

Analysis on Deep Foundation Pit Support Construction Technology in Construction Engineering

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Abstract: Deep foundation pit support construction is very important. The effect of support has an important impact on the quality and construction safety of the building in engineering construction. Deep pit support generally has the characteristics of large depth and compact area, which increases the risk coefficient of the project. In construction engineering, we should monitor the quality strictly, control each link closely, and strengthen on-site supervision. The construction quality of deep foundation pit support largely depends on the quality of design scheme. Therefore, we should constantly optimize and improve it in the construction scheme design and further improve the construction quality of deep foundation pit support in construction engineering by learning from other experience.

Keywords: Construction Engineering; Construction Technology; Deep Foundation Pit Support

With the acceleration of urbanization, the urban population is becoming more and more, which leads to the shortage of land resources. Therefore, there are more and more high-rise building projects and their building scale is increasing. In order to increase the available space of the building, the underground engineering and basement space are also increasing. In this situation, deep support construction technology has been more and more widely used and it plays an important role in building construction. Deep pit support with poor quality and effect will cause problems such as edge collapse. It is the key factor to ensure the stable promotion of construction engineering and maintain the safety of the project site that we should strengthen and improve the support construction technology of deep foundation pit combined with practical situation in engineering construction.

1. Common Problems in Construction Engineering Deep Foundation Pit Support Construction

1.1 Unreasonable Repair of Side Slope

Repair of side slope is extremely important in deep foundation pit support. It has a decisive impact on the whole support quality and is the fundamental premise to ensure smooth construction. In actual construction, there is contempt for slope repair management due to the tight construction period and the pursuit of construction progress by relevant units. The relevant construction personnel have weak safety awareness, and the safety management personnel are inexperienced. All kinds of situations eventually lead to the large randomness of deep foundation pit construction, obvious problems such as blind construction and the construction is not carried out in strict accordance with the plan. In the construction of deep foundation pit support in construction engineering, there are obvious situations such as less excavation or more excavation. Moreover, it is not implemented in strict accordance with the requirements of relevant regulations in the side slope repair and the protection process during construction is obviously unreasonable. This situation has brought potential dangers for the safety of the construction site ^[1].

1.2 Great Differences between Construction Design and Practical

Construction

The quality of construction design is very important and it is also the key point to ensure construction safety. However, the design segment of some construction units in deep foundation pit support construction is relatively hasty and is not in accordance with design requirements in on-site engineering management. They started the scheme design without actually exploring the underground hydrological conditions. Therefore, there are great differences between the on-site environment and the scheme during the construction, which not only affects the on-site construction progress, but also brings great safety risks. In addition, there are also situations that on-site staffs do not operate according to the design requirements. For example, the staff does not comply with the requirements for the adjustment of mixing amount when mixing cement. There are situations such as random water injection for the convenience of operation, which affects the strength of cement and have a negative impact on the support quality of deep foundation pit.

1.3 Poor Construction Quality of Excavation

Excavation is an important construction section. There is obvious lack of attention to excavation in many deep foundation pit construction management, which causes many problems for excavation quality. One of the most common problems is that the tacit cooperation among various teams is insufficient in excavation construction resulting in the delay of construction period. When the construction period is tight, the construction is carried out blindly in the excavation, the operation is not carried out in a reasonable order, and the quality of on-site control is insufficient in order to catch up with the progress. The emergence of various situations has brought serious potential safety hazards to the construction site and affected the normal progress of deep foundation pit support to a certain extent ^[2].

2. Construction Technology of Deep Foundation Pit Support in

Construction Engineering

2.1 Soil Nailing Construction

The protection of side slope is important. In order to avoid landslide and other problems, soil nailing is generally used to strengthen the original side slope. This is also a common support technology in construction. The method can effectively improve the stability of side slope soil layer and strengthen the integrity of side slope soil layer through the action of soil nailing. In on-site construction, it is necessary to select the strength and tension of soil nails by machine before using this process. During construction, the tension and bending moment shall be controlled to ensure the balance between the forces of multiple soil nails. Here are some points need to be noticed in deep foundation pit soil nailing support.

