Application of Construction Technology of Retaining Walls in Highway Subgrade Engineering

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Abstract: Today, the pace of social life is gradually accelerating, and the construction technology of retaining walls has also been innovative. Its application in highway subgrade engineering has greatly improved the stability and robustness of highway subgrades. Different from the previous construction technology of highway subgrade engineering, the application of retaining wall technology has solved the restricted problem of highway subgrade engineering under harsh conditions, which has significantly improved the effect of construction. However, the construction process of retaining walls is cumbersome and the entire construction process must be organized in an orderly manner. Thus, this paper researches the application of construction technology of retaining walls in highway subgrade engineering and summarizes relevant countermeasures.

The construction effect of highway subgrade engineering is affected by local conditions, for instance, harsh conditions such as mountainous areas and hilly areas will cause the problem of limited construction technology and reduce the construction effect [1]. The main function of retaining wall is to support the mountain and fill the soil, which greatly improves the firmness of the main body of the slope. It has a positive impact on the construction technology in highway subgrade engineering. Therefore, it is an important problem that needs to be solved urgently to research the application of construction technology of retaining wall in highway subgrade engineering.

1. Significance of Construction Technology of Retaining Wall in Highway Subgrade Engineering

The main function of retaining wall is to support the mountain or fill the soil, which greatly improves the firmness of the main body of the mountain and avoids the occurrence of mountain collapse and deformation. The retaining wall consumes less funds and plays a huge role, and it can be described as an important subgrade construction technology. In addition, the retaining wall can also buffer water flow to avoid excessive scouring of soil by water to affect the quality of subgrade project, and to prolong the vitality of subgrade project [2]. At present, relevant departments have introduced a series of standards for the research on application of construction technology of retaining wall in highway subgrade engineering. The standards clearly stipulate various important parameters, and include the stability and strength of the wall into the management scope. And they also prove the important position of construction technology of retaining wall in highway subgrade engineering, which must be strictly standardized during construction.

The biggest limitation of construction technology in highway subgrade engineering is the construction section with steep slope. In the specific construction process, the first thing to do is set up a reasonable retaining wall building to improve the stability of the subgrade, and guarantee the construction of highway subgrade engineering. The retaining wall can be divided into shockproof retaining wall, immersion retaining wall, and general retaining wall. According to the location of cross section of subgrade, the retaining wall can also be divided into shoulder wall and embankment wall, and the types of retaining wall used in different environments are also different [3]. In the construction process of the actual retaining wall, it is necessary to keep a clear design idea, follow the principle of thrifty, reduce the excavation volume; use the surrounding resources flexibly and take local materials to reduce the construction cost and improve the construction speed; pay

attention to the harmony between human and nature, ensure the harmony of nature and beautification, and strive to achieve the unity of highway construction and landscape.

2. Application of Construction Technology of Retaining Wall in Highway Subgrade Engineering

2.1 Construction Scheme and Setting Out

The application of construction technology of retaining wall in highway subgrade engineering must ensure that the construction scheme is scientific and reasonable. The geographical environment in China is relatively special, and there are great differences in the environment, topography and landform of the construction site. Therefore, there are also great differences in the use of construction technology of retaining wall in subgrade engineering, and it is necessary to adapt to local conditions. In the process of practical application of construction technology of retaining wall, it is necessary to control the combination of human resources and material resources, and develop a construction plan suitable for the local environment by combining the local financial situation, so as to guarantee the quality of subgrade and lay a good foundation for the development of highway subgrade engineering [4]. During the actual operation of setting out, the construction scheme must be fully followed to achieve accurate specifications. With the help of relevant instruments, the axis of retaining wall building must be measured to ensure the measurement of the width and depth of the subgrade base under the condition of reasonable data specifications, and to ensure the accuracy and specification of the data and meet the construction requirements. In the process of setting out, white ash shall be used for construction marking to accurately record the measured data and parameters. It is worth noting that the marking method shall be approved by all participants to avoid adverse problems due to insufficient understanding [5].

2.2 Foundation Trench Excavation and Formwork Installation

The two engineering elements of basic condition of the construction site are foundation trench excavation and formwork installation. After dealing with the surface problems of the construction site, it is necessary to determine the drainage slope layout, design and construct according to relevant theories, ensure that the ground water and underground water flow can be discharged normally and that the drainage system is complete before the retaining wall project can be formally excavated. The excavator is an important construction tool in the construction process of retaining wall. Considering the uncertainty in the construction process of the excavator, relevant personnel can be arranged for secondary processing when the excavation depth cannot meet the construction requirements, including deepening the excavation depth and handling the flatness of the construction surface, to ensure that the excavation meets the construction scheme. After the construction is completed, professional inspectors are arranged [6], who are mainly responsible for measuring various data parameters on the construction site and comparing with the standards to ensure its sufficient construction accuracy and bearing capacity. The formwork installation is carried out after the excavation of the base slot. During the formwork installation process, the main process and the order of the formwork must be strictly followed, and the skeleton should be connected on the basis of ensuring the quality of the steel structure to ensure that each formwork is combined in the best way. The most critical content of formwork installation is to prevent overturning problems, whose best solution is to follow the standard process of formwork installation and orderly operation. In view of the construction of subgrade retaining wall in mountainous areas, the requirements for the firmness and stability of retaining wall are high, so it is necessary to pay attention to the concrete coagulation reaction to ensure that its firmness meets the standard [7].

