

**APPLICATION OF COMPOSITE MATERIALS IN REINFORCEMENT OF REINFORCED CONCRETE STRUCTURES**

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Abstract

During the years of independence, large-scale work is being carried out in Uzbekistan to develop the quality of construction and improve the achievement of economic efficiency. The consistent implementation of important priorities, programs and projects on the development of infrastructure facilities in our republic is the development of modern construction in cities and districts, including rural areas. In the Republic of Uzbekistan, great attention is paid to the development of a national-innovative system in the production of building materials, objects and structures, ensuring the required growth rates of modern construction and the development of the construction industry. This article provides relevant instructions on the problems that the materials used in the reinforcement of reinforced concrete structures face in them, and of course on modern solutions.

Keywords: Fittings, Composite, deformation, cone, clamps, panels, brick walls, carbon fibers, expulution, delamination, columns, lintels.

Introduction

The construction structures of buildings and structures go through several stages before they are completed from the beginning of operation. At each stage (lasting 15-20 years), structural disorders occur, so-called Wear and tear or malfunctions, as a result of emergencies that require restoration work. Each phase ends with a major renovation or reconstruction, giving the old building a new life. [1,2] strengthening the load-bearing structures of buildings and structures is one of the main directions of construction in the near future. The design of fittings is almost always more difficult than new designs. As a rule, in each individual case, certain individual characteristics must be taken into account. To date, great experience has been accumulated in the strengthening of various reinforced concrete structures. [4,6] when designing an armature, two approaches are performed - unloading the existing structure (i.e. transferring the load to a partial or complete armature structure) and increasing the load-bearing capacity of the existing structure.

Main Body:

The buildings and structures currently in use are mostly constructed of stone or reinforced concrete. The use of load-bearing structures made of these materials is economically desirable. They are quite durable, technologically advanced, meet climatic requirements.



[3,5] at the same time, stone, concrete and reinforced concrete conglomerates, composite materials, that is, materials, are very heterogeneous. In the event of a violation of the initial state of these materials, a failure of the structural elements of the building occurs. Disturbances or damage that occur in the material of structures are the cause of a decrease in the reliability of buildings. A gradual decrease in strength characteristics occurs under the influence of external (natural and man-made) and internal (functional or technological) factors. The materials of construction structures are affected by mechanical loads and physical and chemical effects of the environment during the operation process, resulting in structural changes and a decrease in the quality of the material. [9,10] Initial defects and breakdowns lead to the development of different types of damage, different levels of risk and reliability, and therefore the level of risk of continuing structures. As a rule, the need to strengthen the structures of buildings and structures occurs as a result of the occurrence of emergency situations that lead to a change in normal conditions of use, with the appearance of natural disasters, sediments, cracks and individual deformations in foundations. [8,11] structures and in the building as a whole. There are several types of classification of reinforcement methods. Depending on the purpose of increasing the load-bearing capacity of reinforced concrete structures, three ways can be achieved:

the first is to install new replacement or unloading facilities when existing structures are difficult to use;

the second is the restoration of damage to structures with reduced load capacity during Operation;

the third is an increase in the load - bearing capacity of structures, which are expected to significantly increase external loads during operation.

In cases where the load-bearing capacity of existing structures is less than 50%, or supporting structures (made of concrete, steel) are corroded and the next process cannot be stopped, existing structures are replaced with new ones that take on all the useful load (Figure 1). Partial unloading of elements, such as board plates, secondary and primary barriers, barriers, etc., is used when only part of the load needs to be removed from the lowered structure. The peculiarity of this method is that in the unloading and unloading structures, the redistribution of forces occurs in proportion to their rigidity, and their joint work is a necessary condition. [7,12] any decision on reinforcement is not an easy task, because there cannot be template solutions, since each case is unique and has its own characteristics. Unloading structures can be made in the form of beams or columns mounted on medium supports, reducing their range and perceiving part of the load. During partial discharge, additional discharge elements can come into contact with existing structures along the entire length or at certain points. Additional drop elements should be considered as a partial drop design, as opposed to an extension, unless their placement ensures joint operation with a reinforced element along the entire length.[13] Partial unloading of structural elements is recommended if only part of the load has to be removed from the unloaded structure. If the supports of the elements that receive the load of the unloading structures do not have the necessary load-bearing capacity or there are no supports for installing the unloading structures, special support clamps are installed on the columns



