Study on Quality Control of Construction Structure Reconstruction and Reinforcement

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Abstract. Compared with the new building project, the overall situation of building structure reinforcement and reconstruction is more complicated, and it will be affected by many different factors, so it is more difficult to reinforce. It can be seen that during the building structure reconstruction and reinforcement, the relevant personnel must fully grasp the specific situation of the building structure and properly cooperate with the professional design and construction, only in this way can the ideal effect be achieved. This paper makes a comprehensive study on the quality control content of building structure reconstruction and reinforcement, hoping that the content in this paper can help the relevant staff and promote the healthy and stable development of China's construction industry.

1. Introduction

Building structure is the core and skeleton of building engineering, and the reconstruction and reinforcement of structure is the core content of stabilizing building engineering. The work needs systematic calculation and design, and the construction technology is also very strict. There are many factors to be considered in the design and construction of structural reconstruction and reinforcement. In the design, we should collect all kinds of building data, comprehensively consider the construction site conditions, master the objective damage and damage degree that may occur when the building structure is applied, improve the reported data, and finally formulate a set of reconstruction and reinforcement scheme that is consistent with the actual situation. At present, with the rapid development of the construction industry, a large number of reasonable structural reinforcement schemes have emerged, and their application scope has become more and more extensive, which is also the basis for improving the overall quality of construction projects.

2. Necessity of the Reconstruction and Reinforcement of Construction Engineering Structures

The core purpose of structural reconstruction and reinforcement of old buildings is to improve the overall stability of construction projects. In recent years, structural reconstruction of construction projects has become a key research content in the development composition of construction enterprises in China, and the development of this project has also touched the development of China's construction industry and economic development to a certain extent. The structural system of architectural engineering is an important place to ensure the safety of people's lives and property. Therefore, the reconstruction and reinforcement of architectural engineering structure is an important issue to ensure the application of architectural engineering[1]. With the continuous improvement of the application life of the building project, the overall stability of the building structure is bound to deteriorate, and the structural components of the building project will be damaged. At this time, if reasonable measures are not taken in time to properly reinforce the building structure, the life length of
the building project will be shortened, which will bring serious potential safety hazards for people's application and easily lead to accidents [2]. The old building structure has poor stability and the seismic ability is weak. The reconstruction and reinforcement of the old building structure can further improve the overall stability of the construction project, and realize the protection of people's life and health. Therefore, it is of great significance to do a good job in the reconstruction and reinforcement of the building structure.

In order to meet the change of modern people's demand for construction projects, a large number of construction projects have appeared in the city due to the acceleration of urban construction, and the original buildings have been difficult to meet the high demand of people. At the same time, they will also be constrained by various factors such as urban land. China advocates appropriate upgrading and reconstruction of the original construction projects, and puts forward a series of policy support for the original construction reconstruction projects, and realizes the reconstruction and reinforcement of old buildings by means of subsidy funds. Reconstruction and reinforcement of construction projects can further improve the overall stability of construction projects, thus providing more high-quality services for people. At the same time, it can also alleviate the shortage of urban land resources, greatly reduce costs, and improve good conditions for the stable development of construction enterprises.

3. Reasonable method for reconstruction and reinforcement of Construction Structure

3.1. Bonding steel reinforcement method
In the specific application period, the method is to bond the thin steel and the original concrete together to form a whole. The structural adhesive is used for reasonable bonding, and the two are combined with each other to form a composite section under common stress. Through this mode, the bearing capacity of the building structure can be further improved, and it is mainly used in the components that are greatly bent under static force. This construction method is very convenient to apply.

For example, the floor is reconstructed and reinforced by bonding steel reinforcement method to improve the stability of the floor, as shown in Figure 1.

