

REVIEW

Analysis on Construction Quality Control Technology of Reinforced Concrete Shear Wall Structure

Ting Zhou*

Jiangxi Vocational College of Industry and Engineering, Pingxiang, Jianxi, 337055, China

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ABSTRACT

In the process of continuous development of construction enterprises, new requirements have been put forward for construction projects. By strengthening the construction quality control of reinforced concrete shear wall structure, the construction level of reinforced concrete can be continuously improved, the construction quality can be guaranteed, and the construction project can be successfully completed, which is worthy of extensive application and promotion in construction enterprises, thus providing a broader development space for construction enterprises.

1. Introduction

In the construction project, the shear wall structure has been widely applied and popularized. For the shear wall, it can bear the internal forces caused by various loads, and can effectively control the horizontal force of the structure. The shock resistance and stability of the structure are extremely significant, which in turn has a profound impact on the construction project. However, in the actual construction process, it is extremely vulnerable to many external factors. Therefore, it is necessary to formulate practical and feasible optimization measures to ensure the construction quality of reinforced concrete shear walls. This paper mainly focuses on the construction quality control technology of reinforced concrete shear wall structure for the reference of relevant personnel.

2. Summary and Analysis of Construction of Reinforced Concrete Shear Wall Structure

2.1 Advantages and Disadvantages

2.1.1 Advantages

In the process of continuous development of science and technology in China, new materials and new technologies have been widely applied and promoted in construction projects, and under the influence of the improvement of the quality of life of the society, they are not consistent with the requirements of basic materials, so the construction The overall framework and comfort requirements of the project are getting higher and higher. In the past, the traditional slab beam frame construction technology is very prone to the phenomenon of external leakage of

**Corresponding Author:*

Ting Zhou,

Jiangxi Vocational College of Industry and Engineering,

No. 106, Yuhu East Road, Economic Development Zone, Pingxiang, Jianxi, 337055, China,

E-mail: zt0919@163.com.

the beam. If the ceiling is used for covering, it is difficult to improve the space frame of the construction project and bring a sense of visual depression. For the reinforced concrete shear wall structure, this problem can be greatly solved. By comparing and analyzing with the original beam and slab construction technology, the space advantage is more significant, and the characteristics of the overall frame are also extremely obvious. For example, the bearing capacity and seismic performance of the shear wall technology frame are significant, and can withstand large vertical loads and lateral loads. If the construction works partially damaged, it can bear the corresponding load to ensure the overall stability and seismic performance of the construction project. The concrete reinforced concrete shear wall structure is shown in Figure 1:

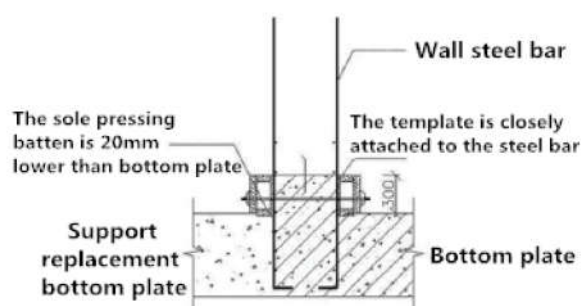


Figure 1. Structure of reinforced concrete shear wall

2.1.2 Disadvantages

For the shear wall frame construction technology, its advantages are more significant, but because the shear wall structure construction technology is still in the initial exploration stage in China, there are still many problems in the actual application process. For example, the construction project has a relatively high self-weight, and the requirements for many aspects are increasing, such as ground treatment and overall frame stability. At the same time, in the construction project, the shear wall frame is one of the most important components. In the graphic design process, it takes a lot of time to reflect the practical application functions of construction projects; it is difficult to give full play to the flexibility of construction engineering.^[1] In the construction of large-scale public construction projects, there are many restrictive factors. Furthermore, it brings new challenges to the construction of reinforced concrete shear wall structure in China.

2.2 Characteristics of Reinforced Concrete Shear Wall Structure

2.2.1 Stress Nature

Based on the external perspective of the frame, for the

frame shear wall, it has a perpendicular relationship with the ground. In the case of external forces, there is a significant difference between the horizontal bearing capacity and the horizontal bearing capacity due to the strong bearing capacity of the frame structure. The shear wall has a good horizontal load carrying capacity, but the vertical force is weak. Furthermore, under the action of the two, the hollow frame cantilever beam structure of the overall frame shear wall appears to be curved, and its shape is biased toward the curve.

2.2.2 Rigidity Nature

There is no significant difference between the force response of the frame shear wall structure and the pure frame structure, but if the bending moment of the substrate reaches 20%, the frame stiffness will change dramatically. Generally speaking, the construction personnel should set the seismic resistance level of the frame shear wall in time. After the bending moment of the frame shear structure itself reaches 80% of the bending moment, the frame stiffness will gradually shrink. Combined with the relevant documents of the seismic design of the building, it can be seen that the rigid proportional relationship between the frame and the shear wall must be coordinated and standardized to determine the structural seismic rating of the frame shear wall.

