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ANALYSIS ON KEY POINTS OF CONSTRUCTION TECHNOLOGY OF BEAM-TYPE TRANSFER LAYER IN HIGH-RISE BUILDINGS

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Abstract: With the continuous improvement of China's economic development level , urban construction is developing faster and faster. While people pay attention to the quality of buildings, they also put forward higher requirements for building functions. In order to meet this requirement, in the process of urban construction, the structural form of the building should be adjusted accordingly according to the requirements, which leads to the concept of conversion layer. Beam-type transfer layer construction is a construction technology widely used in the construction of high-rise buildings. This construction method can effectively solve the structural conversion problem between the upper and lower parts of the floor. Based on the patent search, this article mainly analyzes the application and technical key points of beam-type transfer layers in the construction of high-rise buildings, and explores quality control methods.
Keywords: High-rise buildings; Beam transfer layer; Construction technology; Quality control

1 OVERVIEW OF BEAM TRANSFER LAYER

In recent years, urban construction has greatly improved both in terms of development speed and scale, and the number of urban high-rise buildings continues to increase. However, the architectural functions of many high-rise buildings are relatively single and cannot meet the needs of urban construction and development. In order to improve the functionality of urban buildings, it is particularly important to transform the structural form of high-rise buildings. The beam-type transfer layer construction has the advantages of simple structure and convenient operation, and can effectively realize the conversion between building structures. At present, the beam-type transfer layer has been widely used in the process of urban construction. However, in the construction practice of the beam-type transfer layer, there are still deficiencies in its construction technology and construction technology. In order to ensure the construction quality of the beam-type conversion layer, it is necessary to master the construction methods and control the key points of the construction during the construction process to achieve effective conversion of the building structure.

Beam-type conversion is a commonly used conversion method in the construction of conversion floors and plays an important role in realizing the conversion of building structures. During the construction process of high-rise buildings, the methods of beam-type transfer layers are also diverse according to different construction conditions. In terms of construction methods, there are single spans and multi-spans. In terms of construction materials, there are reinforced concrete, prestressed concrete, etc. during the specific construction process. Based on the above factors, according to the conversion method and structural characteristics of the transfer beam, the structure of the beam-type transfer layer commonly used in daily construction is shown in Figure 1.

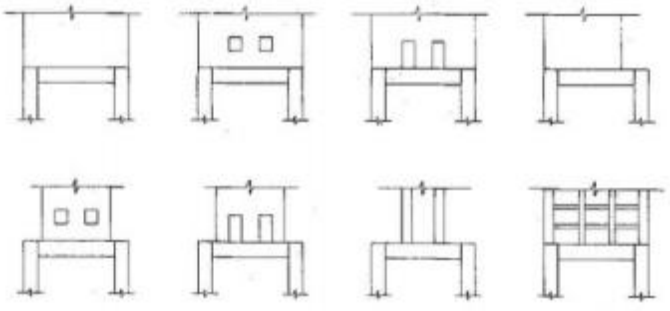

Fig. 1 Beam conversion structure type

Therefore, during the construction process of the beam-type transfer layer, specialized technical personnel must design the construction plan according to different engineering requirements and practical conditions, and select the appropriate transfer structure to ensure the quality of the construction of the beam-type transfer layer. Technical personnel train construction personnel on beam-type conversion construction technology and related technical specifications, standardize construction behaviors, and ensure the project quality of beam-type conversion layer construction in high-rise buildings.

2 PROJECT CASES

The high-rise building project of a certain project integrates commercial and residential buildings. The planned building area is 25,000㎡, the commercial land area is 12,480㎡, the building height is 98.5m, and there are 33 floors in total. A transfer layer is set up between the 5th and 6th floors. A frame-supported shear wall structure is used below the transfer layer, and a shear wall structure is used above the transfer layer. The construction method of beam-type building transfer layer is used in the transfer layer part. In the transfer layer structure, the cross-sectional size is controlled between 1000 (thickness) × 1950 (height).

