Construction Method of Seepage Control and Leakage Stoppage in Water Conservancy Project Construction

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Abstract: In order to promote the development of water conservancy and improve the quality of water conservancy project, this paper expounds the causes of leakage in water conservancy project construction through theoretical analysis, and expounds two basic construction methods of seepage prevention and plugging in water conservancy project, and puts forward guarantee measures for seepage prevention and plugging construction in water conservancy project, for reference of relevant personnel.

1. Introduction
As an important part of domestic public utilities, water conservancy project construction can improve people's living standards and provide welfare for the people. The work of anti-seepage and plugging is very important in water conservancy project construction. Anti seepage and plugging construction in place can improve the quality of water conservancy construction projects, promote the development of water conservancy public utilities, and bring economic benefits and living standards for the society and people. Wang Shixian[1] pointed out that dam construction is the foundation of water conservancy project construction, accounting for 80% - 90% of the whole water conservancy project; the dam built in the early days, now there are many leakage phenomenon, if not handled in time, it will cause greater losses, for the future use of buried larger security risks. He Zhaozhong[2] put forward that anti seepage and anti-leakage is an important index of water conservancy projects. The emergence of leakage will reduce the durability and perfection of water conservancy projects. The use of new anti-blocking materials and technologies can better improve the quality of water conservancy projects. Ji Guibin[3] mainly through the application of China's relatively new plugging technology, high-pressure grouting plugging can greatly improve the quality of water conservancy projects, promote the continuous growth of national income, and promote the continuous development of water conservancy projects.

2. Causes of leakage in water conservancy project construction
2.1. There is a problem with the lead wire of the through wall pipe
The number of water pipes used in many water conservancy projects is relatively large, and the types of water pipes are relatively rich. The appropriate construction method should be selected according to the construction technology, construction method category and installation requirements[1]. If there is a problem with the water pipe installation, there will be leakage. For example, when the water pipe is connected with other parts, the quality of the welding structure is not in place, which leads to a gap in the middle. Or, if the concrete is not used in accordance with the requirements in the concrete construction process, the quality of concrete will not meet the standards and lead to leakage at the...
concrete pouring place. If the concrete is not fully vibrated, the surface after pouring will be uneven and easy to seep.

2.2. Leakage due to construction joints
In many water conservancy projects, the concrete pouring area is large. In most cases, stacking pouring and segmental pouring are used to divide the concrete into small pieces to improve the efficiency of concrete pouring. During the construction of water conservancy projects, there will inevitably be gaps between the interconnected concrete blocks, and these gaps will lead to leakage.

2.3. Other reasons
The construction period of water conservancy project is long, the equipment used is more and more complex, and there are many uncertain factors, which are easy to cause the deformation of construction joints. For example, it is not suitable to carry out water conservancy project construction in bad weather. Some construction units still insist on the construction so as not to delay the construction period, so that the construction quality cannot meet the standard requirements, and the construction gap is getting larger and larger, so it will leak when it rains.

3. Basic methods and reinforcement technology of seepage control and plugging construction in water conservancy project construction
Leakage is the most common and serious problem in water conservancy project construction. In order to solve the leakage problem in water conservancy project, it is necessary to carry out anti blocking according to the actual situation of water conservancy project construction.

3.1. Hole plugging method
For the leakage of the hole, the plugging method should be selected according to the specific situation of the hole, considering the size of the hole, the strength of water pressure and the difficulty of plugging. For the large hole and large water pressure hole, the pipe plugging method is generally selected. The simple and direct plugging method has the advantages of simple, convenient, fast and effective implementation[4]. When using this method for construction, the hardness around the hole should be tested, and the actual working method should be determined according to the hardness and depth of the hole. First of all, laying a layer of gravel at the bottom of the hole, paving asphalt felt, and finally pouring cement mortar and adding waterproof layer can solve the problem of water leakage. For small holes and small leakage holes, the direct plugging method is usually used. When the water level is low and the leakage is not serious, the direct plugging method is more convenient and practical. However, this method is only suitable for small holes with less serious leakage.

3.2. Plugging method of gap
The direct plugging method is a method to prevent the leakage of gap type. First, leave a gap to form an octagonal chute, and then clean the chute. After cleaning, quickly fill the chute with the mud strips after friction. After blocking in this way, check whether it is blocked in time. Finally, ordinary ash and mortar are used to sweep the groove to the rough surface, and then a waterproof layer is laid to complete the leakage and leakage protection of the whole gap. These are different anti leakage and blocking measures that must be taken for different holes and gaps.