![Figure 1. Reconstruction and reinforcement of floor slab by bonding steel reinforcement method](image)

The principle of using bonding steel reinforcement method to reconstruct and reinforce building engineering is to apply high-performance hydrogen-oxygen adhesives, so that the steel plate can be reasonably connected with the concrete members in the original building engineering, and then the tensile strength of the steel plate can be further improved to meet the application requirements. Concrete has strong compression resistance, and the structural stiffness and bearing capacity can be further improved after reconstruction and reinforcement, so as to meet the application requirements [3].
During the actual construction operation, the bending structure is applied, and the compression zone of the normal section is reinforced. In both sides of the compression zone, the purpose of structural transformation and reinforcement is achieved by sticking steel plates. This method is the most common and convenient way to reinforce the beam body. After the reconstruction and reinforcement, the post-inspection operation is also very convenient, which can further improve the efficiency of the whole work.

3.2. **Carbon fiber material reinforcement method**

During the practical application, this method is to apply new fiber materials, which contain more than 90% carbon and are often used in construction projects. Carbon fiber has many characteristics such as high modulus, corrosion resistance, light weight and so on. It is an important material commonly used in structural reconstruction and reinforcement of building engineering at present. According to different carbon content, it can be divided into different types of carbon fibers. The specific gravity of carbon fibers is only 20% to 25% of iron, but its strength can reach 3 to 5 times that of iron. Compared with carbon fiber prefabricated steel, carbon fiber has many advantages, such as high strength, high stiffness, and also has many advantages, such as corrosion resistance, screw resistance, high milk temperature, which traditional steel does not have [4]. At present, carbon fiber reinforced materials can be used in highly corrosive environments, and various new materials such as resin, ceramics and special metals can be added to carbon fibers to form carbon fiber composite materials, which can improve the material properties and meet the application requirements. Therefore, it is feasible to apply the carbon fiber reinforcement method to the reconstruction and reinforcement of building structures reasonably.

3.3. **Increasing cross-section method**

During the practical application, the method of increasing cross-section is to add cross-sections and reinforcement on many sides of the section to be reinforced to complete the reconstruction and reinforcement, so as to realize the transformation and reinforcement of the building structure and further improve the stiffness and bearing capacity of structural members in the building engineering. For example, in construction engineering, a layer of reinforced concrete should be set on the structure to be reinforced. The principle of this method in application is to expand the stress area on the surface of construction engineering, thus reducing the stress per unit area and improving the bearing capacity of building structure. Raw materials can also be used to improve the ratio of steel bars to achieve the purpose of reconstruction and reinforcement. The reconstruction and reinforcement method of increasing cross-section method is finally applied to civil houses [5]. In the actual reconstruction and reinforcement, the data of reinforcement background, size, stress characteristics and so on of the components to be reinforced and reconstructed can be grasped through analysis. The structural reinforcement design of building engineering can be divided into different ways of unilateral reinforcement and bilateral reinforcement. According to the different purposes of reconstruction and reinforcement, the concrete reconstruction and reinforcement can be divided into the reinforcement methods of increasing the cross-sectional area and increasing the amount of steel bars. On the basis of increasing the cross-section, the reconstruction and reinforcement of the building structure are realized to improve the overall stability of the construction project.

3.4. **External bonding steel reinforcement method**

This reinforcement method is to use steel to wrap around the structure. For example, in building engineering, steel frames welded by section steel and flat steel can be wrapped around reinforced concrete columns or beams. At the same time, it is also necessary for the constructors to pour a certain amount of adhesive. After being treated in this way, the reinforced structure and steel can form a stressed structure, and the building is resisted by reinforced members. Therefore, the shear resistance and bending force have been significantly improved, and the structural stability of building engineering has been further improved.
3.5. Embedding steel bars reinforcement method
In order to realize the reconstruction and reinforcement of building engineering structure, bolt anchor bar or embedded steel bar can be adopted in concrete reconstruction and reinforcement, and embedding steel bars reinforcement method is the most commonly used method in building engineering reinforcement. For the concrete building engineering structure, this reinforcement method has the advantage of convenience in the reconstruction and reinforcement. If there is no embedded steel bar in the construction, the reinforcement method of planting steel bars can improve the overall stability of the building engineering and meet the application requirements.

