Study on Application of Construction Technology for Diaphragm in Underground Building

Xuexin Liu

Shandong University of Arts 250300

Abstract: With the continuous development of social economy, the construction of construction projects has also shown a trend of rapid development. Various advanced technologies have been applied to the construction of construction projects. One of the underground diaphragm wall is widely used in engineering construction technology, the construction period is short,for less affected by the geological conditions, the construction efficiency is relatively high, the project has been widely used in the current construction. This article will analyze the application of the construction technology of the diaphragm wall construction and put forward corresponding measures.

1. Introduction

In recent years, under the rapid development trend of construction engineering, people's requirements for construction are constantly increasing. Through various researches and analyzes, various advanced technologies have been widely applied to the construction projects. Based on a socio-economic benefit and consider the interests in enterprises, underground diaphragm wall construction technology as the current construction of an important technology, but also is a latest technology, the construction of the building has been widely used. The underground diaphragm wall construction technology has many advantages, including the impact on geological conditions, low noise, high construction efficiency, and the structure of the wall rigidity is relatively large, it has an important role in the construction of housing construction, but also full play an important application value. Although there are shortcomings in the construction of continuous diaphragm wall construction technology to some extent,, but overall the advantage is greater than the disadvantages, so this advanced technology has been widely used in construction.

2. Related Description of the Concept of Underground Continuous Wall

Diaphragm wall is a basic technology in the construction, it is through the use of a mining machinery, to dig out a long narrow slot along the set axis, the deep groove of some soil or debris removed, through into the steel cage, by pouring a certain amount of concrete, built into a cell slot, forming a reinforced concrete wall. With the continuous development of economy and science and technology in our country, various groove machines in our country are also constantly developing and perfecting, and various construction techniques are also emergent one after another, and the materials of the wall are not simply concrete, either as impervious or retaining soil, but also more applied to the construction of the foundation. The continuous wall technology in our country has been very mature. According to the related statistics, the excavation depth of underground diaphragm wall reaches 140 meters. In the initial stage of construction of this material, it is mainly used as retaining wall. With the continuous development of various technologies, the continuous application of various new materials, and gradually as the building's foundation or the main structure has been applied [1].

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The main function of underground continuous wall are: (1) It has a certain role in retaining the trench, the process of digging the trench, close to the surface of the soil is prone to collapse phenomenon, therefore, in the process of trench excavation, are play the role of retaining earth through continuous walls. (2) As a measure, the diaphragm wall also defines the location of the groove and can be used as a measure of elevation and accuracy of the groove. (3) Being able to carry heavy loads effectively, such continuous walls can serve as a support for mechanical tracks and can withstand some significant loads during construction.

3. Underground Continuous Wall Classification

The construction of the diaphragm wall will be restricted by the machinery. The thickness of the diaphragm wall is also a certain modulus. The thickness of the diaphragm wall can not be flexibly adjusted. It needs to be fully used in the excavation project of a certain depth and some advantages will gradually emerge. The normal continuous wall needs to be used in the deep foundation pit construction. When the local and underground construction is carried out at the same time, the continuous wall needs to be used as the retaining wall. Often the application of continuous wall classification includes: (1). In accordance with the way of the wall of a pile of rows, slotted; (2). According to the use of the wall is divided into cutoff walls, retaining walls, etc.; (3). There are also according to the wall the material is divided into reinforced concrete, mud tank wall. With the maturity of relevant technology in the construction of the construction process, there has been a great development and improvement in the construction technology and related materials of the continuous wall.

4. Advantages and Disadvantages of Diaphragm Walls

Underground diaphragm wall construction technology has been widely used in the construction industry which has become an important form of maintenance of the current construction of the pit, diaphragm wall high and relatively rigid, it is the most basic and most common underground structures and continuous diaphragm walls are widely used in housing construction. They will also be the development trend of the future construction industry, laying a good foundation for promoting the development and progress of the construction industry.

