

2014

BioTechnology

An Indian Journal

FULL PAPER

BTAIJ, 10(15), 2014 [8907-8911]

Use and research on construction on the effective use of foundation reinforcement structure in the process of civil engineering

Xueke Yan

Institute of Civil Engineering of Hainan University, Haikou, 570228, (CHINA)

ABSTRACT

Recent years, real estate development projects and municipal projects have gradually increased. They drive the development of the construction industry. Quality of buildings is increasingly becoming the focus of attention. Foundation is the premise of construction. Construction technology is directly related to the security and progress of the whole building. This paper mainly focus on the construction process on the basis of some models described, analyzed the relationship between the foundation and the foundation and construction methods, research on the applications of foundation reinforcement technology in civil engineering, in order to improve construction quality.

KEYWORDS

Civil engineering; Foundation; Reinforcement technology; Application.



INTRODUCTION

At this stage, with the improvement of people's living standards and increasing engineering and construction, architecture and our lives, working closely linked, the public put forward higher requirements on the quality of the project. The past two decades, it developed very rapidly at home and abroad, the development of the theory of design calculations, the new structure, new construction technology and construction machinery continue to emerge, engineering applications are increasing, the normal design. Pile foundation of construction can meet the demands of basis of force and deformation for high-rise buildings, and its application effect is good. But under the influence of a variety of unusual factors, same as the other civil engineering structures, project quality accident prone, pile project quality accident is more common at home and abroad, to know the method of the accident. Grasp extent and treatment measures are different; the consequences of an accident will be completely different. Serious quality accident and unreasonable measures will cause great loss of people's lives and property, scientific and reasonable treatment measures can minimize losses caused by the accident and reduce the adverse effects caused by the accident. The foundation is an important part of the building, in the construction, we should pay attention to the artificial control of work to improve construction workers technology, strengthen supervision and management of the project, reduce the negative impact of subjective factors on the quality of construction, and improve the overall level of building construction.

INTRODUCTION OF BASE REINFORCEMENT STRUCTURE

Base reinforcement structure refers to the foundation of the construction work of the foundation. Foundation refers to the soil of building at the bottom. That is the stratum supporting the formation under the foundation, carrying the load of the building. The foundation refers to the buildings between buildings and the soil. Its role is to transfer building load to the foundation, as detailed in Figure 1. The post is vertical buried in the soil or slightly inclined, the cross-sectional dimensions is smaller than the length. The pile and cap connected the pile consists of deep foundation, referred to as the pile foundation. Compared with shallow foundations, pile foundation can improve the force situation of shallow soil, full carry the capacity of deep soil, and the pile with a small deformation, high capacity, suitable for mechanized construction and other advantages, it is a widely used foundation type. Pile with a variety of functions, one is to withstand the axial compressive load, as applied to the pile foundation and pile foundation houses the tank. Second is the pullout effect by the axial load, such as used in pile foundation dock floor. The third is bending action to withstand horizontal loads, such as by boat and mooring piles used in cluster trestle ago. Fourth, to withstand a combination of the two superimposed loads, such as pile pier abutments and pile load combination of vertical and horizontal pile foundation and tower on the composition of pulling and horizontal loads and anchor piles. Foundation reinforcement structure must serve to prevent the destruction of the gravity and intensity of the effect of the imbalance, measure its foundation subsidence caused by the magnitude of the load, and implement effective control measures to make load of the building safely passed to the foundation smoothly. Foundation reinforcement structure should be designed according to the height and size of the building, in the premise maximize compliance with construction specifications, as far as possible choose a basic type with relatively small depth, simple construction program, not difficulty technical. In short, make use of natural ground conditions and build the shallow foundation. For foundations with poor construction environment or common, foundation reinforcement processing techniques should be used. On the basis of artificial modification, create foundation conditions of compliance with building production to meet the construction needs. Therefore, the basic foundation is usually divided into natural foundation and artificial foundation, while the latter one has points with shallow foundation and deep foundation.

