

# Discussion on Construction Technology of River Regulation and Bank Protection in Water Conservancy Projects

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**Keywords:** Water conservancy project, River regulation, Bank protection

**Abstract:** Water conservancy project is an important livelihood project in China, which is of great significance in flood control and waterlogging prevention, hydropower generation and so on, and plays a great role in China's social and economic development. Judging from the current development, river regulation has become the focus of social attention and an important part of current ecological environment protection. It needs to be realized that although the construction of water conservancy projects in China has achieved remarkable results at present, there is a large room for development in river regulation of water conservancy projects. In this paper, the application and construction points of ecological revetment in river regulation of water conservancy projects are analyzed, and the technologies used are discussed accordingly.

## 1. Introduction

At present, the continuous progress of water conservancy projects in China has a certain role in promoting economic development, but there are also many shortcomings. River regulation is very important, which can promote the regulation of ecological environment and the development of water conservancy projects. During the river regulation, bank protection is a very important part, and traditional bank protection methods can easily damage the ecological environment. Therefore, it is necessary to choose more suitable measures to keep the river ecosystem in a more stable state, so as to meet the basic needs of river management and development.

## 2. Principles of River Regulation in Water Conservancy Projects

### 2.1 Basic Content of Moving Target Tracking in Wireless Sensor Networks

The principle of comprehensiveness During the river regulation of water conservancy projects, the staff need to know the urban construction planning in advance, and on this basis, carry out systematic river regulation. In this process, we should ensure that the drinking water function and drainage function of water conservancy projects can be kept in an orderly operation state, and we also need to pay attention to the basic needs such as water purification, and fully consider a series of characteristics such as ecological landscape, so as to ensure that people's hydrophilic activities can be maintained in a safe state <sup>[1]</sup>.

### 2.2 Ecological Priority Principle

At present, the environmental situation is becoming more and more severe, and the ecological environment has begun to be widely valued. In the process of each work, the ecological environment is the primary factor to be considered. When carrying out the river regulation of water conservancy projects, we should fully meet the basic requirements of the natural law of ecological development, take the principle of ecological priority as the basis, follow this principle, and design the regulation scheme in strict accordance with the requirements, so as to minimize the damage caused by construction operations to the surrounding natural environment and avoid a series of ecological environment problems caused by human factors as much as possible <sup>[2]</sup>.

### **2.3 People-oriented principle**

In essence, water conservancy project is a man-made project mainly serving people's daily life, daily work and social and economic operation. Thus, during the river regulation, we should follow the people-oriented principle, pay attention to the relative balance between man and nature, ensure people's normal life, and build a more harmonious ecological environment, which can not only broaden people's horizons to a certain extent, but also let people get emotional relief by enjoying the wonderful natural scenery, enhance people's experience of the living environment, and promote people's life pressure to be effectively relieved<sup>[3]</sup>.

### **3. General Situation of Water Conservancy River Regulation Project**

The application of ecological revetment in river regulation of water conservancy projects needs further exploration. In this paper, it is explained with practical cases. This case project is mainly a river regulation project of rural water conservancy projects in a certain area. The width of the river itself varies, with the widest point being 45m and the narrowest point being 40m. The local government has also planned an updated road around the river, and a road of about 55m is also planned along the northern coastline of the whole river. Considering that the land used for crossing the river will also reduce the utilization rate of the whole plot to a certain extent, the relevant management departments need to move the river to a certain extent. The plan is to move the river to the north by about 37m, so as to reduce the division of the plot caused by the river. Relevant technicians need to fully consider the actual situation of the construction area and the actual demand of the construction itself, and finally decide to adopt the method of ecological revetment, which can not only enhance the function of flood control and waterlogging prevention of the river, but also improve the road landscape to a certain extent.

### **4. Key Points of Ecological Revetment Construction Design**

#### **4.1 Guiding Ideology of Scheme Design**

In the actual case project, construction technicians need to expand the green area and water area in strict accordance with the guiding ideology of ecosystem design. In the process, it is necessary to ensure that the water quality and the biological growth area in this area will not be damaged. At the same time, in the specific design, it is necessary to design the relevant buildings reasonably, so that they can coordinate with the surrounding environment and ensure that the waterside landscape can have certain continuity and naturalness, so as to meet the aesthetic characteristics and aesthetic needs of the people. In the process of specific operations, it is also necessary to make full use of some natural wood and stones with porous structures to control the generation of waste to the greatest extent, so as to effectively avoid secondary pollution<sup>[4]</sup>.