(Figure 1). Before installing reinforced concrete support clamps, it is recommended to grind the surfaces of the columns and columns to the thickness of the protective layer to open the reinforcement. Concrete for support clamps should be on finely ground stone or gravel in a plastic consistency with 10 cm conical pull. As one of the reinforcement methods, a sticker is inserted into the cracked areas of fiberglass and carbon fiber materials (Figure 2). When reinforcing with clips, shirts, when building fittings without additional tension, it is necessary to try to bring down the reinforced structure to the maximum. In the case of strengthening structures under load, it is usually recommended to use pre-stressed reinforcing elements. Restoration and strengthening of surrounding structures in the form of panels, brick walls and other individual elements of buildings (columns, lintels, individual parts and associations of walls) is reduced to three main cases, depending on the technical condition of the stone.



Figure 1. Emergency reinforced concrete column, a state replaced by a unloading system.

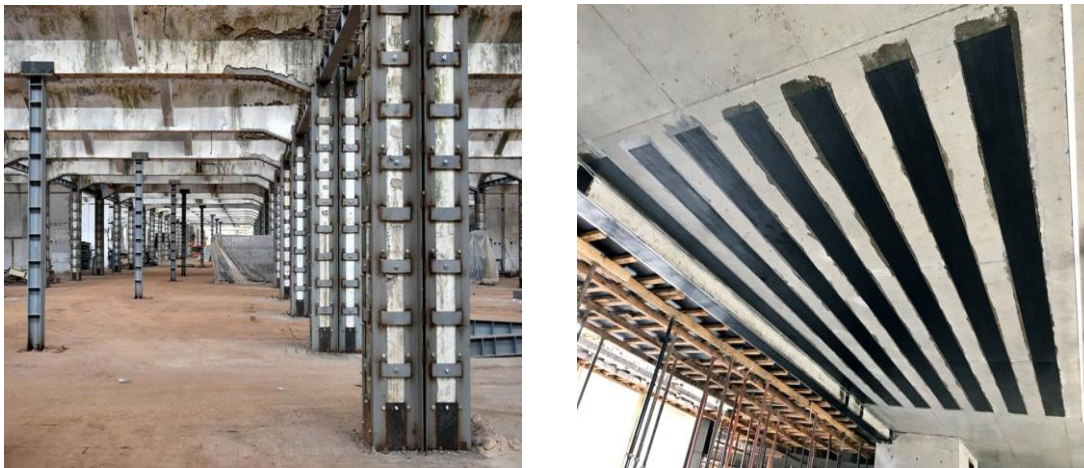


Figure 2. Local reinforcement by reinforcing the column with reinforced concrete clamps and gluing carbon fiber materials.

1. Given the existing weakening, the load-bearing capacity of the stone is sufficient, the decrease in the load-bearing capacity is not more than 15% of the original, the damage to the stone is negligible. Existing cracks are closed with mortar, no other measures are required.



2. The load-bearing capacity of the Masonry is sufficient to absorb the load, so no reinforcement is required, but the weakening of the wall with cracks exceeds 1/3 of the original strength with significant delamination of the wall. The technical condition is assessed as limited performance. Restoration is required by local re-laying of the part of the walls with cracks. Posts and studs are plastered over a structural mesh made of steel with a diameter of 4-6 mm with cells measuring 15x15 cm or reinforced with clamps.

3. The load-bearing capacity of stone elements is insufficient, with a loss of 50%, the technical condition is assessed as unacceptable; reinforcement is required.

Clips strengthen not only damaged parts of the walls, but also lintels over the holes in them

Conclusion

To decide on the necessary measures for strengthening structures, information about the types and nature of violations, as well as the expected consequences, is required. The causes of damage to building elements can be overloads, violation of the load application system, changes in geometry, material quality, etc. Of course, enough work is being done on the sections seen, and I believe that this in turn is an effective result of the reforms being carried out in our country.

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