will be kspluated. The theory of calculation of reinforced concrete structures in the construction Sciences is considered to be one of the well-developed sections. In modern mathematical models of calculation, the rheological properties of concrete, its anisotropy, nonlinear connection of deformation with voltage at short-term loads are taken into account. Although many studies have been carried out on the properties of iron concrete, destructive processes in concrete are not sufficiently taken into account. One of the founders of the physical theory of concrete strength is o.Ya. Berg. According to his research, when compression reaches a certain level, microdistricts are formed in concrete, and elementary microdistricts occur. The coincidence or convergence of many experimental studies carried out with theoretical values has shown that this theory can be applied. Research in the Twenty-First Century testifies that the strength of concrete increases under load.

To compare the properties of concrete in monolithic reinforced concrete structures with the properties of concrete in prefabricated reinforced concrete, experimental studies were carried out in the Laboratory of the Namangan reinforced concrete stock company. Experimental studies used cubic samples with sides of 15x15x15cm and 10x10x10cm. In their preparation, the metal was compacted using vibrators, using molds. Samples of the first category were heat treated with moisture in order to accelerate hardening. And the specimens of the second category were kept in natural conditions. Due to the fact that the first samples were prepared in the spring months, their hardening conditions became close to normal conditions. The samples were discharged from the mold after 7 days and stored in a wet OPIL until testing was carried out.

When choosing a concrete composition, attention was paid to the preparation of concrete of low strength (class B15-B20), medium strength (B25-B35) and high strength (B40 and above). The test results are presented in Table 2. The consistency of the samples was determined in 3, 7 and 28 days. In the early stages of the test, the strength of the heat treated concrete was higher, in 28 days, that is, when the concrete reached a draft consistency, the strength of the hardened concrete in natural conditions was higher.

Table 2

Changes in the composition of concrete in experimental samples and their strength

Project consistency	Solid state	Composition of 1m^3 concrete mix				C/Ц ratio	Compressive strength limit MPa (in different terms)		
		Water l	Cement кг	Sand kg	Flash kg		3 сут	7 сут	28 сут
1	2	3	4	5	6	7	8	9	10
Low consistency	Steamed treated	175-190	250-260	650-700	1255	0.68-0.76	21.2 - 21.6	11.3 - 33.7	16.3 - 47.9
	Natural	170-190	250-260	650-700	1255	0.69-0.76	-	20.4 - 34.2	22.4 - 38.3
At medium consistency	Steamed treated	160-165	450-500	450-490	1250-1500	0,32-0,37	32,0 - 34,20	33,2 - 43,8	49,5 - 64,2
	Natural	160-165	450-500	450-490	1250-1500	0,32-0,37		48,1 - 54,1	51,2 - 67,2
High strength	Steamed treated	140-150	500-550	520-570	1200-1350	0,28-0,30	407-645	58.0 - 83.6	70.8 - 93.2
	Natural	140-150	500-550	520-570	1200-1350	0,28-0,30	-	60.3 - 88.6	71.6 - 94.1

CONCLUSION

These studies were carried out in April, and in natural conditions, samples of mold were stored in the laboratory of the enterprise. Due to the fact that these conditions differed little from normal ones, the average strength of samples stored in natural conditions was more than that of heat-treated samples. Hence the strength of monolithic concrete and reinforced concrete is not less than that of prefabricated reinforced concrete, the advantages of monolithic reinforced concrete are even more pronounced, given the low energy consumption. From the results of a study in subsequent years, it is known that if monolithic reinforced concrete structures are made in the summer months, its strength and deformability properties are negatively affected by dry hot climates. But recommendations were developed to take this effect into account, taking into account the influence of climatic conditions on the structural safety of reinforced concrete

construction. In conclusion, it is worth noting that in the conditions of Uzbekistan, it is advisable to apply monolithic reinforced concrete structures more widely.

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