3. Technical Points for Construction of Reinforced Concrete Shear Wall Structure

3.1 Steel Works

In the steel works, the amount of steel materials used is large and the types are extremely rich. For example, the primary steel bar has a diameter of 6 mm and the tertiary steel bar has a diameter of 18 mm. The main technical difficulty is that in the case of dense steel bars, the steel bars are prone to displacement during the installation and pouring process. In this case, the following measures should be taken: First, fix the stirrup frame. Combine the physical lofting, make the relevant processing and shaping molds such as the column ribs, and fully exert the positioning function of the frame ribs. Moreover, the application of the vertical or horizontal wall ladder reinforcement is strengthened to control the position of the steel bar to prevent the steel bar from shifting.^[2] Second, clear the beam and column nodes. In high-rise buildings, the requirements for the number of steel bars are clearly stated. If the number of steel bars is large, dense beam-column joints are prone to occur. In order to ensure good implementation results, it is necessary to strengthen the application of computer technology to draw and stake out the on-site steel bars, and then use them as template

templates to prevent them from being on the construction site. In the construction of the project, the construction of the beam-column joints of the steel bars can be effectively guided. Finally, the sample guide system. In the construction, in order to ensure the good precision of the steel bar project, the staff must increase the control of the physical model during the construction process, and give certain guarantees to the project quality.

3.2 Template Engineering

3.2.1 Inside and Outside Template Design

In the process of template matching, the proportion of the external wall template is lower than the proportion of the outer template to ensure the accuracy of the template. In the process of supporting the mould, the reference object is the wall to be poured, and the outer template and the wall are to ensure a high degree of coordination and consistency.

3.2.2 Fix the Inner Template

In the process of template casting, the wall root simulated on the inner template and the inner side is very prone to movement,^[3] which affects the accuracy of the template. Therefore, the designer will place the short steel head on the inside of the template to play a good control role.

3.2.3 Lifting Wall Formwork

For the lifting of wall molds, to ensure good stability and accuracy, in the hoisting process, in order to prevent the wall mold from hitting the steel bar, it is necessary to effectively control the lifting position, continuously improve the stability of the floor, and maintain the personal safety of the construction personnel.

3.3 Concrete Engineering

In the concrete construction process, it is necessary to attach great importance to the problem of concrete material configuration, and then rationally control the material proportion to prevent the collapse phenomenon, so as not to threaten personal safety. Moreover, in the pouring process, the specific pouring sequence should be followed. In the process of pouring large-section beams, the application of the layered casting method should be strengthened, and various ingredients should be sturdy to ensure good density.

In addition, after the completion of the concrete project, the engineering designer should conduct an in-depth analysis of the humidity on the construction site and do a good job in concrete sprinkling maintenance to ensure a good wetness of the concrete surface. The humidity is controlled at least for about 7 hours.

4. Quality Control Measures for Construction of Reinforced Concrete Shear Wall Structure

4.1 Prepare for the Construction

First of all, it is necessary to arrange the construction personnel reasonably. In terms of concrete pouring quality, technical parameters such as initial setting time and slump of concrete are extremely important influencing factors, so it is necessary to reasonably arrange the construction organization of concrete pouring to give a certain guarantee of concrete strength. Secondly, we also carefully selected commercial concrete suppliers, conducted in-depth analysis of concrete daily output, timely completed the signing of concrete contracts, and conducted in-depth analysis of the characteristics of the pouring parts and weather conditions to select the most suitable admixture. Once again, it is necessary to determine the various technical parameters of the required materials. In various experimental reports, the focus is on various raw material tests, cement, construction ratios, etc., to provide certain convenience for the technicians to conduct experiments.^[4] Finally, for the equipment required at the construction site, to ensure the completeness and integrity of the configuration, before the construction, the use of the equipment should be carefully examined. At the same time, it is necessary to prepare the on-site operating conditions, such as: do the hidden inspection of steel bars, check the iron and the blocks, ensure the proper thickness of the protective layer, and clean the impurities in the template in time. In the case of preparing for work before construction, it can lay a solid foundation for the smooth progress of the construction process.

4.2 Conduct Rationalized Control of Raw Material Quality and Concrete Ratio

In the construction process of reinforced concrete shear wall structure, if the cement encounters water, it is very prone to hydration reaction and produce corresponding heat, which becomes an important cause of cracking of the shear wall, which makes it difficult to ensure the overall stability of the reinforced concrete shear wall structure, and the quality of the project is also threatened accordingly. Therefore, in the application process of construction materials, it is necessary to increase the control of the quality of construction materials. For example, in the concrete proportioning process, the application of coarse sand should be strengthened to effectively control the water content of concrete. In the actual construction process, in order to fully reflect the concrete and the easiness of the concrete, it is necessary to continuously improve the anti-segregation function of the concrete. Therefore, in the

concrete proportioning process, it is necessary to add an admixture to ensure that the concrete meets the pumping requirements, and the concrete mixing work is minimized to ensure a good saving effect.