3 TECHNICAL POINTS OF CONSTRUCTION OF BEAM-TYPE TRANSFER LAYER

3.1 Key Points of Construction Sequence of Transfer Layer

During the construction process of the transfer layer of a high-rise building, in order to ensure the construction quality of the transfer layer, the construction operations should be carried out in strict accordance with the construction sequence. The general construction process is as follows: First, the steel bar tying operation is carried out, and the structural part of the floor where the transfer layer is to be set is The steel bars are tied and the formwork is installed. Then pour concrete at the bottom of the beam and tie the steel bars of the transfer beam. After the side formwork of the transfer beam is installed, concrete pouring at the bottom of the transfer beam is carried out. The pouring process at the bottom of the transfer beam requires strict control of the pouring position to ensure the firmness of the transfer beam. degree. After the poured concrete reaches a certain strength, the top pour is carried out.

During the concrete pouring process, pay attention to the reservation of construction joints. Under normal circumstances, 2 construction joints are reserved during the conversion process, and they are reserved according to the specific location of pouring.

3.2 Formwork and Bracket Construction

During the construction process of the beam transfer layer, the design and installation of the formwork has an important impact on the project progress and project quality, and is a key step in the construction.

3.2.1 Technical points of diagonal braces

During the construction of diagonal braces, the angle of the diagonal braces should be controlled within the range of 45° to ensure that the diagonal braces are coordinated with the external steel structure. In order to ensure the quality of formwork installation, the firmness of the support rods must be ensured. Determine the position and spacing of the support rods according to the construction drawings, so that the support rods and the lower support plate are stressed at the same time, reducing the load on the formwork and improving the stability of the formwork.

3.2.2 Technical points of steel pipe support

During the process of supporting the formwork, pay attention to the firmness of the installation, check whether the joints of the formwork used are firm, and whether the support rods are tightly integrated with the wall to reduce the pressure of the steel pipe on the formwork. During the construction of the formwork bracket, steel pipes with higher specifications should be used to ensure the load capacity of the bracket and avoid the bracket falling apart due to excessive pressure, which will not only affect the progress of the construction, but also greatly harm the quality of the construction and increase the cost of the project. investment, causing serious economic losses.

3.2.3 Technical points for formwork removal

Only after the poured concrete is completely consolidated and the strength meets the requirements for engineering construction, and it is ensured that the removal of the formwork will not affect the quality of the concrete consolidated body, can the formwork removal operation be carried out. Different parts of the formwork carry different load pressures and have different requirements for consolidation strength. The strength requirements for the removal of formwork at different parts are shown in Table 1.

Table 1 Formwork removal strength requirements table

Component type	Member span	The percentage of reaching the design compressive strength standard value (%)
plate	≤2	≥50
	<2, ≤8	≥75
	>8	≥100
Beams, arches, shell cantilever members	≤8	≥75
	>8	≥100
	-	≥100

In addition to the consolidation strength, the factors affecting the removal of the formwork must also fully consider the load pressure of the formwork. Dismantle them in order from small to large according to their load-bearing capacity. During the dismantling process, always pay attention to the condition of the consolidated body. If there is any abnormality or looseness, the formwork removal operation should be stopped immediately, and technical personnel should be organized to survey the site conditions to confirm that there are no quality problems before proceeding with the dismantling.

3.3 Technical Points of Steel Bar Binding

During the construction of the beam-type transfer layer of a high-rise building, a large amount of steel bars are required at the junction of the transfer layer girders to ensure the load-bearing capacity of the transfer layer. During the cutting process, it is necessary to reasonably plan the placement of steel bars according to the stress points and load-bearing parts of the transfer layer, tie the steel bars well, and weld the joints of the stressed steel bars. When connecting the steel bars used in the transfer layer, different steel bar connection methods are selected according to the location and stress conditions of the steel bars to ensure the firmness of the steel bar connections while minimizing engineering costs.

