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Application Analysis of High Pier Construction Technology in Highway Bridge Construction

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Abstract: ***The highway bridge project construction is the main point of the current development of our social economy, it can promote the development of the highway transportation industry in a great extent, but also can provide a certain opportunity for the social benefit. At present, different highway bridge construction techniques have been applied in the process of the construction of traffic network, the construction technique of high pier is one of them. This paper mainly analyzes the development status and technical characteristics of high pier construction, and briefly discusses its application in highway bridge construction.***

Keywords: expressway engineering; Bridge construction; High pier technique.

1. INTRODUCTION

Bridge construction is an important link of highway construction, and the construction quality of this link directly affects the construction safety of the project. Therefore, many construction units pay more attention to the development of highway bridge construction operations, and will spend more time and energy to improve the work content. With its own technical characteristics, the high pier construction technology has been valued in highway bridge construction, which can promote the development of highway traffic transportation industry.

2. DEVELOPMENT STATUS OF HIGH PIER CONSTRUCTION

The construction technology of high pier has attracted much attention under the increasing number of highway bridge projects in our country, and has made great achievements. Although we have introduced relevant quality and safety management regulations for highway bridge construction, there are still many problems in the actual construction. The application of high pier construction technology is mainly reflected in three points. First, the comprehensive capacity of the construction unit is weak. In the process of organizing technical personnel to implement high pier construction technology, the construction unit did not examine their practical operation ability. In particular, the number of workers with high pier construction experience is small, and the implementation of this technology is still at the primary level, which is difficult to reflect the effectiveness of the technology. Second, the form of technology is relatively simple. There are big differences in the construction environment of highway project in different regions in our country. It is necessary to ensure that the technology of highway bridge construction conforms to the construction environment requirements among complicated terrain. At present, the high pier construction technology applied by technicians is still limited in the synovial construction technology, which is difficult to meet the construction needs of different engineering projects. Third, high pier construction maintenance is not in place. Maintenance work is the key point of highway bridge construction. Some construction units have not implemented maintenance construction after completing the project construction. There are still many construction personnel do not master the construction and maintenance operation of high pier, and the overall level is low, leading to the damage of high pier of highway, and it is aggravated in the subsequent application.

3. TECHNICAL CHARACTERISTICS OF HIGH PIER CONSTRUCTION

The characteristics of high pier construction technology are reflected in three aspects. First, the construction requirements are high. Many high pier construction requires technical personnel to carry out high altitude work, this form of work has a certain risk, high requirements for the operation of the construction personnel, once the accident in the construction will affect the personal safety of the operator, will also bring adverse effects to the construction unit. In the implementation of high altitude work, technical personnel. To do a good job of joint treatment, at the same time to ensure the overall effectiveness of the project construction, so it needs to meet the higher requirements. Second, the construction period is long. Technical personnel need to consider supporting capacity in the process of operation, when carrying out high pier pouring construction often need to implement the relevant operations in stages. These work content will affect the duration, so it will take a long time. Third, the amount of resources is large. High pier construction has specific requirements in diameter and height, construction personnel also need to use a lot of concrete to complete the project construction. At the same time, the larger area of the template should be used to ensure the construction progress, so the overall project construction needs to consume more resources.

4. APPLICATION OF HIGH PIER CONSTRUCTION TECHNOLOGY IN HIGHWAY BRIDGE CONSTRUCTION

4.1 Measuring lofting

Measurement lofting is the first step of high pier construction technology. Technicians should do a good job of measurement lofting operation before the actual construction, so as to provide data basis for the subsequent work. This operation can improve the accuracy of high pier construction to a large extent. In the actual operation, technicians need to do a good job of measuring and lofting the structure line of high pier and the middle line of column, and they need to pay special attention to the generation and control of deviation. For the size around the pier column and the center line, the maximum allowable deviation is 10mm, so technicians need to improve the degree of attention to this work, to avoid excessive deviation affecting the construction quality of the project. In the construction of the pier, technical personnel can use the method of segmental pouring concrete construction work, after the completion of the first concrete pouring construction to carry out measurement and review operations. In the process of measurement, it is also necessary to measure the verticality of the post without bending. After that, it is also necessary to clean the post to improve the accuracy of the measurement results.

