

Analysis for Application of Deep Foundation Pit Support Dewatering Construction Technology in High-rise Buildings

Zan Hu

¹ Shaanxi Provincial Land Engineering Construction Group Co.,Ltd., Xi 'an, Shaanxi 710075; China;

² Shaanxi Dijian Guantian Investment Construction Co., Ltd., Baoji, Shaanxi 721000, China

Abstract

With the in-depth development of the economy, high-rise buildings have also achieved rapid development, but at the same time, people's requirements for building quality have gradually become higher, and there are still many problems when carrying out construction operations, which will not only affect the building to a certain extent. quality, and may pose a threat to people's safety. Based on this, this paper analyzes the current high-rise building projects in my country, focuses on the problems encountered in the construction of deep foundation pit support technology, and also discusses relevant solutions on this basis, in order to provide reference for relevant people.

Keywords

High-rise building, Deep foundation pit support work, Construction Technique.

1. Introduction

A high-rise building project is an extremely high-risk project. Errors in any part of the construction process can bring life safety to the staff and bring huge economic losses to the entire construction enterprise. Although the relevant government of our country has invested a lot of money and energy in the construction of deep foundation pit support for high-rise buildings in recent years, and has also made remarkable achievements, there are still many problems in the application of deep foundation pit support construction technology for high-rise buildings. . Therefore, each construction enterprise must attach great importance to the discussion on the application of deep foundation pit support construction technology for high-rise buildings, and propose some effective management measures, so as to continuously improve the quality level of the entire high-rise building project. In addition, various enterprises should continue to increase investment in the research of high-rise building deep foundation pit support construction technology, and strengthen the training of high-rise building engineering construction technicians. For high-rise building projects, it has a very high construction risk. During the construction of the building project, no matter which link has a problem, it will seriously threaten the construction project. The safety of workers, and for the construction unit, will also cause significant economic losses. Although in recent years, the relevant government departments have increased their investment in the deep foundation pit support operation, including a lot of financial and energy support, and have also achieved obvious results, but from the application of deep foundation pit support technology. Look, in the construction process, there are still a series of problems. Therefore, the construction unit should strengthen the research on the deep foundation pit support technology, and explore an effective construction plan in order to strengthen the construction quality. In addition, for each construction enterprise, research efforts should also be increased, and more attention should be paid to the training of relevant technical personnel.

2. Construction technology types of deep foundation pit support engineering

With the rapid improvement of the level of construction technology in our country, deep foundation pit support technology plays an increasingly important role in the entire construction process. It can better ensure the normal operation of high-rise building projects and the safety of the building itself. For different building types, deep foundation pit support also has corresponding technical types. The following is a brief analysis of the most commonly used support technologies in the construction process of construction projects.

2.1. Construction technology types of deep foundation pit support engineering

The supporting structure of deep foundation pit supporting steel sheet piles is a relatively common construction technique, and compared with other construction techniques, the operation of this construction technique is relatively simple. Therefore, high-rise building enterprises often use this technology in the actual construction process. In addition, compared with other more complex construction technologies, the economic investment of this construction technology is also relatively low, and the use of this construction technology can greatly reduce the economic expenditure of construction enterprises. In the actual building construction process, this construction technology is mainly suitable for buildings with soft floors.

2.2. Design of underground diaphragm wall

Compared with the support structure technology of deep foundation pit steel sheet piles, this technology is more difficult. However, it can better improve the stiffness of the entire building, thereby better ensuring the safety and stability of the building. Therefore, many companies gradually began to use this technology as one of the main technologies in building construction. This construction technology is mainly applicable to the construction environment with complex geological structure.