#### **4.2 Construction Site Investigation**

In the project of this case, the construction unit needs to pay attention to the preparatory work, and organize relatively professional technicians to conduct a systematic investigation on the construction site before the formal start of the construction operation, and conduct a systematic investigation on the construction site according to the basic drawings of the engineering design and the relevant information of the river course. According to the field measurement results, it can be known that the interval of this section is 30m, the width of the cross section is 100m, the length of the river is 620m, and the number of measured sections is 22. At the same time, according to the relevant geological exploration results, it can be known that the strata in this area are mainly cohesive soil and silty soil.

In the process of investigating the construction site, relevant technicians need to systematically investigate the construction area and the surrounding conditions of the construction area to ensure that the surrounding environment will not hinder the construction. At the same time, it is necessary to make a more systematic plan for raw materials entering the factory and the location of temporary

facilities strictly according to the design drawings. In addition, in practical work, construction technicians need to pay attention to the analysis of the source of rainwater and surface water along the river, and pay attention to the reasonable design of dam filling and pumping and drainage schemes. In addition, the construction unit also needs to consider the influence of building materials. Before the formal organization of construction, professionals need to carefully check the quality of some raw materials such as concrete and steel bars, so as to carry out more solid protection for the subsequent construction [5].

### **4.3 Key Points of Revetment Construction**

#### **4.3.1 Cofferdam Engineering Construction**

In the actual case project, technicians mainly consider the connection section of two ponds. Therefore, in the process of actual design, it is necessary to backfill an access road in the middle of the river with a width of about 8m, which can be used for construction operation with water excavator equipment, and provide more convenient conditions for the subsequent access road construction on the north side of the revetment. Besides, technicians also need to adopt a sectional construction scheme during the actual work to minimize the impact of water pumping and drainage in the previous operation on the construction period itself<sup>[6]</sup>. Considering that the old river itself is relatively deep, in general, technicians need to design on both sides of the middle service road area, and they can use about 9m steel plates according to the interval of 20cm to carry out the corresponding piling operation, which can effectively avoid the problems such as erosion and collapse of the service road caused by river erosion. In practical work, technicians need to effectively ensure the construction quality of old river backfilling, and begin to use the method of filling clay in the middle of double-row steel sheet piles in the areas on both sides of old river and new river to carry out concrete cofferdam construction, so as to create a relatively good construction environment for pumping and drainage work and sludge cleaning. For the design of cofferdam construction level, the relevant technicians decided to use high-quality clay with water content of about 0.4L/m<sup>3</sup> for the corresponding construction, and use the method of tamping and backfilling layer by layer. Due to the influence of river depth, the water pressure at the bottom is obviously large. Therefore, in order to effectively avoid the collapse of the cofferdam during the construction, the technicians involved in the construction can design the slope of the soil as 1:2 after the construction of the double-row steel sheet piles, and the width of the top of the soil needs to be controlled, which needs to be kept above 1.6m. At the same time, in order to effectively cope with the current water level rise, it is necessary to reserve a position at the top of the cofferdam as a heightening allowance. After the cofferdam construction is completed, the pumping and drainage operations can be started. In this process, it is also necessary to pay attention to the need to organize special personnel to conduct 24-hour inspections. In the process of actual excavation, it is necessary to strictly follow the design scheme to carry out slope operation, so as to avoid problems such as loss cofferdam.

#### **4.3.2 Key Points of Revetment Construction**

In the actual case project, the construction unit needs to carry out the corresponding setting-out work according to the technological process and design drawings when carrying out the revetment construction, so as to ensure the accuracy of the construction itself, and then the formal operation can be started<sup>[7]</sup>. During the foundation construction of C20 concrete, the construction unit relies on the excavation of the bottom of the left pit that has been completed before, determines the position of the foundation axis through the total station, and systematically calculates the template size of concrete. According to the calculated results, technicians can use bamboo veneer with a specification of about 2m×0.4m. At the same time, after the formwork is fixed, it needs to be evenly coated with release agent. After passing the quality inspection, it needs to be applied to concrete pouring. In the process of building ecological concrete blocks, the constructors need to pay attention to the installation of blocks according to the shallow mouth, and use mortar to fill the gap between the blocks and the steps on the top surface of the stone wall, so as to minimize the horizontal