2.3 Combination of Anchor Technology and Retaining Wall Technology

Today, science and technology are changing rapidly, and the construction technology of retaining walls relying on modern technology has also been improved, and the stability and firmness of the

roadbed have been guaranteed. As for the anchor retaining wall technology, it is necessary to inspect the progress of the project during the actual construction process, clarify the construction situation, do a good job in the construction of key nodes and the flexible use of various construction technologies, innovate the construction method, and improve the quality of the project. From the perspective of application of construction technology, a scientific and rigorous working attitude is particularly important. We should grasp the operating specifications of each construction site, determine the fixed position of the anchor and install it effectively. The insertion depth of the anchor should also be properly controlled to avoid the construction hidden danger caused by the unqualified insertion depth. During the construction of retaining wall, the protection of the roadbed is extremely important. The setting degree of concrete is directly related to its tightness and construction quality [8]. The combination of the anchor technology and the concrete retaining wall technology can avoid the occurrence of aliasing and ensure the construction effect of anchors and retaining walls. During the construction of retaining wall, the basic condition of the concrete pouring is the orderly construction of the building materials, and the quality, quantity, and specifications of the building materials meet the standards. Therefore, when pouring the concrete in the construction of retaining walls, it needs to use layered pouring to improve the construction effect.

2.4 Wall Masonry

In the process of wall masonry of retaining wall, in order to avoid the problem of dry stone surface, it is necessary to dye the stone before masonry, clean the stone surface, ensure that the dust and other substances on the stone surface are completely removed, and then check the condition of the base to ensure that no abnormality is found before wall masonry. The wall masonry shall be carried out based on the prepared column line to ensure that it is in a vertical state, and it must be closely observed and measured throughout the construction process. There are many walls of retaining wall with large size difference. It is a large amount of work to operate in strict accordance with the design requirements. During this period, it is particularly important to ensure the construction quality. It can be divided into different working layers according to the construction procedure. However, even in the same working layer, there are differences in the construction situation, which need to be paid attention to ensure the quality of construction [9]. During the masonry of the wall, the stones must be evenly distributed and closely integrated with the mortar. The protection of the wall structure is particularly important. After the completion of wall masonry, it is necessary to do a good job in its maintenance, and regularly spray water to keep the wall in a wet state, so as to avoid the occurrence of dry wall, which is of great significance for the prevention of wall cracks.

3. Quality Control of Retaining Wall in Highway Subgrade Engineering

3.1 Measures for Foundation Reinforcement

In the process of retaining wall reinforcement, the increase of 20 cm is generally set to ensure that the size of the wall corner is appropriate and the structure is reasonable. In the process of concrete reinforcement of the retaining wall, if there is a negative impact, it needs to be controlled reasonably to ensure that the firmness and stability of the retaining wall develop in the direction of improvement. The material selected for the reinforcement of the retaining wall is the gravel to enhance the firmness of the subgrade [10].

3.2 Measures for Construction Drainage

The setting of drainage measures for highway subgrade is particularly important. If it is not equipped with a good drainage system, there will be perennial water accumulation, which has a great impact on the vitality of retaining wall. According to the types of retaining walls, there are differences in the temperature of drain holes of retaining walls of different heights. Generally speaking, the drain holes of retaining walls are staggered up and down. The hole types are mainly

round and square with a diameter of about 10cm, and the distance between multiple drain holes is between 2 m and 3 m [11]. The hole parts are equipped with filter materials, and the hole is closed with cement to prevent rats from using the perforations as caves, which can cause the retaining wall to collapse.

3.3 Setting of Expansion Joints

Cracking of highway subgrade is a common problem. Adding settlement joints can effectively avoid foundation cracking. In addition, there are expansion joints to prevent cracking due to thermal expansion and contraction of the foundation. Expansion joints and settlement joints can be set at the same location. But the distance between different joints must be more than 10 meters, and the joints are filled with asphalt material, and the depth of filling is generally more than 15 cm to ensure the prevention effect of expansion joints and settlement joints on cracking of the foundation.

Conclusion

Highway subgrade engineering is directly related to economic development. The construction technology of retaining wall is an important part of highway subgrade engineering. Its application is directly related to the construction effect. Considering that the retaining wall plays an important role in highway subgrade engineering, it is necessary to treat it scientifically and reasonably during the development and application, improve the construction effect and comprehensively improve the firmness and stability of highway subgrade engineering by carrying out various measures, and promote the development and improvement of highway engineering.

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