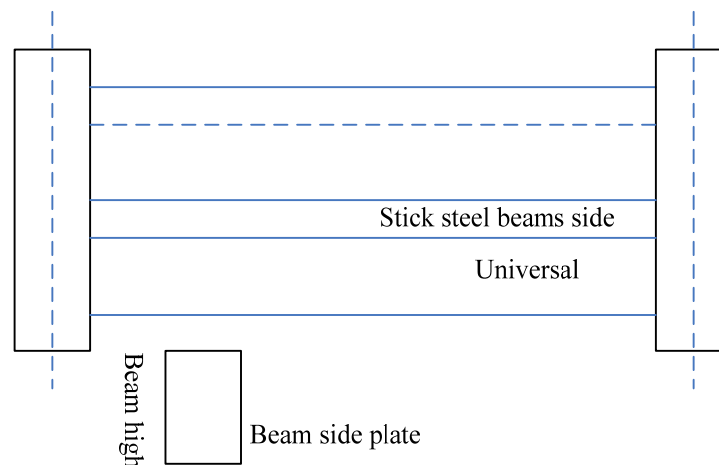


Figure 1 : Reinforcement method and two-story partial structure figure

THE MAIN FACTORS OF FOUNDATION REINFORCEMENT STRUCTURE

Stability of the foundation reinforcement structure is constrained by many factors, mainly in the following aspects: firstly, the type of foundation, the basis of each type of structure has its advantages and disadvantages, in the play support function, integrity of the building will be subject to different degrees. Secondly, since the construction of buildings of different intentions, resulting in the difference between the use of its structure, durability and safety, etc., they can cause varying degrees of pressure applied on the basis of the foundation, causing deformation strengthening too early. Thirdly, strengthening structure technology is influenced by value of building structure deformation , trends and speed, reinforcing the impact of construction technology and the master degree of workers. Lastly, the quality of the structure is often reinforced by the construction intention of the building itself. Excessive emphasis on the speed and benefits of construction will increase the possibility of foundation defects.

USE AND RESEARCH ON CONSTRUCTION ON THE EFFECTIVE USE OF FOUNDATION REINFORCEMENT STRUCTURE

Emphasis on engineering exploration work in order to ensure its accuracy

Before engineering investigation, rigorous survey program should be developed, determine the engineering survey mission and purpose reasonably, exploration work with purpose according to the plan in order to ensure exploration comprehensive. Firstly, overall understand the characteristics of the construction, including the soil type, geological structure, hydrological conditions of the construction site etc. Construction flowchart with steel piles is shown as Figure 2.