2.3. Architectural design of row pile support of column cast-in-place piles

The operation process of this kind of support technology is relatively complicated. When operating, the construction personnel must accurately understand and master this technology. In addition, and for different types of buildings, it is divided into two main design forms: sparse row design and close row design. Therefore, this construction technology puts forward higher requirements for construction personnel, and any small mistakes in the construction process may bring huge economic losses to the enterprise. For example, construction technicians must ensure the tightness and reliability of concrete connections when operating. In addition, during the construction process, it is necessary to use high-pressure grouting, the only way to better prevent groundwater from entering the deep foundation pit support structure at will, thereby increasing the safety hazard of the building.

3. Control of technical key points in the construction of deep foundation pit dewatering engineering

3.1. Recharge technology

In order to make the deep foundation pit support technology better applied to the actual construction process and reduce the hidden safety hazards of the building, each construction enterprise should use the recharge technology as much as possible. As we all know, due to the influence of weather and other aspects, precipitation greatly increases the safety hazards of buildings, and the most fundamental measure to avoid this phenomenon is to reduce the loss of groundwater under buildings. We can use the recharge technique to build a row

of well points between each dewatering well point and the building. Then, when pumping these well points, we can use the recharge well to pour the appropriate amount of water into the soil layer, and use the water that has been poured into the soil layer to form a stable curtain, which can better reduce the construction A large amount of groundwater is lost underground, ensuring that the amount of groundwater is always within a safe range, thereby better ensuring the safety of the building itself.

3.2. Using sand trench or sand well recharge technology

Although the recharge technology can better ensure that the underground water volume of the building can be within a safe range, this technology cannot completely solve this problem, while the sand trench and sand well technology can better solve the problem. These two technologies have been applied to the actual construction process by many construction enterprises, and have also achieved great achievements. The sand trench or sand well technology is to build some sand wells between various buildings and dewatering well points for protection. Then, along the surrounding of these sand wells, we can arrange some sand trenches, and then use the sand trenches and sand wells. The well can discharge an appropriate amount of water discharged from the dewatering well point into the sand trench, and then the water finally enters the ground through the sand well, thereby ensuring the water volume of the groundwater of the building.

3.3. Guarantee the construction quality around the well point pipe

Ensuring the construction quality around the well point pipe of the building is one of the foundations to ensure the normal progress of the building project. At the same time, it can prevent precipitation well and ensure that the groundwater under the building is always within the specified range. For example, when we build wells around a building, we should strictly follow the existing regulations, that is, the number of wells should be increased as much as possible around the building, and the number of wells should be minimized in the middle.

4. Concluding remarks

The deep foundation pit support project plays a vital role in the whole high-rise building construction process. The quality of this project is one of the main factors affecting the safety and stability of the building. However, due to the influence of various factors, the deep foundation pit support engineering of high-rise buildings in my country is still relatively backward compared with foreign countries, and there are always many problems in the actual construction process. Therefore, various high-rise building engineering construction companies must improve the technical level of deep foundation pit support as soon as possible, and continuously improve their technical level and construction level to ensure that their construction quality can meet the standards set by the state, thereby better guaranteeing the entire building. quality level.

Acknowledgements

Fund Project: Internal Scientific Research Project of Shaanxi Provincial Land Engineering Construction Group Co., Ltd. (DJNY2022-47).

References

- [1] WANG Miaoling,WANG Hao.An experimental study on local seismic behavior of deep foundation pit supporting pressure structure of high-rise buildings[J].China Earthquake Engineering Journal,2022, 44(2):299-305.

- [2] Zheng Ping, Wu Xujun, Du Fuzhi. Technical Analysis on High-Rise Building Foundation Engineering Construction in Confined Aquifer[J].Geotechnical Engineering Technique,2012, 26(3):159-163.
- [3] Liu Yang, Zhao Hujun, Bai Qingjiang, et al. Construction Technology for Deep Foundation Excavation Supporting with Anchor Under Confined Water of a High-rise Building[J].Construction Technology,2015, (19):43-47.
- [4] Cheng Jun, Liu Jiahua, Xu Lin. Deep Foundation Excavation Technology for a Tall Building[J]. Construction Technology,2012, 41(19):62-64.