4.3 Properly Select the Construction Process and Carry out the Concrete Pouring Work

(1) The construction process of reinforced concrete is fully reflected in the process of pouring concrete. It is necessary to ensure that the pouring work is completed at one time to avoid the accumulation or inclination of concrete. We must also attach great importance to the problem of selecting concrete discharge, slow down the speed of the hopper,^[5] and ensure the flatness of concrete pouring. Moreover, it is necessary to properly control the pouring speed of the concrete and combine the standard speed of the construction to carry out the pouring, thereby ensuring the steady improvement of the quality of the pouring work.

In addition, in the pouring process, the concrete temperature should be rationalized. In the aspect of construction quality control, it is necessary to increase the supervision and control of the concrete mold temperature, do a good job of cooling the concrete, and regularly spray water.

(2) In the construction process of concrete shear wall structure, it is necessary to strengthen the application of one-time pouring method. Ensure good cleanliness of the shear wall before carrying out concrete pouring work. On the surface of the shear wall, the mortar should be poured, and its thickness should be controlled at about 1.5 cm to prevent the buckling phenomenon of the coarse aggregate in the concrete, so as not to threaten the quality of the shear wall structure. In the lap joint work of the shear wall structure template steel column and beam ribs, because the pores are narrow and widely distributed, the height of the material below should be controlled below 50 cm, and then the application of the plug-in high-frequency vibrator should be strengthened. In this way, the concrete vibrating work is carried out, and after the vibrating and compacting, the layered pouring work is also carried out.

4.3 Do a Good Job in Water and Cement Ratio, and Pay Attention to Vibration Management

(1) In the construction of reinforced concrete shear wall structure, it is necessary to minimize the difficulty of pumping and prevent the influence of steel bar density on concrete vibration. In actual construction, the water addition method will be used to continuously improve the fluidity of the concrete, but to a certain extent, this will lead to an increase in the rate of concrete segregation, thus affecting the stability of the shear wall structure.^[6] There-

fore, in the specific construction process, it is necessary to strengthen the application of modern science and technology, and calculate the proportion of various raw materials rationally before the concrete ratio. In the process of adding water and loading, it is necessary to strengthen the application of quantitative equipment and facilities to ensure that the quality of various concrete proportions is in line with actual needs. In addition, the project supervision function should be fully exerted, and on-site inspection and inspection work should be done to ensure the concrete water-cement ratio quality.

(2) After the concrete is poured, and before the initial setting, a second vibrating work needs to be carried out to avoid affecting the quality of the pouring to ensure good tightness between concrete and steel, give a certain guarantee to the construction quality of reinforced concrete shear wall structure, to prevent cracks in concrete walls. In the first layer of vibrating process, the vibrating bar should penetrate deep into the concrete root to complete the vibrating work and avoid the separation of the mortar and the post-cast concrete,^[7] which makes it difficult to reflect the stability of the shear wall structure.

5. Project Cases

Take an A project as an example, its footprint is 300m², and the total construction area is 11050m². The construction project consists of 12 floors, mainly including shops, commercial houses and hop houses. Among them, 1-3 floors are shops, and 5-11 floors are commercial houses. In the foundation construction method of this project, the pre-tensioning method is applied to the pre-tensioning method. The foundation is the concrete pipe pile, and the reinforced concrete frame is the main structure. For the elevator shaft, the shear wall structure has been widely used.

Firstly, use the template engineering technology. In this project, the new multi-layer glued template has been widely used. The thickness of the template is 18mm. The combination of the layer height is combined with the layer height. The size of the wood selected by the main keel and the secondary keel is 100×100mm, 50×100mm.

Secondly, use the concrete crack control technology:

(1) Design the proportion of raw materials. In the concrete configuration process, it is necessary to select good quality raw materials and add quantitative water reducing agent to continuously increase its density and firmness. (2) Properly lower the temperature. For concrete materials, it has certain peculiarities. When it encounters high temperature, it is prone to bulging, which leads to pores in the casting process and cracks.^[8] Therefore, the construction workers of the project focus on controlling the temperature of the building concrete. (3) Timely testing of concrete. The

engineering technicians use the electronic thermometer to actively detect the temperature of the concrete on the concrete, so as to promote the smooth progress of the concrete pouring work.

6. Conclusion

In summary, in the construction project, it is crucial to strengthen the construction quality control of the reinforced concrete shear wall structure, which can continuously improve the overall quality of the construction project, conform to the construction safety principles, maintain the personal safety of the construction personnel, and create a standardized and safe construction engineering environment. Therefore, in the process of construction quality control of reinforced concrete shear wall structure, it is necessary to do a good job in preparation before construction, rationalize control of raw material quality and concrete ratio, correctly select construction technology, and carry out concrete pouring work, etc., thereby promoting the smooth construction of reinforced concrete shear wall structure.

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