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Analysis of Seepage Prevention Technology for Water Conservancy and Hydropower Projects

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Abstract: In China's water conservancy and hydropower engineering implementation project at the present stage, anti-seepage technology has been widely used, grasping every link of the project, to ensure the project quality and smooth implementation, water conservancy and hydropower engineering has a very important impact on every aspect of our country, so we should innovate and improve the water conservancy and hydropower engineering construction constantly. Due to the construction of water conservancy and hydropower engineering to our country's economic and social development has a great impact, so this requires that we pay great attention to the implementation process, more standardized engineering implementation of scientific and normative, improve the stability and durability of water conservancy and hydropower engineering, promote the long-term economic and social development.

Keywords: Water conservancy and hydropower engineering; Anti-seepage technology; Key points of construction

Introduction

The construction quality of water conservancy and hydropower projects is related to people's well-being. For a long time, the leakage problem of water conservancy and hydropower projects has been existing in the construction of water conservancy and hydropower projects in various countries. The existence of the leakage phenomenon will not only cause a serious impact on the construction quality of water conservancy and hydropower projects but also lead to serious safety accidents. Therefore, all countries have invested a lot of funds for the research of water conservancy and hydropower engineering anti-seepage technology, through the application of new technology to improve the anti-seepage capacity of water conservancy and hydropower engineering, improve the construction quality of water conservancy and hydropower engineering, to ensure that water conservancy and hydropower engineering can be safe and reliable operation.

1. The significance of seepage prevention construction in water conservancy projects

In the process of construction of water conservancy projects, it is not only necessary to meet its shock resistance, firmness, and stability but also to do a good job of anti-seepage work, which is also crucial in the construction of water conservancy projects. In the case of leakage, it is necessary to be able to deal with it in time and take appropriate solutions. The water conservancy project is related to people's livelihood in our country and plays an important role in our economic construction and people's livelihood. Therefore, it is necessary to do a good job in the quality of water conservancy construction and do a good job in seepage prevention. In this way, not only can be conducive to the economical utilization of water resources in our country, but also can make the water conservancy project enduring, and effectively avoid the damage to its internal structure.

2. Impermeable construction technology in water conservancy project application necessity

As an indispensable part of water conservancy projects, the anti-seepage construction technology must be built to a more perfect level, to effectively manage and control water resources. Anti-seepage construction technology is one of the basic technologies of water conservancy projects, because of the serious impact of terrain factors, sometimes it will seriously affect the use of the whole water conservancy project. So to do a good job of anti-seepage construction work is one of the core issues. If you want to do a good job of anti-seepage construction, you should improve the relevant technology, which requires improving the professional and scientific knowledge of the relevant staff, before the implementation of anti-seepage technology design, we must go to the local investigation, according to local conditions, to develop the most in line with the local terrain and the situation of the program, to maximize the advantages of anti-seepage construction technology in the erection project. Enhance the value of water conservancy projects.

3. Causes of leakage of water conservancy projects

3.1 Design reasons

In the early stage of the implementation of water conservancy projects, many construction personnel do not master the core technology

of the project sufficiently, so when the project is implemented, they cannot understand the relevant requirements of the project, lack relevant knowledge in technical aspects, and cannot grasp the essentials of the project well, making it difficult to meet the relevant requirements in the design of the project. In the construction process of water conservancy projects, It may also be ill-considered and produce some problems, in the construction project of water conservancy project, many problems cannot be fully considered, so there is a large area leakage problem of water conservancy project.

3.2 There are problems with the quality of raw materials

In the implementation of water conservancy projects, the design unit seeks new ideas and usually will pay attention to the management and design of the project, thus ignoring the choice of raw materials in the project, in the implementation of the project, there will often be unqualified project quality, jersey-cutting practices, resulting in the quality of the project is not up to standard, at the same time, in the process of project implementation, Sometimes because of the shortage of domestic resources and technology, as well as the issuance of funds is not in place, resulting in the design unit often use some inferior raw materials to bad fill, these two important human reasons cause the quality of water conservancy projects greatly reduced.

3.3 Construction reasons

In the process of the implementation of water conservancy projects, due to large area of the foundation and walls of water conservancy projects, play a decisive role in the implementation of water conservancy projects, and such a huge project, to effectively complete it, it should be divided into relatively small stages to complete in turn, divided into different units to complete, and when each small unit is spliced, Often due to the irresponsibility of construction technicians, the splicing cracks between the units are incomplete, so when the rain accumulates in a large area, it is easy to appear leakage phenomenon.