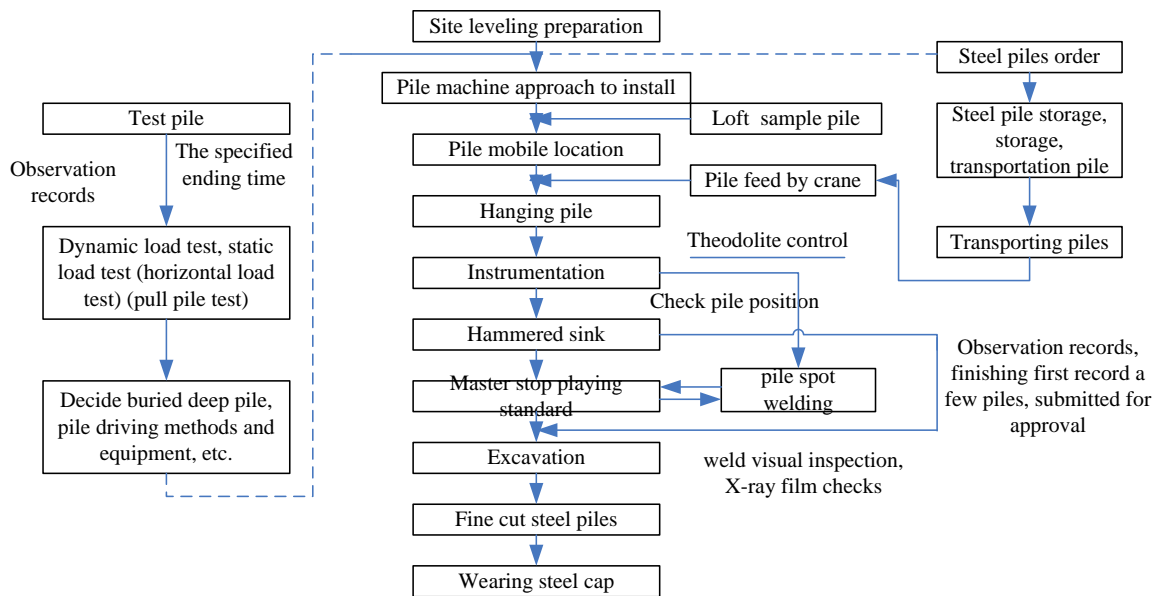


Figure 2 : Construction flowchart with steel piles

According to construction conditions and building plan, develop construction program of foundation reinforcement structure. Accident prevention projects to increase preventive measures and response plans, and resolving conflicts between construction and risk factors, do well engineering exploration work. Exploration work is the basic condition and an important prerequisite for building construction and it should be given adequate attention. According to survey results, for the more weak and complex construction of the foundation should be considered appropriate way to determine the type of construction for caution. Second, when drilling survey, according to the relevant requirements of drilling designed to determine the appropriate drilling depth. For end-bearing piles, based primarily on the top surface of the pile tip layer determines the slope of the force, generally 12-24m. When the supporting layer gradient between two adjacent survey points is measured more than 10% or its structure is complex, undulating, it should be properly encrypted exploration point probe according to the conditions and the construction site of the construction environment. For friction piles, they are usually set exploration hole with 20-35m, but encountered a special nature or horizontal distribution of soil significantly different circumstances, it should be properly encrypted exploration points. For complex geological conditions of the site, it should be listed piles arranged to carry out exploration activities and press line. In addition, drilling depth must meet certain criteria, if the thickness of the compressed soil or soil too shallow piles under the foundation, the foundation will not to reach the requirements, and thus the change in the value of the foundation or pile bearing capacity cannot be calculated. Therefore, a lot of exploration work should be done during drilling exploration work, increased exploration and drilling pit distribution, ensure sufficient drilling

depth, expression bedding soil consistency and uniformity of pressure, because the foundation appears to avoid bending or warping phenomenon, and to building safety and security.

Based on the survey results, design scientific and reasonable structure of foundation

Foundation design should be according to site-specific, soil conditions at the site, structure type, as well as the requirements of the building as the main reference basis, not only to achieve applicable, for economic purposes, but also to ensure that the future use of foundation in the process of ruggedness and durability. The recommended value engineering survey report shows, the designer should be determined through a rigorous inspection and calculation procedures, load test and evaluation of the foundation bearing capacity and actual soil pressure through other means. The results and exploration reports suggest the value of the difference is greater, making double counting, until it is determined the correct compression values. Of particular note is that when using basic natural foundation for the construction, engineering and responsible officers must be full support to carry out design work, cross-checked construction design. According to the coordinates set foundation vertical and horizontal of the center line firstly, the location of control point set as far away from the construction site shall, in order to not interfere with the construction and soil disturbance affecting principle. Determine the basis of the construction according to the design aspect and dimension of the intersection bitmap pile, knocking a small stakes and nailed small round nails, then this is the center of a small set of samples per nail pile hoop, then the outside of the hoop-like pile of cast lime, to show pile mark. Kind of pile construction control precautions are as follows Figure 3:

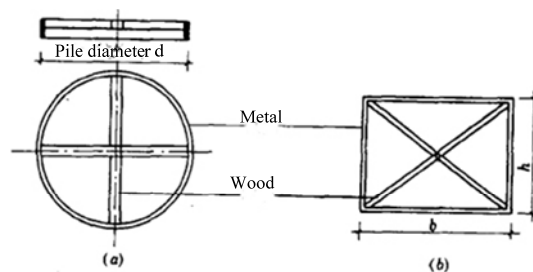


Figure 3 : Hoop-like pile

Reinforce the foundation structure, strengthen the construction technology

Selection of the foundation structure. The basis transmitted the load to the building foundation. It is the linker between them. If the foundation has a strong bearing capacity, the base can be arbitrarily distributed using vertical or longitudinal way. Assuming bearing capacity of the foundation is weak, you must take the corresponding action. When we are prospecting, we should identify soil composition, in order to provide reliable parameters for foundation treatment. When calculating, we estimated approximate weight of housing, and get an average load. Then, compare with the bearing capacity of the foundation itself, if the load is greater than the average more than twice, or need to increase stretched raft foundation. Compared with the independent foundation, wide piece slab foundation of the contact surface, the load evenly dispersed on the ground, maintaining a strong long-term carrying capacity. However, the foundation cost higher, increasing the cost of the project expenses. The strengthened hoop is shown as Figure 4.