3.3. Treatment technology of cutoff wall
In the above explanation, the reason why the dam will leak during the construction of related projects is introduced. It must be clarified that if the dam leaks, the consequences will be very serious. Due to the failure of normal operation, it will cause great losses to human life, so it is necessary to ensure safe and stable operation through in-depth research and vigorously strengthen leakage prevention technology[6]. The most important point is that the most commonly used leakage prevention technology in China is the leakage prevention wall treatment technology that does not affect the
surrounding environment or ecological environment. Moreover, due to the heavy work of water conservancy projects, construction workers often have to do a lot of work to shorten the construction period, but this does not mean that all workers have skilled working skills and processing skills. Impervious wall is different, one of the advantages is that the operation is very simple, no complex technical principles and machinery and equipment. Basically, this technology is usually selected in the case of complex dam, because the operator can complete the work independently. However, it is necessary to check the surrounding environment carefully and remove all obstacles before use.

3.4. Grouting anti-seepage technology

Grouting anti-seepage technology is one of the most common methods to prevent dam leakage and strengthen treatment. The main operation process is as follows: First of all, the staff must go deep into the dam leakage environment and carefully investigate. Site investigation can help the construction personnel to understand the actual situation of the project. According to the specific situation of the construction site, considering various characteristics and environmental conditions of the dam, the causes of leakage can be analyzed and determined. Analyze whether there are cracks in the dam body, if there are cracks, what is the specific length of cracks or perforation, and design a specific anti leakage reinforcement plan according to the specific conditions of width, depth and penetration. Then it is necessary to treat the crack surface completely. For example, it is necessary to use professional tools to completely remove dirt, debris and pollutants from the loose layer on the crack surface, and then use some organic solvents to scrub both sides of the crack with alcohol, acetone, etc. The most important thing is to wait for it to dry completely before proceeding to the next step of "filling the grouting hole". There are two kinds of grouting holes: horseback joint and inclined hole. According to the actual situation and needs, they can be reasonably selected and can be used at the same time when necessary. Pay attention to the location of the grouting hole, which must be set at the place with the largest leakage, and fill the grouting nozzle, and check the tightness after filling the cracks. After all work has been done, grouting can be carried out. As a key step, it is necessary to ensure the quality of grouting and ensure grouting according to the size of crack area. It is usually bottom-up grouting, one end of the horizontal joint is poured into the other end, and then the facility is sealed. The construction site of grouting anti-seepage technology is shown in Figure 1.

![Figure 1. Construction site of grouting anti-seepage technology](image)
4. Guarantee measures for seepage prevention and leakage repair of water conservancy projects

With the development of science and technology, some new technologies and new materials are constantly developed and studied. The continuous innovation and application of these technologies in water conservancy project construction is the trend of future development and promotion. Therefore, considering the topic of this study, we put forward some suggestions to promote the progress of leak prevention and plugging technology.

4.1. Strengthen the research on anti-blocking technology and train a large number of professional and technical personnel

The development of science and technology is inseparable from the cultivation of talents, who are the source of the development of science and technology. Therefore, it is necessary to actively cultivate technical talents in this field, carry out more technical exchanges and scientific research projects, share theories and achievements, and pay more attention to the leakage prevention and plugging work in the construction of water conservancy projects.

4.2. Actively develop and introduce advanced leak proof grouting materials

The application of anti-leakage and plugging technology has a history of more than 100 years, and has gradually developed from the initial use of clay, lime, cement and other materials to the later use of water glass, chemical slurry and so on. With the application of various new materials and the development of leakage technology, we can find and use suitable leakage proof grouting materials according to the actual situation of the project and the local surrounding environment, and actively seek suitable construction technology. These technologies are more complete, innovative and economical.

4.3. Strengthen water conservancy project construction process management and ensure construction quality

Whether the construction can be carried out according to the technical specifications and standards is also the key to the effective application of the anti-seepage and plugging technology. First of all, in the construction stage, it is necessary to control the construction quality in strict accordance with the requirements of drawings and specifications, and the main management contents of reducing the possibility of leakage are concentrated in the areas prone to leakage. Carefully analyze the causes of leakage, investigate all the causes of leakage, select practical and economic leakage prevention and plugging measures, and establish a strict quality supervision system. The construction personnel should always pay attention to the quality in the construction process, strengthen the sense of responsibility, and prevent the faults caused by human factors.

5. Conclusion

Water conservancy is not only the lifeblood of agriculture, but also closely related to the national economy. Once there is a quality problem in a water conservancy project, it will affect people’s lives and property safety, with unpredictable consequences. Leakage prevention and plugging construction technology is one of the commonly used technologies in water conservancy project construction. We should pay attention to the research and summary of leakage prevention and plugging technology to ensure the quality of project construction.

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