3.4 Time factor

The completed water conservancy project, due to the long-term operation and it is also limited number of years, the strength and durability of the project will be seriously challenged, and over time there will be certain leakage problems, coupled with the lack of maintenance funds for water conservancy projects, and make it continue to age, and then appear more serious leakage problems.

4. Application of anti-seepage treatment technology for water conservancy and hydropower projects

4.1 Application of composite geomembrane in seepage prevention of water conservancy and hydropower projects

Composite geomembrane is a composite material, with lightweight, strong duct ability and other characteristics, because of its strong anti-seepage performance and low price, it has been widely used in the anti-seepage treatment of water conservancy and hydropower projects. In the application process of composite geomembrane, it is necessary to pay attention to the selection of a reasonable type of geomembrane combined with the actual situation of leakage, and then choose a scientific and reasonable joint between the geomembrane and the impermeable body to ensure the reliability of the connection between the geomembrane and the impermeable body. In addition, in the process of construction, it is also necessary to pay attention to the protection of the geomembrane to avoid damage of the geomembrane and cause leakage.

4.2 Application of grouting technology in seepage prevention of water conservancy and hydropower projects

4.2.1 Application of high-pressure jet grouting technology in seepage prevention of water conservancy and hydropower projects

High-pressure jet grouting technology is a more widely used technology in the seepage prevention of water conservancy and hydropower projects. In the process of application of this technology, drilling operations are first carried out in the project area of water conservancy and hydropower projects. After the completion of drilling operations in the project area, a high-pressure cement slurry is pressed into the drilling hole so that the cement slurry can be fully mixed with the soil in the drilling hole. To form a strong impervious layer to achieve the impervious effect of water conservancy and hydropower projects. In addition, in the application process of high-pressure jet grouting technology to achieve a good anti-seepage effect, it is necessary to combine the specific situation of water conservancy and hydropower projects to adjust the performance of grouting accordingly. In addition, the high-pressure jet grouting technology contains a variety of ways such as swing jets, rotary jets, etc. The choice of jet mode needs to be combined with the specific situation of the project.

4.2.2 Gravel layer anti-seepage curtain grouting

The anti-seepage curtain grouting of the gravel layer mainly uses a mixed slurry of clay and a small amount of cement as the main material of grouting. Compared with the grouting in rock, the grouting of the gravel layer makes it more difficult to form effective drilling holes, so valve tube grouting and pipe grouting are mostly used.

4.2.3 Controlled grouting

Controlled grouting is an innovative process developed based on the traditional grouting technology. Controlling the pressure and flow of the slurry, it can improve the grouting efficiency and realize the control of the grouting scope, reduce the cost of enterprises, and ensure the anti-seepage effect of water conservancy and hydropower projects.

4.3 Application of anti-seepage wall technology in anti-seepage of water conservancy and hydropower projects

4.3.1 Thin cutoff wall

This anti-seepage technology uses a small excavator to dig a tunnel in a water conservancy and hydropower project and use concrete to pour it and eventually form an anti-seepage wall. In the process of excavation of the tunnel, the width of the anti-seepage wall needs to be controlled within the range of 30cm. This technology is widely used in the seepage prevention construction of water conservancy and hydropower projects with high soil content such as earth DAMS.

4.3.2 Saw-groove method anti-seepage wall

This technology is similar to the thin anti-seepage wall, mainly the use of a slotting machine to open the water conservancy and hydropower projects, while the edge of the groove sprays cement slurry to form a mud wall, and then meets the corresponding conditions in the mud wall pouring concrete and finally complete the construction of the anti-seepage wall.

4.3.3 Multi-head deep mixing cement technology

Multi-head deep mixing cement technology is widely used in the anti-seepage construction of water conservancy and hydropower projects in China, which can obtain better anti-seepage effects in silt, clay sand, and other soil layers. Multi-head deep mixing cement technology is through the use of a multi-head deep mixing pile machine, cement soil piles are formed in water conservancy and hydropower projects, and then a cement seepage prevention wall is built between each cement pile. In the construction, by using a multi-head deep mixing pile machine, multiple soil drilling piles can be made into piles at one time, while spraying mixing is carried out, which greatly improves the construction efficiency of water conservancy and hydropower engineering seepage prevention wall. And can form a deeper anti-seepage wall.

5. Conclusion

With the advancement of the reform and opening up process, every profession in our country has been developed by leaps and bounds. Various high-tech means and technologies emerge in an endless stream. The water conservancy project, as an important economic construction of people's livelihood in China, has also been developed by leaps and bounds. In the process of water conservancy engineering construction, there are strict requirements for anti-seepage construction, which is of great significance for the safety and quality of water conservancy engineering.

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