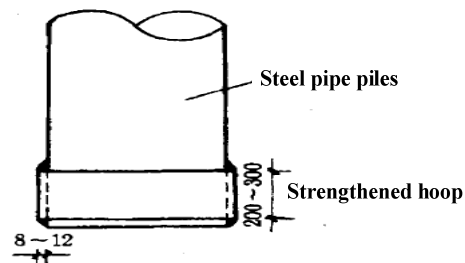


Figure 4 : Strengthened hoop

(1) Joints need to set during foundation construction, to ensure the wide slit will not affect the stability of the building, while maintaining the independence of the building, while also closely tracking and observation of the foundation and soil subsidence. If not set or increase the stretch stitch spacing structure, after pouring with permanent deformation joints and some other necessary measures should be taken (construction process see Table 1), etc., to prevent structural cracking, reduce the adverse effects caused by concrete shrinkage of the building. According to the foundation bearing stratum site soil conditions, set up a permanent deformation joints between the high-rise buildings, in the use of natural foundation depth, it should be deeper than the common basis of 2 m above the podium. When the construction does not have the above conditions, and high-rise buildings should be increased through overhead between the layers, and calculate the implicit

qualitatively high-rise buildings. In addition, settlement is made of a hard material filling, put into use after seam construction walls on both sides prone to cracking, causing leakages. Whether seam pitch it properly is handled or not, is directly related to the intensity of the aerial layer balancing role and architectural layer problems.

(2) If expansive soils, due to consolidation of soil collapsible loess appear on the foundation and other conditions, by increasing the appropriate filling to reinforce the foundation. When the basement structure is too long, you can use compensatory shrinkage of concrete and micro-expanders in place, so that the basement structure designed to meet the limit values specified in the expansion.

(3) Composite foundation is a common form foundation reinforcement structure in recent years, it solves problems of the pressure due to the differences between the foundation of the building and the adjacent building and caused imbalances, on the one hand to improve the foundation bearing layer load capacity, on the other hand also can effectively control the settlement building. So, set up a permanent deformation joints or pouring belt use after construction method can maximize the stability of the foundation, effectively improving the overall service life of high-rise buildings.

CONCLUSION

In summary, the key lies in strengthening the foundation structure is doing well foundation construction work, foundation and foundation reinforcement work is an important part of civil engineering construction. Reinforcement technology can improve the use of architectural and profit, otherwise, it will cause significant waste of resources, or even lead to project an accident. Therefore, improving the quality of foundation reinforcement structure is necessary.

REFERENCES

- [1] Junshuai Huo, Wang BingLong, Zhou Shunhua; Metro Shield Tunnel wear under foundation reinforcement program intercity rail safety analysis[J], China Railway Science, **5**, 71-77 (2011).
- [2] Lu Pin; Field study[J], Xinzheng highway soft foundation reinforcement mechanical behavior, Foreign Highway, **1**, 53-57 (2014).
- [3] Zheng Gang, Liu Qingchen, Deng Xu and so on; Measurement and analysis of excavation under the influence of both the box lying subway operators[J], Rock and Soil Mechanics, **4**, 1109-1116 + 1140 (2012).
- [4] Cao poetry set; Foundation reinforcement program designed under complicated geological conditions [J], China Municipal Engineering, **1**, 46-48 + 51 + 84 (2011).
- [5] Zheng Pengyi, Deng Longzhao; Application of deep cement mixing pile foundation reinforcement in revetment[J], Water Transport Engineering, **5**, 134-138 (2012).
- [6] Zhang Zhiyong, Li Shuhai, Sun Hao; MJS construction method and its application in ultra-deep foundation reinforcement of a subway project in Shanghai [J], Exploration Engineering (Rock & Soil Drilling and Tunneling), **7**, 41-45 (2012).