

Research on the slope support technology in civil engineering construction

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Abstract. For the whole process of civil engineering construction, slope support technology is a very key technical point of civil construction. Engineering and technical personnel shall be able to fully ensure the safety and firmness of the foundation structure of the engineering slope by setting up retaining walls or using other slope support treatment techniques, and extend the safe service life of civil engineering. Under this premise, engineering and technical personnel must integrate the technical measures of slope support into the construction process of civil engineering.

1 Introduction

The important construction techniques of civil engineering for slope support have been comprehensively promoted and used, fully demonstrating the important practical value of the slope support structure. At this stage, engineering slope support technology is increasingly enriched, and civil construction technicians should flexibly choose a variety of slope support modes to effectively ensure that the foundation slope structure of civil engineering is consolidated. Construction personnel must clarify the key points of the support construction for the retaining wall structure and other important slope support structures, and effectively ensure the safety of the slope support construction operation.

2 Basic characteristics and meaning of slope support technology

The basic meaning of the construction technology of the slope support engineering is to set up the slope retaining wall, arrange the anchor rod support structure or choose other types of slope support structures to achieve the goal of consolidating the safety performance of the slope soil structure. Effective prevention of defects in construction processing [1]. Under the current status quo, the engineering slope support technology has reached a relatively complete and mature level to ensure the effect of improving the strength of the slope. When selecting and using different types of civil engineering slope support methods, construction technicians must strictly ensure that the quality of civil engineering meets safety standards [2].

Specifically, in the implementation of the excavation of deep foundation pits, the correct use of slope support

methods has significant practical significance. In order to prevent slope collapse, water seepage of the engineering structure or other safety risks, engineers and technicians must deeply understand the application value of slope support technology, and choose the construction mode of slope support in combination with the basic characteristics of the civil building structure.

3 The important influence of slope support technology on the construction process of civil engineering

If the civil engineering building lacks the important guarantee of the slope support method, it will cause higher safety risk consequences [3]. Under the current circumstances, some civil engineering technicians do not use correct construction techniques to complete the layout of the slope support structure, which will cause the deep foundation pit of the building or other important structural parts lack firmness. The construction process of civil engineering has brought obvious adverse effects. Therefore, it can be judged that the technical measures of slope support help ensure the safety of civil construction structures and effectively improve the solidity of civil engineering.

Before the construction and treatment of deep foundation pits, civil construction technicians must first use the construction technology of foundation pit slope support to set up engineering support protection. The slope supporting structure has a good practical effect to ensure the overall structural stability of the building foundation pit, and can achieve the goal of comprehensively eliminating the hidden dangers of slope construction. At this stage, engineering construction technicians should choose the treatment method of underground continuous wall, anchor rod support or soil nail wall support according to the key points of civil

construction projects. They should reasonably use the engineering technical means of slope support to extend the safety life and eliminate the quality defects of civil engineering support.

4 Application cases of slope support technology

The rock slope of civil engineering building mainly contains soft structural surfaces. The above-mentioned engineering building structure is designed with a slope support height of 12.39m, which belongs to the first-class slope structure safety building level. The area where the civil engineering is located generally presents changeable and complex topographical fluctuations, and includes valleys and dissolution land forms. Through the preliminary survey of civil engineering, it can be judged that the engineering slope structure mainly consists of rock layers with a thickness of about 0.5m, of which more than 60% of the rock layer geological structure belongs to dolomite with moderate weathering degree, and the soil cohesion of 23.7C/KPa is obtained through the survey.

When constructing the slope support, the civil construction unit mainly designs the excavation slope ratio of 1:0.45 for the above-mentioned soft rock layer

area, and controls the slope excavation angle direction within 180°. After a comprehensive engineering survey and consideration, the construction form of slope support of civil engineering buildings combined with hanging nets, anchor rods, lattice beams and shotcrete is finally selected [4]. Engineers and technicians conduct real-time monitoring of the overall supporting structure of the slope, and accurately judge the performance safety of the slope supporting soil layer.

Engineering and technical personnel can judge the slope support of the building structure combining the above-mentioned support forms by comprehensively surveying the slope support construction site of civil engineering. The purpose is to achieve a stronger slope construction treatment effect, and it is helpful to prevent the safety hazards of slope landslide and soil fracture. The construction technicians control the construction size of the 300 square millimeter lattice beam support structure for the slope support structure, and choose a 2.8m lattice beam spacing distance to ensure that the mixed concrete mortar is fully poured into the anchor hole. When excavating the supporting structure of the foundation pit, the personnel can strictly follow the gradual slope excavation method to prevent under-excavation and over-excavation [5].