4.1 Advantages

The construction of underground continuous wall is mainly applied mechanization of a mode of operation, advanced mechanized operation can effectively reduce noise, but also on the basis of construction to fully enhance the efficiency of construction and construction quality, to a certain extent, reduce the working intensity of construction workers, shorten the construction period, mainly the use of machinery for construction, the vibration is relatively small, will not have a certain impact on the lives of residents, suitable for urban construction, in the process of housing construction, will not cause certainty to the surrounding residents Interference. In addition, underground continuous construction technology is widely used, and is suitable for different soil engineering construction, such as some gravel rock, hard rock and other foundations, are able to carry out the construction of underground diaphragm wall. At the same time underground diaphragm wall stiffness is better, and the water permeability is better, the general pressure to withstand the thickness of 0.6-1.3 meters between, in some deep foundation pit with a certain role in retaining, has been widely used in housing construction,it can effectively achieve impermeable construction.

4.2 Disadvantages

Each construction technology has both advantages and disadvantages. The advantages of underground continuous wall construction technology are more than disadvantages. It has been widely used in construction projects and has great advantages over other technologies. As the continuous wall is a period of paragraph, you need to segment the organic connection, then the connection site is relatively fragile, its hardness is not enough in the actual construction operation is prone to problems. In the

continuous wall applied to the actual construction, due to improper operation of construction technology, will lead to continuous wall adjacent wall leakage occurs, it will affect the actual construction of the project. In addition, under special geological conditions, it is necessary to invest a great deal of funds to carry out the construction. The difficulty of application of construction technology will also increase correspondingly. Moreover, there will be a lot of residual mud after the construction of the continuous wall, and the handling difficulty is relatively larger, it has increased a lot more difficult for the construction work.

5. Construction and Application of Diaphragm Wall

5.1 Pre-construction Process

5.1.1 Construction Drawings Design
During the construction of diaphragm wall, the geological conditions of the construction site should be surveyed first. According to the relevant geological report and the related investigation, the design of the construction drawings should be well done. The design contents mainly include the groove digging method, reinforcement Cage production, the use of mud, tank joints at the junction of some of the content.

5.1.2 Construction Site Preparation
First of all, the relevant construction equipment and materials should be transported to the site. There are mud blenders, pool preparation, reinforced cage processing sites and concrete storage sites; then, the foundation for the installation of the digging machine site should be reinforced as the construction is in use mechanical products, the foundation must be strong enough to withstand some of the weight of machinery and equipment and vibration pressure; Finally, the site needs to install and configure the water supply and drainage equipment and power supply needs to be calculated, but also need to ensure the wall of underground continuous walls Stability, which requires Meyerhof's trench stability formula to be calculated, can fully guarantee the accuracy [2].

5.2 Construction of Underground Diaphragm Wall

5.2.1 Guide Wall Pouring Construction
Guiding wall pouring is an important part of the diaphragm wall construction, but also the most basic part of the guide wall not only has some measurement, and can give full play to retaining the function. In the actual construction process, (1) The guide wall ditch can not have any internal water, because a lot of water will guide the wall has a lot of erosion, affecting the stability of the guide wall, should be properly protected preparation, to ensure the dryness of the guide wall trench; (2) for the guide wall trench seal tight to prevent leakage phenomenon, to fully handle the guide wall trench inside the channel; (3) The guide wall into the original and some soil layers; (4) During the construction of the guide wall segment, the position of the rebar should be reserved in advance so that the rebar between the continuous wall and the continuous wall can be stabilized. During the construction of the guide wall, the vertical mold can ensure the stability of the guide wall and the proper style. After the construction is finished, the template needs to be removed, the back wall is used to ensure the stability of the guide wall, and the position is reinforced to prevent the phenomenon of movement. The following figure 1 is the guide wall construction.



