Research on construction technology of frame structure in construction engineering

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Abstract: With the rapid development of the construction industry, the building technology needs to be improved day by day. The application of reinforced concrete frame structure is suitable for all kinds of projects for its strong seismic capacity, good integrity and durability. This paper introduces the characteristics of the frame structure, discusses the problems existing in the two important works of reinforcement and formwork, and introduces the correct construction technology. Finally, it expounds the construction method of the frame structure of the construction engineering, and the affectivity was demonstrated in concrete frame structure cases.

1. Introduction
The concrete characteristics of frame construction are in the aspects of vertical components and composition. The gravity and load of high-rise buildings are accumulated layer by layer. In this case, large-scale columns and walls are needed to support it, and to a certain extent, higher technical requirements are put forward for the construction of engineering frame structure. In addition, the seismic load and wind load also need to bear the building components, and these loads show nonlinear vertical distribution in the characteristics, and put forward higher requirements for the sensitivity of building height [1].

Taking the earthquake load as an example, if the number of floors of the building is small and the height of the building is low, in the process of considering the building load, generally only the constant load and part of the dynamic load need to be considered. The wall, column, stairs and other structures of the building will not be truly controlled [2]. For other components, after meeting the relevant regulations, it usually will also meet the design requirements.

For high-rise buildings, it is not only to deal with the above matters simply, but also to analyze and deal with the shear matters, and analyze the deformation and other contents. In the design process, it is often necessary to consider the specific layout of columns, beams, walls and floor structures of some high-rise buildings. The use of special materials, so as to resist large deformation and large lateral load is to a certain extent.

2. Analysis of reinforcement construction technology
In the construction of reinforcement engineering, there are many quality problems, such as unqualified electrode model. Therefore, it is necessary to check in time, replace in time and take treatment; otherwise it will affect the construction quality of the building and the safety of the residence. After the completion of the reinforcement construction, if there is maintenance quality problems in the later maintenance process, such as unstable factors in the reinforcement cushion block [3]. If not solved in
time, it will lead to unqualified construction. In addition, it will bring serious harm to the overall engineering frame structure, and affect the construction quality.

2.1. Concrete engineering technology
Before the construction of building frame structure, firstly, the staff should monitor the quality of concrete and ensure that the material of concrete reaches the standard. Meanwhile, they should control the material quality of concrete, do a good job in material quality testing, and ensure that the material quality is qualified before entering the construction link. Secondly, the proportion of concrete materials needs to be done well. In the process of proportioning, follow-up construction can only be carried out. To make the cement content meet the corresponding proportion requirements. In addition, during the transportation of concrete materials, pump transportation equipment is generally used for transportation. It is necessary to avoid the quality change of materials in the process of transportation and the occurrence of bleeding, which will lead to the quality change of concrete [4]. In the process of concrete pouring, the concrete shall be poured layer by layer. After a certain interval of time, the second pouring shall be carried out to ensure that the pouring quality meets the requirements. The next layer of pouring shall be carried out and the vibration of concrete shall be avoided. Finally, after pouring the concrete, it also needs to be well maintained, to maintain a certain degree of wetness of the concrete, and to take certain measures in the strong light or rainy weather, to avoid excessive sun cracks or humidity, which is not conducive to setting, or the concrete structure will produce cracks.

2.2. Key points of reinforcement construction technology
During the preparation of reinforcement materials, it is necessary to cut the reinforcement according to the construction drawings, cut it reasonably and bend it to make all kinds of required shapes. And it is necessary to make a good shape of steel bars, place them by category, and fix the ends of steel bars. Secondly, it should collect materials according to the formulation and procedures of collecting, and it should not use them casually. Finally, for the steel bars with special requirements for storage, special placement arrangement can only be carried out after communication with the construction party. In addition, it should ensure that the storage place does not affect the quality of materials [5].

The type of reinforcement to be reserved for discharging and blanking is different, and the coefficient of thermal expansion and cold shrinkage is also different, so it is necessary to reserve the dimensions of discharging and blanking according to the nature of reinforcement. If the reinforcement is processed twice, the volume of the reinforcement will change accordingly, so it is necessary to leave a reasonable size. For example, the material can be taken as the reference standard according to the total length of the steel bar bending. If it is less than 250mm, the reserved size of about 0.6cm can be reserved. If the length is more than 250mm, a dimension of about 9mm needs to be reserved. In the process of discharging and blanking, it should always pay attention to the degree of expansion and contraction of materials, reserve a certain size, so as to ensure that there will be no case of insufficient size in use and discharge and blank, effectively improve the utilization rate of materials, and save construction costs.

![Figure 1. Reinforcement construction technology](image-url)

Welding construction preparation in building use, steel will involve welding. Therefore, the welding experiment should be done well. After the preparation of the corresponding test, the
outstanding requirements can be followed. If there are quality problems, they should be dealt with in time to ensure the welding quality is qualified, as shown in Figure 1.