3.4 Technical Points of Concrete Pouring

During the construction process of the beam transfer layer, concrete pouring has an important impact on the overall project quality. First of all, it is necessary to ensure that the supply of raw materials is sufficient during concrete pouring to avoid interruptions in concrete pouring and affect the pouring quality. Secondly, in order to ensure the quality of pouring, the layered pouring method is adopted, and the pouring height of each layer is reasonably divided according to the total height of pouring. The vibrating operation can be stopped only after the concrete appears to be slurrying. The quality of the vibration is tested, and manual tamping is organized where the vibration is not in place.

4. QUALITY CONTROL OF BEAM-TYPE TRANSFER LAYER CONSTRUCTION

4.1 Determine the Seismic Resistance Level

Before constructing the beam transfer layer of a high-rise building, the seismic resistance level that the building needs to reach must be determined based on the specific height, geological conditions and geographical location of the building. The seismic resistance of the upper and lower parts of the transfer layer is designed according to the seismic resistance level to avoid insufficient seismic resistance of the transfer layer and potential safety hazards. For vertical buildings, the lateral force resistance of the transfer layer must be higher than 80% of the previous layer to meet construction requirements.

4.2 Pay Attention to the Graphic Design Layout of the Conversion Layer Structure

During the construction process of the transfer layer, not only the load-bearing capacity and seismic coefficient of the transfer layer must be considered, but also the graphic design and layout of the transfer layer must not be ignored to achieve the unity of practicality and aesthetics. When carrying out graphic design and layout work, in order to ensure the appearance of the exterior, the use of vertical components should be reduced within the scope permitted by technical conditions. The design of modern buildings is no longer limited to the practicality of the building. It is also constantly pursuing the beauty of the building and showing its unique architectural charm. Therefore, we must also pay attention to the beauty of the structural layout during the construction of transfer floors.

4.3 Carry Out Testing and Selection of Raw Materials

High-rise buildings have higher requirements for stability. When constructing beam-type transfer floors, the quality of raw materials must be controlled. The steel bars and concrete used in the construction of beam-type transfer floors must be quality tested in advance. Only those that pass the test can be used. Investing in the construction process is the basis for ensuring the quality of beam-type transfer layer construction and reducing safety hazards. When configuring the steel bars of the transfer layer, select steel materials of corresponding specifications according to the load-bearing capacity of different locations to ensure the stability and load capacity of the beam-type transfer layer. Specialized personnel should be assigned to observe and detect the deformation of the steel bars. If the deformation of the steel bars is too large, the construction should be stopped, and the relevant materials and equipment should be adjusted before the construction is restarted.

4.4 Temperature Control of Concrete

Temperature has an important influence on the initial setting and firmness of concrete. During the concrete pouring operation, the temperature of the concrete needs to be measured in real time. When the temperature difference between the inside and the surface of the concrete is too large, the temperature of the concrete must be controlled. At the same time, pay attention to the maintenance of concrete. The commonly used maintenance method during construction is the film covering method. The surface of the concrete is covered with a film to reduce water loss. If the temperature of the construction environment is low, it will affect the consolidation of the concrete. On the basis of film covering, Cover with canvas to increase the temperature of the concrete. In addition, during concrete curing, the surface of the concrete must have sufficient moisture so that the concrete will not crack during the consolidation process.

5 CONCLUSION

In summary, through the analysis of the technical points of the construction of beam-type transfer floors in high-rise buildings, we explore effective methods to improve the construction quality of beam-type transfer floors, which has positive guiding significance for the practical application of this technology in the construction process. With the continuous development of our country's national economy, urban construction work is also carried out in depth, and the number of high-rise buildings in cities is also increasing. How to ensure the diversification of functions of high-rise buildings and realize the transformation of transfer layer structures is a challenge faced in the development of urban construction in our country. A big problem. Beam-type transfer layer construction has a simple construction structure and easy operation, and plays an important role in realizing the functional diversification of high-rise buildings.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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