

Application Analysis of High Pier Construction Technology in Road and Bridge Construction

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Abstract: As a key technology widely used in road and bridge construction, high pier construction technology requires more attention of engineering technicians due to its high construction technology content and practical difficulties. Therefore, it is of great engineering significance to explore the practical application analysis of high pier construction technology in the modern road and bridge construction in China.

Keywords: High pier construction; Road and bridge construction; Application analysis

1. Introduction

In the development and construction process of China's economic and social modernization, the construction of nationwide transportation network is particularly important, which restricts the development of the local economy and affects the economic and cultural exchanges between different regions. In the construction process of transportation network, road and bridge construction, as the most common form of transportation, requires engineering technicians to conduct more in-depth technical management research. With the continuous application of advanced road and bridge construction technology in the construction of modern road and bridge, high pier construction technology has been widely used in China as a key road and bridge construction technology.

2. Analysis of the Characteristics of High Pier Construction

The volume and shape of the high pier itself is one of the characteristics. The height of the high pier of road and bridge construction is relatively high, which deepens the difficulty and complexity of the construction, and further increases the engineering quantity of the bridge construction.

Because of their own volume problems and construction technology problems, bridge piers have long construction time. In order to further improve and optimize the quality of the bridge high pier construction, strict inspection and supervision should be carried out in all aspects involved, and the multiple quality inspection of the high pier construction process should be carried out, which makes the cycle span of the bridge high pier construction very large.

The cost of bridge high pier construction is relatively expensive, because the requirements for professional technicians and construction media are relatively high in actual construction, which makes the investment of funds relatively large, thus increasing the cost of high pier construction in bridge construction.

The requirements for joint treatment of bridge high piers are relatively high, because only effective connection between bridge and high pier can guarantee the quality of bridge construction, thereby improving the safety performance of road and bridge as a whole.

3. Application Status of High Pier Construction Technology in Road and Bridge Construction in China

The high pier construction technology has important application value in the construction of expressways and bridges. It is the road and bridge construction technology emerged with the continuous increase of China's requirements for road quality, driving speed and driving safety. In the road modernization construction in China, the construction scale of expressways, high-speed railways, river-crossings and sea-crossing bridges has been continuously expanded, and the high pier construction technology applied in engineering construction is also constantly applied and progressed with different traffic modes.

High pier is an important carrier in road and bridge construction, and it is an important link for the vertical connection between the air part of the upper part of the road and bridge and the ground. High pier also connects the horizontal part of the road and bridge to maintain the stability of the road and bridge building. It bears the overall structure of the whole road and bridge building and is an important building foundation to ensure the overall stability and safety of the bridge. The quality of

its construction directly affects the realization of road and bridge traffic function and the life of the building. The factors that need to be considered in the construction of high pier of road and bridge in China are: the technical characteristics of the high pier technology itself, the construction geography environment, the management control of the project, an so on. These subjective and objective factors will affect the engineering quality of the final high pier construction. High pier construction technology is an engineering technology that needs to be continuously explored and applied in practice. It has unique technical characteristics in the wide application of road and bridge construction in China. It needs to be explored and researched by engineers and technicians. At present, the experience of high pier construction in China is insufficient, so engineering and technical management personnel are required to make positive improvements and developments.

4. Classification of Traditional High Pier Construction Technologies

In the construction of bridge high pier, there are three traditional construction technologies: climbing formwork construction technology, sliding formwork construction technology and turning formwork construction technology. These three construction technologies have different technical characteristics and suitable application scenarios. Therefore, it is necessary for constructors to distinguish and make use of them after they are familiar with them in order to achieve better construction results.

The climbing formwork construction technology of bridge high pier construction mainly refers to the new advanced construction technology of high pier based on the perfection and improvement of sliding formwork construction. It is more suitable for the construction of high pier of cast-in-place concrete bridge with vertical structure. The steel consumption of climbing formwork construction technology is less than that of sliding formwork construction. It does not form obvious joints and is not easy to cause surface damage of road and bridge, so it is beneficial to the quality of road and bridge construction and subsequent use and maintenance. However, the high pier structure completed by climbing formwork construction is relatively complicated, so the cost of construction and the technical difficulty of construction are relatively high.