displacement caused by the change of soil pressure. According to the height of the top surface of the bottom block, the frog rammer can be used to backfill, which can ensure that the compactness of the final fill area can meet the expected basic requirements. After completing the compaction operation, the construction unit can lay the corresponding geotextile on the top of the soil layer, so that graded macadam can be filled between the top of the soil layer and the masonry, which can make it have the basic function of the filter layer. After that, it is necessary to lay the geogrid horizontally on the geotextile, so that the end of the geogrid can be leveled directly by using the anchor rod, and the corresponding placement opening of the block anchor rod is reserved. During the construction of this link, it is necessary to ensure that the geogrid cannot be directly observed through the water surface, so as to ensure that the rest of the ecological blocks and the backfill behind the abutment form a whole, so as to improve the pressure bearing capacity of the masonry soil.

## **5. Filling Technology of Dike Body during Dike Construction Project**

### **5.1 Selection and Mining of Soil Materials**

In the process of using the construction technology of river regulation and bank protection in water conservancy projects, it is necessary to pay attention to the work of dike construction and management. The selection and exploitation of soil materials are closely related to the river regulation of water conservancy projects. Therefore, in the process of selecting soil materials, we need to pay attention to the following aspects: first, we need to make the soil materials meet the basic needs of seepage prevention; Secondly, in the process of selecting soil materials, it is necessary to choose nearby, and it is necessary to carefully refer to the actual construction situation to select the corresponding soil materials. In the process of concrete construction, it is necessary to master a variety of different construction requirements, as well as a series of conditions such as soil quality and moisture of soil itself. For homogeneous embankment, it is necessary to choose more suitable loam and loam; For the impervious embankment, it is necessary to choose soil with higher viscosity. Among them, the role of sandy soil basically needs to be covered behind the embankment, and attention should be paid to the rationality of selecting soil materials. In the process of mining soil materials, it is necessary to clean the soil surface first to avoid the problem of water accumulation. Then choose a suitable method to collect soil. In most cases, the method of combining section with cutting is used to collect soil, which can effectively control the quality of soil materials and make all indicators and parameters of soil materials better meet the specific needs of construction.

### **5.2 Construction Technology of Embankment Filling**

#### **5.2.1 Dike Foundation Cleaning**

During the embankment filling construction, attention should be paid to the related work of embankment foundation cleaning. In this case, the embankment body, pavement and foundation surface should be cleaned accordingly, and all kinds of impurities near the embankment foundation should be removed in the actual cleaning process. In view of some dike foundations with a relatively long history, it is necessary to take more effective measures to comprehensively improve the safety of dike engineering. After the final cleaning work is completed, the subsequent compaction and leveling work is needed after the first layer is filled, which can effectively meet the construction requirements of various parameters of soil, and can also effectively guarantee the governance effect of the whole project <sup>[8]</sup>.

#### **5.2.2 Carry out Filling Work**

In the actual filling work, it is necessary to master all kinds of precautions that may exist. If there is uneven ground during the actual filling period, it is necessary to carry out horizontal layered operation and choose a more scientific and reasonable construction direction for filling work. During this period, it is not only necessary to carry out the corresponding paving and filling work on the inclined slope, but also if the slope of the dike cross section itself is relatively large, then it is

necessary to take more reasonable methods to deal with it in combination with the actual situation to ensure that the slope of the dike can be effectively controlled. During the subsection operation, the relevant length needs to meet the specific requirements of construction. In the actual construction and operation, if the construction length is more than 100m, it is necessary to carry out relatively unified rolling and soil laying, and deal with it in the form of lap joint, which can effectively prevent the occurrence of boundary ditch. During the construction of soft soil foundation, it is also necessary to complete the corresponding cutting planes on both sides of the embankment, and carry out layered filling with reference to the completed cut-off surface. In this process, it is necessary to strictly control the construction speed, monitor the foundation state and displacement in real time, and refer to various data to carry out systematic analysis, so as to provide a more solid guarantee for the subsequent construction.

## 6. Conclusion

In this paper, combined with the actual case project, the case project has achieved relatively good results after applying the ecological revetment scheme, and the flood control and waterlogging prevention functions of the water conservancy project have also been effectively improved. Among them, it should be noted that in the actual construction process, it is necessary to strictly follow the corresponding design scheme, carry out all aspects of work, and rationally use all kinds of construction technologies, so as to lay a solid foundation for the follow-up work.

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