First of all, Before using the soil nailing process, the pull-out experiment shall be carried out according to the requirements of deep foundation pit support construction in combination with the site environment, and the pull-out force shall be judged through the experiment to ensure that the pull-out force meets the standard requirements before it can be used. During the pull-out test on site, the third-party supervisor shall preside over the test on site and complete the inspection and acceptance of the test quality on the spot.

Second, we should calculate the depth of the soil nailing. In the process of calculation, the on-site environment shall be fully investigated and combined with the construction design requirements and on-site environment deeply so as to ensure the effectiveness of the calculation results. In the ongoing construction, the hold depth of every soil nailing support should be marked well and it can be regarded as the reference data for the continuous construction.

Third, the materials quality of deep foundation pit support shall be managed. During the construction of soil nailing, the water cement ratio of cement mortar shall be strictly managed, and no one can be allowed to adjust it without permission. The relevant additives involved should be controlled strictly to ensure that the quality of cement mortar meets the requirements.

During on-site operation, it is strictly prohibited for workers to adjust the water cement ratio of cement mortar without permission. During the pouring, the cement mortar shall flow freely, and the slurry filling operation shall be done in time^[3].

2.2 Soil Anchor Construction

The preparation of soil anchor construction links shall be started after the soil layer is excavated to the design depth and the relevant foundation construction links are completed. The construction of hole forming is generally completed by circulating drilling rig. And in the process of operation, multiple processes such as hole cleaning and drilling shall be completed at one time. After the completion of the hole forming construction stage, the tie rod shall be placed and finally the grouting construction link shall be carried out. This link is very important. In the soil layer construction of deep foundation pit, the anchor construction will have an important impact on the quality of the whole project. Portland cement is generally used as grouting material. When selecting the type of cement, the groundwater quality at the construction site shall be detected. For example, different cement slurry shall be used for construction according to different water quality acidity and alkalinity. The fluidity of cement slurry shall be considered in the proportioning to ensure that the fluidity meets the pumping requirements, which is the basis for ensuring the smooth construction on site. In order to avoid the occurrence of dry shrinkage or bleeding of cement slurry, which will affect the progress of the whole project, a certain amount of calcium sulfonate can be added to the cement preparation to solve the dry shrinkage or bleeding. In the grouting process, the cement slurry is mainly pressed into the pull rod by the grouting pump, and then injected through the anchor hole of the soil layer.

2.3 Slope Protection Pile Construction

During the construction of slope protection pile, the drilling shall be in accordance with the corresponding design requirements. In the drilling link, the commonly used equipment is screw drilling machine. After the drilling is completed, the cement slurry shall be poured from below the hole bottom to ensure that the cement slurry is gradually poured into the hole at a uniform speed and stably, so as to ensure the overall pouring quality. The underground environment shall be detected before pouring. The key points of observation are groundwater and hole collapse. The pouring construction can be carried out only after the underground environment is determined to meet the requirements. During the pouring construction, the level of cement slurry will gradually rise. After reaching the marked position, the drill pipe shall be raised and then fill it with reinforcement cage and aggregate. Finally, we can conduct slurry supplement construction for the remaining part by means of vibration, and the slurry supplement link shall be carried out in layers^[4].

2.4 Construction Management of Deep Foundation Pit Support

We should improve the management of foundation pit support construction, put forward strict requirements for relevant managers, and strengthen the supervision of all links of foundation pit support construction. Before the specific construction, the hydrology and geology of the site shall be explored, and then the excavation scheme shall be designed in combination with the actual situation. At the same time, the construction plan of deep foundation pit support shall be demonstrated to ensure the feasibility of the construction plan. When auditing the construction plan, the process shall be strictly controlled, and the emergencies in the construction plan shall be reviewed to ensure the construction quality of deep foundation pit support. At the same time, we should strengthen the inspection of the surrounding environment, pay close attention to the deformation of soil slope, implement this work to relevant personnel, and protect construction safety and quality.

3. Conclusion

In a word, we should pay attention to the construction quality of deep foundation pit support under the background of the rapid development of China's construction engineering and the situation of more and more high-rise buildings. The construction quality has a great impact on the service life of buildings and on-site construction safety. This paper discusses the problems existing in the current construction of deep foundation pit support and puts forward the strategy of strengthening the construction management of deep foundation pit support, hoping to provide value for promoting the rapid development of construction engineering in China.

References

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