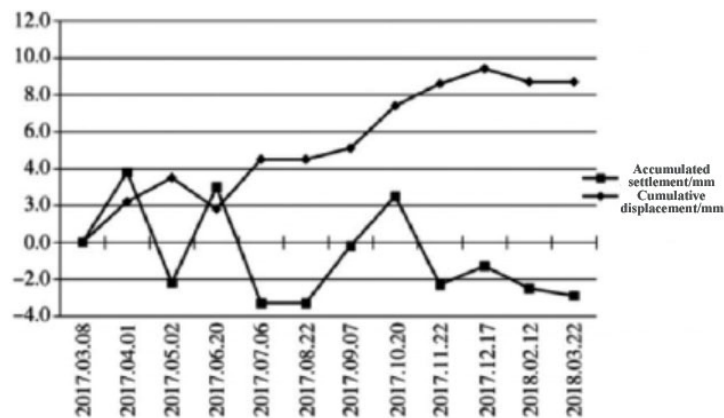


Fig.1. Variation curve of monitoring data for slope support of civil engineering building structure

5 Concrete application of slope support technology

Diaphragm wall, anchor rod support and soil nail wall support are all core technical measures in the field of civil engineering. The construction personnel must correctly choose a variety of different types of slope support treatment technologies. It aims to ensure that the slope structure of the project meets the most basic safety performance standards and strictly eliminate the defects of civil construction. Specifically in practice, engineering and technical personnel should focus on the following technical application for the construction technology of slope structure treatment.

5.1 Construction technology of civil engineering slope support of underground continuous wall

At this stage, the supporting methods of underground continuous and retaining walls have been fully integrated into the civil construction process. As a key technical method of slope support for civil construction, underground continuous walls have inherent advantages in robustness and safety. Specifically, in the whole process of arranging and constructing the underground continuous wall, civil construction workers need to incorporate concrete materials into the trenches of the foundation pit to effectively reinforce various important construction parts of the foundation pit of civil engineering [6]. Engineers and technicians must make a scientific choice for the two basic retaining wall structures

of reinforced soil and gravity, in order to reduce the construction cost and resource consumption of the slope, and to ensure the best seismic performance of the soil itself.

In most cases, engineering and technical personnel should combine other engineering support methods with bolt support methods, including lattice beams, hanging net support, and shotcrete support. If the civil construction unit can combine and utilize different types of slope support combinations, it will achieve the best support combination layout and fully guarantee the stability of the soil. At the same time, the combined use of various types of foundation pit support methods can also achieve the goal of eliminating the hidden safety hazards of foundation pit collapse, and reasonably control the potential soil displacement amplitude.

5.2 Construction technique of bolt support

The interconnecting structure of civil engineering foundation and retaining wall helps to optimize the overall stability of the engineering building. Therefore, construction technicians must adjust the construction parameters of bolt support in real time, especially when it comes to the internal force, pressure and wall thickness parameters of bolt support. In recent years, bolt support has been used in various civil engineering construction fields. The use of bolt support structure will achieve the goal of consolidating the safety of deep foundation pit construction and extend the safety service life of bolt support structure.

The construction personnel of foundation pit support must ensure that the implementation of the basic construction sequence of slotting support and layered excavation is followed. The safety risks of damage or collision with surrounding structures are completely eliminated. Specifically, for the bolt support form of hopping and graded excavation, it should be ensured that the bolt support structure is installed in the relatively stable area of the rock mass to effectively prevent the construction safety accident of sudden landslide or collapse of the soil layer. The slope support construction personnel must accurately control the anchor hole angle, and it is best to limit the anchor hole angle within 30° to ensure that the horizontal separation distance of 2 meters is not exceeded.

5.3 Construction technology of soil nail wall support

The basic technical feature of soil-nailed wall support is to reduce the cost of the support project and achieve a good effect of significant savings in engineering materials. At this stage, the soil-nailed wall support mode is being valued by engineers and technicians, and is widely used in the construction process of finishing civil engineering slopes, excavating construction surfaces, installing drainage pipes, and tying reinforcement nets. The construction technicians shall ensure the correct construction operation and treatment of the soil nail wall support mode, and improve the basic drainage facilities of the project site.

Civil construction workers often encounter engineering geological structures that are difficult to deal with. For example, the construction treatment method for paving the lime-soil layer is generally suitable for larger-scale collapsible foundation soil, so it is necessary to ensure that the thickness of the artificially tamped soil layer is at least 30 cm. If it is necessary to pave the soil layer by layer, the thickness of each lime soil layer needs to be increased by about 10 cm. During the processing stage of compacting the lime-soil layer, the construction personnel must ensure that the lime-soil layer in the area where the collapsible foundation is located is repeatedly rolled to ensure that the lime-soil mixture can achieve the effect of comprehensively strengthening the foundation soil.

In addition, construction personnel should prohibit the transportation of lime-soil mixing particulate materials exceeding 5 mm in diameter. And it is necessary to limit the maximum particle size of the lime-soil mixing composite material within 20 mm. The lime-soil mixing material with an excessively large particle size will cause specific material properties of the lime-soil mixed material after the mixing is completed, so it must be fully paid attention to by the engineering construction personnel.

The following table shows the specific implementation points of slope support technology used in civil engineering construction.

Table1. Construction processing technology of important slope support in civil engineering field

Major technical types of slope support	Underground continuous wall support	Bolt support	Soil nailing wall support
The key points of concrete support technology application	Properly protect the soil and underground pipe network structure	Rational adjustment of internal force and wall thickness parameters	Drainage installation Excavation Reinforcement Netting

6 Conclusion

It can be seen from the analysis that the slope support technology must be integrated into every construction link and stage of civil engineering, improve and optimize the overall solid performance of civil building structure, and reasonably perfect the technical flow of civil construction treatment. In practice, engineering construction personnel should be able to accurately use the technical means and measures of slope support, strictly ensure the safety of slope construction, and enhance the professional accomplishment and ability of civil construction technicians.

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