4. Construction Quality Control of the Structural Reconstruction and Reinforcement of Construction Engineering

4.1. Make corresponding preparations in advance
Before carrying out structural reconstruction and reinforcement of architectural engineering, the staff should first conduct a comprehensive investigation of the architectural engineering situation, do a good job of analysis, and do a good job of preparation before carrying out structural reconstruction and reinforcement of architectural engineering. As constructors, they should be familiar with the reconstruction and reinforcement methods adopted and the difficulties faced by various technologies in specific application. For example, when steel structures are used for reinforcement and reconstruction, the staff must conduct a comprehensive investigation on the specific structure of the construction project, and take relevant experiments for inspection. If the situation is necessary, professionals should be hired to complete the corresponding evaluation work. It doesn't seem to be difficult to carry out all the above work, but all the work will have a direct impact on the overall structural quality and stability of the building project. Therefore, every staff member who takes the work must take it seriously to ensure the rationality of all the work and avoid the failure of the stability of the reconstructed and reinforced engineering structure due to inadequate work. According to the steel involved in the experiment, in order to determine the specific performance of steel, the steel model, new steel model and corresponding welding technology should be specified in the final experiment report. In addition, the relevant staff should take reasonable measures to maintain the old steel. For example, the old steel in the building structure should do a good job of anti-corrosion and rust removal. At the same time, it is necessary to comprehensively consider the damage degree and application life of the old steel, and comprehensively consider the above factors to complete the reconstruction and reinforcement of the building structure, so that the overall structural bearing capacity of the building engineering can be further improved.

4.2. Key points of structural reconstruction and reinforcement of construction engineering
When the relevant staff reconstruct and reinforce the construction engineering structure, they should know the whole structure of the building engineering in advance, properly maintain the original building engineering structure as far as possible, and carry out the reconstruction and reinforcement operation on the basis of fully considering the bearing capacity of the whole original structure of the building engineering, so as to improve the stability of the building engineering structure and make the building engineering meet the application requirements. In addition, the relevant staff should give full consideration to the specific conditions of the construction project and the surrounding environment of the construction project, comprehensively analyze various problems, and finally work out a set of reconstruction and reinforcement scheme that conforms to the structure of the construction project, try not to demolish and modify the original construction project in large areas, and properly reconstruct and reinforce the structure on the basis of retaining the original construction project structure to the greatest extent. For example, when workers reconstruct and reinforce reinforced concrete structures in construction projects, they usually use the technology of planting steel bars and anchoring bolts to connect the structures, which is suitable for concrete structures in general buildings. In view of the beam members of general construction engineering, whether the size of the members can meet the
specific requirements of anchorage and length, and whether the information such as the specific position of reinforcement, reinforcement signal, and the selection of planting adhesive should be implanted, the construction personnel should know all the information well, and only in this way can we ensure that the reconstructed and reinforced construction engineering structure is stable enough.

Reconstruction and reinforcement of building engineering is a complex work. In order to ensure that the effect of reconstruction and reinforcement can meet the expected requirements, the staff should strictly investigate the building engineering and do the corresponding inspection work. Before construction, the staff should strengthen communication and ensure the overall integrity of the building engineering. At the same time, as designers, we should work out a set of reconstruction and reinforcement scheme according to the construction report and data, and the project managers should always be vigilant in carrying out the work and conduct comprehensive monitoring and management of the project.

5. Conclusion
Reconstruction and reinforcement of building engineering structure is an operation with high technical requirements. In actual reconstruction and reinforcement, a set of reasonable reconstruction and reinforcement schemes should be worked out according to specific conditions. With the rapid development of science and technology, the methods of structural reconstruction and reinforcement of building engineering are constantly innovating. Therefore, it is not an easy task for designers to choose the best one from many reconstruction and reinforcement schemes. Designers should fully grasp the surrounding conditions of building engineering, adopt reinforcement materials consistent with the actual situation, rationally apply the original building structure, and formulate reasonable schemes to achieve the purpose of reconstruction and reinforcement.

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