4.2 Installing Supports

Because there is a certain height between the construction of high pier and the ground, technicians need to set up support to improve the construction safety of the project. In the process of setting up the bracket, it is necessary to do a good job of fixing the template, and let it play a good role as a platform to provide stable support for technical personnel to implement relevant operations. Construction personnel should ensure the strength of the support and improve its stability in accordance with the technical requirements of high pier construction in the process of erection, so as to avoid safety accidents caused by technical personnel during operation. Before setting up the support, the construction personnel should do a good job of foundation tamping operation, so that the support. The bearing table can be close to each other, and then use fasteners to improve the stability of the support. According to the requirements of high pier construction technology, the distance between the horizontal and vertical supports should be kept 1.2m. Technicians also need to test the performance of the supports to ensure strong safety in actual use. Construction personnel also need to calculate the bearing capacity of the support scientifically to avoid the phenomenon of overweight affecting the stability of the support.

4.3 Formwork Construction

Technical personnel in the use of high pier construction technology to carry out the template construction, to choose the construction material suitable for pier structure, so it can use the processed large composite steel template, to ensure that the construction of the project meets the requirements. In order to be more convenient in the later disassembly process, technicians can process large composite steel formwork, which can reflect its own advantages in the actual construction. Before the formwork construction, technicians also need to check the size of the formwork, control its error range and improve the rigidity of the formwork. When installing the formwork, the construction personnel need to check the solidity of the formwork to ensure the quality of subsequent concrete placement and vibration construction, and prevent problems such as mold leakage. In addition, the construction personnel should also determine the installation position of the template to improve the overall project construction stability.

4.4 Reinforcement engineering construction

Reinforcement is an important material for the construction of high pier of highway bridge. Technicians need to do a good job in the construction process of reinforcement lashing. After completing the erection of support, we need to improve the content of this work. In the process of the implementation of reinforcement engineering construction, construction personnel should be in the processing site according to the design requirements of the project to process the steel bar, but also to carry out straightening, cutting, rust removal, bending and welding operations, this series of processes can realize the steel finalize treatment. After the operation of these processes, the technician will stack the bars according to the number and ship them

After being transported to the construction site, it is bound and welded by a crane to improve the stability of the steel bar. Construction personnel also need to make reasonable design of the length of the steel bar, while making it meet the seismic requirements, to avoid other problems in the construction.

4.5 Concrete placement construction

Before the concrete pouring operation, technical personnel should do a good job of concrete mixing and transportation, in accordance with the high pier construction requirements of the reasonable application of this technology. When carrying out concrete mixing construction, the construction personnel should strictly control the mixture ratio, and adjust the concrete with high water content according to the actual situation, so that it can meet the construction standard. In the use of high pier construction technology for concrete pouring, technical personnel can be divided pouring, if the production of working joints need to be strictly treated, to ensure the smooth of the concrete, but also need to make it consistent with the appearance. The construction personnel should check the position and size of the support, tie rod, template and steel bar, so that these indicators can meet the construction requirements of the project. In the vibration operation, the construction personnel to ensure that the template around the fullness and full. After that, the formwork needs to be removed in sequence. The side formwork can be removed after the strength of the concrete members reaches 25% to 50% of the design strength. The other formwork can be

removed while the concrete is cured by real-time protection measures.

5. CONCLUSION

The application of high pier construction technology in the construction of expressway bridge can improve the construction stability and ensure the construction quality. When carrying out relevant operations, technical personnel need to clarify the characteristics of high pier construction technology and its shortcomings, use diversified construction methods to strengthen the construction quality of high pier, do a good job in late maintenance, and effectively improve the construction quality and safety level of the project.

REFERENCES

[1] JIANG Donglin. Application Analysis of High Pier Construction Technology in Highway Bridge Construction [J]. Sichuan Cement, 2018 (4) : 57.
[2] ZHANG Jun. Application of High Pier Construction Technology in Highway Bridge Construction [J]. Transportation World: Transport Vehicles, 2018 (6) : 82-83.
[3] WANG Qiang, XU Ziyang. Analysis of High Pier Construction Technology in Highway Bridge Engineering [J]. Electronic journal of Baike Forum, 2019 (6) : 192.
[4] XUE Hongru. Application of High Pier Construction Technology in Highway Bridge Construction [J]. Value Engineering, 2019,38 (03) : 125-127. (in Chinese)