Figure 1 guide wall construction

5.2.2 Underground Diaphragm Wall Configuration and Construction

In the process of underground diaphragm wall construction, firstly, the mud with a certain proportion must be configured and tested and analyzed according to the actual use of raw materials in the construction. The selected mud must meet the corresponding construction standards; then, during the actual construction process. It is necessary to survey the construction site and not allow surface water to accumulate in the construction site. Surface water should be treated with drainage machinery to avoid certain contamination of the mud and cause some problems [3]. In the meantime, the level of mud in the tank must be lower than the surface of the guide wall, and should be higher than the groundwater level, less than 0.5 m below the guide wall and above 1 m above the groundwater level, so as to be consistent with the post-construction operation of the guide wall. Sufficient mud preparation is conducive to the smooth construction of the late.

5.2.3 Trench Construction and Post-Cleaning Work

According to the actual design problems encountered in the actual construction, the trench should be segmented according to the drawings designed in advance. The trench should be divided into several sections, including the angles of some corner sections, which is helpful for the reasonable division of trenches and the trench the construction will also be affected by the geology. For the soft soil foundation, the rig needs to be used to effectively reduce the vibration during construction. After the trench is finished, a large amount of mud or residue will be left at the bottom of the trough. The cleaning work needs to be fully carried out to ensure that the trough bottom is clean and clean without any residual substances. The construction process must be controlled effectively, including the precipitation method and replacement method, wait until the end of construction, some completely precipitated after the waste, and then thoroughly cleaned, and replacement method is to replace the original mud, can effectively ensure a certain density, and then clean up. This will be able to remove some of the remaining particles of the bottom of the tank and waste clean.

5.2.4 Manufacture and Installation of Steel Cage

During the construction of the diaphragm wall, the installation and construction of the steel reinforcement cage is a very important process. The steel cage with the thickness of 3 mm is required to be welded to the steel reinforcement cage, which can fully ensure the stability of the steel reinforcement cage and play a protective role. Making a good steel cage in the installation process, but also a more complicated procedure, by using a way of oblique welding, can fully guarantee the

strength of steel [4]. The stability of the reinforcement cage needs to be effectively controlled in the cage body of the reinforcement cage and the part that needs to be buried in the soil layer. The accuracy of the reinforcement cage is strictly controlled. During the cage reinforcement construction, the height adjustment of the reinforcement cage is needed to improve the position of the reinforcement cage, Generally about 2mm, so that it can effectively prevent the precipitation process, the steel cage sink, causing a series of adverse consequences and effects, we must always ensure the scientific use of steel cage.

5.2.5 Underground Continuous Wall Connection Handling

For the construction of underground continuous wall connection, it is necessary to carry out construction and treatment at the joint location. The joint location needs to be well treated with water. To ensure the connection stability at the joint, effective measures should be taken to deal with it. Waterproof treatment, the use of nylon cloth bandages processing, in the post-construction process, these nylon cloth organic connections together, can play a certain role in waterproofing, it will reduce the accumulation of water on the wall caused by erosion. The construction of the guide wall mainly prevents the notch from collapsing and can store the mud. In the process of construction, it can also fully serve as a measurement reference as an important standard for the construction and installation of various equipment [5]. Therefore, it should be fully noticed that the displacement of the guide wall will have a great impact. The control of the guide wall should be controlled within a certain range. After disassembly, some support needs to be set up between the walls. Can fully ensure that the guide wall reaches a certain degree of hardness before it can be fully applied, prohibiting some heavy machinery and equipment to stay in the vicinity, affecting the stability of the guide wall foundation.

5.2.6 Development of Underground Continuous Wall Construction Technology

In the current rapid development of science and technology in the context of continuous practice and testing process, underground diaphragm wall construction technology is also continuously improved and lay a good foundation for the construction of housing construction works, but also a time-saving and labor-saving it will be an important technology in the future construction of buildings [6].

6. Conclusion

In summary, with the continuous development of construction, underground diaphragm wall as an important technology in construction, construction of housing construction plays an important role in the construction of underground diaphragm wall construction has been in the process of being widely used. It can effectively improve the stability and safety of housing. In practical application, by strengthening construction management, the construction level of housing can be effectively enhanced.

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