3. Formwork construction technology analysis

Formwork construction technology of main structure the construction of main formwork is one of the very important construction links. During the construction of the main formwork, the pole shall be fixed on a solid plane to ensure the quality of the pole [6]. This can be a strong guarantee for construction. Secondly, in the construction of the support and upper formwork, it is necessary to ensure that the main structure is firm and stable, and has great bearing capacity. Finally, in the construction of formwork, to ensure that the construction process is correct, the formwork should be fixed, and then the next construction link can be carried out.

First of all, the construction and installation technology of foundation formwork needs to do cushion construction. After this construction, it is necessary to check whether the cushion is horizontal, use axis for measurement and plane ruler to measure each side line, and the operator shall mark the angle of dark column, so as to provide strong data support for fixing formwork and installing formwork, as shown in Figure 2.

![Figure 2. Formwork construction technologies](image)

Secondly, according to the mark of the angle of the dark column made before, the fixed material column made of the fixed material column needs to be made, so as to meet the requirements of the stability and hardness of the formwork in the construction. Secondly, the compressive capacity of the formwork needs to be continuously improved. In the process of installing the foundation side formwork, the installation angle is a very key link. It is necessary to ensure the angle is vertical and avoid large deviation of this case. The range of passing error shall not be greater than 3mm. After the formwork is installed, the gap between the cushion and the formwork shall be treated, usually sealed with cement mortar, so as to avoid slurry leakage. The edge line of the installed formwork must be perpendicular to the ground, which is qualified. Therefore, it is necessary to proofread the upper part of the template to see if it is vertical.

Thirdly, the formwork shall be removed in accordance with the standards of the drawings. It is necessary to first remove the formwork erected after, and finally remove the formwork erected first. In the removal of the opposite wood formwork, the supporting part shall be removed first. For the removal of support, the formwork with small bearing capacity shall be removed first, and then the formwork with strong bearing capacity shall be removed. Treatment measures shall be taken for the demolished part, which shall not delay the normal construction of the project.

4. Construction method of frame structure

Strictly control the concrete engineering of the frame structure, carefully inspect the raw materials, strictly control the grain size and mud content of the sand, and conduct various tests. The mix proportion shall be determined according to the concrete strength grade and quality inspection as well as the concrete workability requirements, and the concrete construction mix proportion shall be strictly controlled.
Select well graded stones, strictly control the amount of water and cement, reduce the void ratio and sand ratio to reduce the amount of shrinkage and improve the crack resistance of concrete. Early formwork removal shall be avoided and construction operation procedures shall be strictly followed. Through the arrangement of reinforcement mesh in the surface layer on both sides of the girder, the cracks caused by uneven settlement are avoided, and the bearing negative bending moment is borne. After the concrete floor is poured, the surface scraping shall be limited to the minimum extent to prevent the spreading of dry cement on the concrete surface, and strengthen the early curing of concrete, as shown in Figure 3.

![Figure 3. Frame structure technology](image)

The correct position of the reinforcement shall be determined according to the cross relationship between the design section of the component and all kinds of reinforcement. Attention shall be paid to the design of the section of the component in the design drawing and it shall be noted in the drawing. Each discipline of the design unit shall coordinate to deal with the relationship between the embedded pipeline and the reinforcement. Before the concrete pouring, the elevation and flatness of the formwork shall be checked carefully, and the hand mark on the floor shall be set to make the concrete pouring.

There is a correct basis joint concrete pouring. In the concrete frame structure, the joint is a very important component. In the design process, compared with the beam concrete grade, the strength grade of the column concrete is one level higher. For the high-rise building, the concrete grade difference at the joint is larger. According to the construction method of the frame structure, the beam and the column need to be poured separately, because of the concrete work quantity at the core area of the joint. It is relatively small, and it is difficult to separate from the beam slab. It is a common practice for most of the construction to construct the beam slab and the joint concrete at the same time. The construction joint is reserved at the joint of the column and the beam, which does not meet the design requirements, and there is a quality risk.

In order to avoid potential quality hazards at the joint, the concrete pouring method in the core area of the joint is as follows: first, transport the appropriate strength concrete to the construction pouring site, and vibrate it firmly. Secondly, the vibration shall be carried out in a standard way, leaving a proper oblique rubbing. Finally, it is necessary to pump the concrete of the floor beam and slab before the concrete pouring. Avoid cold seam and realize the design requirements.

5. Conclusion
In the construction of construction engineering, the design and construction of the frame structure is an important construction link. If the construction is not qualified, it will affect the construction quality of the whole building, so we should attach great importance to it and strictly follow each construction link to ensure the construction quality. The construction personnel should understand the importance and complexity of the frame structure construction and constantly improve it Construction quality.
Acknowledgement
This work is supported by Science Foundation for Youths of Northeast Petroleum University.

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