The sliding formwork construction technology of bridge high pier construction is the most widely used in the high pier construction of bridge. Its specific working principle is: hanging the formwork around the working platform, building the concrete structure, then using the jack to push sliding formwork upward after concreting, thus completing the construction of the superstructure

until the entire high pier completes the concrete pouring construction work. The principle of turning formwork construction technology for bridge high pier construction is to install a set of three layers of formwork at the position of high pier cap, remove the lower two layers of formwork after each completion of pouring work, and turn over the formwork to the top position to re-implement the installation and reinforcement construction work and start the second pouring operation. Compared with climbing formwork construction, turning formwork construction technology has lower cost and simpler construction technology, which is more conducive to the construction of workers. The disadvantage is that it is difficult to ensure the quality of actual construction, and it is not suitable for high pier operation of road and bridge construction with higher requirements.

5. Key Issues in the Application of High Pier Construction Technology in Road and Bridge Construction

5.1. Key technologies of high pier construction technology in road and bridge construction

The key points of high pier construction technology in different construction links in road and bridge construction are also different. The common construction media in road and bridge construction include steel, concrete, asphalt and so on. The application of different construction media in construction process plays a unique architectural function. At the same time, the road and bridge construction technology should also take into account the characteristics of construction media and carry out actual application adjustment.

In the process of road and bridge construction, in order to ensure the reliability of engineering construction, it is necessary to use steels to fix the brackets. Before construction, the use of steels should be calculated. During construction, the steels need to be scientifically treated. The construction link of steels is the foundation of road and bridge construction. In the process of construction, consideration should be given to the application of high pier construction technology, and application analysis should be carried out combined with the technical keys of high pier technology.

In the high pier construction of road and bridge, the formwork construction link should make detailed and scientific technical requirements for pier body structure on the basis of strictly abiding by the construction standards, so as to improve the quality of the project. It is the key link in the high pier construction of road and bridge, which needs the attention of engineers.

Concrete pouring in road and bridge construction occupies a large amount of work in the construction process. It uses centralized mixing method to control the actual dosage of various materials in the mixing process, to

control the construction of water cement ratio, to determine the slump of the discharged materials, and to transport concrete by mixing truck to carry out the concrete pouring work.

Because the height of high piers of road and bridge is relatively high, the concrete is usually transported to the construction site by transport truck at the height that cranes can reach, the bucket is placed on the crane, and the tumbling barrel is used for pouring. At the height that cranes cannot reach, the conveyor pump is used to pour the concrete into the formwork, vibrator is used to vibrate evenly to ensure the layered and continuous pouring of high pier concrete of road and bridge.

5.2. Maintenance and management after completion of road and bridge high pier construction

Because of the large volume and wide bearing area, high piers are more vulnerable to the continuous damage of local wind and water environment after completion of construction. It is necessary for road and bridge maintenance personnel to carry out key maintenance and management. At the same time, high piers in road and bridge construction need to maintain a certain structural strength to maintain normal function, so as to ensure the overall stability and safety of road and bridge construction.

In order to avoid the phenomenon of dry shrinkage cracks in the high pier concrete of roads and bridges, it is necessary to carefully carry out the regular maintenance work of high pier concrete. The specific procedures are as follows: use straw curtains or wet jute bags on the concrete structure to cover them to prevent the wind and sun from drying, by spraying or watering measures to ensure that the concrete surface is kept moist, and the construction commissioner is appointed to take charge of the smooth development of the work.

The relevant road and bridge management departments need to carry out maintenance work on a regular basis, and strictly monitor and measure the quality of high piers of road and bridge in accordance with the maintenance standards formulated by engineering technicians.

6. Conclusion

As a key technology widely used in road and bridge construction, high pier construction technology requires more attention of engineering technicians due to its high construction technology content and practical difficulties. In the process of modernization development in China, the construction of transportation network is inseparable from the application of high pier construction technology. Through the research and analysis of high pier construction technology in road and bridge construction, it can strengthen the application of high pier construction technology in road and bridge construction in China. This requires high pier construction technicians continue to explore and improve in practice, so as to improve the quality of the high pier of road and bridge construction in China, improve the overall quality of road and bridge construction, and better provide transportation material support for the economic and social development of China.

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