Analysis on Stress Control Technology of Long Span Continuous Beam Casting

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Abstract: ***Along with our country urbanization process unceasingly speeds up, the highway and railway transportation is becoming more and more important, but because in the construction process, the construction environment is more complex, the construction condition is poorer, environmental protection aspect's requirement is higher, causes our country highway and bridge construction to become very slow, Therefore, relevant departments need to actively use the large-span continuous beam cantilever pouring construction stress control technology, so as to ensure that the bridge can meet the design of internal forces, the use of stress control technology and the use of linear control during construction. Taking the Zheng-Wan high-speed railway project as an example, relevant personnel need to explore how to use the large-span continuous beam cantilever casting construction stress control technology in the construction process, and how to control, how to choose the test tools, and how to arrange reasonable measuring points, so that the structural stress is kept in a stable range, so as to ensure the safety of the bridge and stability performance.***

Keywords: continuous beam cantilever pouring construction; Stress control technology; analysis.

1. INTRODUCTION

In the background of rapid economic development in our country, people's economic level has improved obviously, thus increasing the frequency of travel, so it is more required to highway engineering has a high safety, to ensure people's travel, especially in some places where the terrain is more complex, restricted by rivers, lakes and seas, it is more necessary to build long-span Bridges to ensure travel. However, due to the complex environment, it also brings great difficulties to bridge construction, so it is also necessary to actively innovate engineering construction technology and improve the level of engineering construction technology. Therefore, relevant staff innovate the construction technology of long-span bridge [1].

2. BACKGROUND OF APPLICATION OF STRESS CONTROL TECHNOLOGY IN LONG SPAN CONTINUOUS BEAM CANTILEVER POURING CONSTRUCTION

As we all know, the history of Bridges is very long. As early as in primitive times, people used fallen trees, stone beams or stone arches formed naturally, stones protruding from streams, vines growing on the banks of valleys to build Bridges. Therefore, Bridges can represent the history and culture of our country. Recently this year with the rapid acceleration of the urbanization level, the number of roads and Bridges construction is also increasing rapidly. However, during the construction, due to the different regional environment, the construction of roads and Bridges will also be affected. In addition, it is necessary to pay attention to the construction capital and the technology used in the construction. Relevant departments of our country also have found relative solution measures according to the actual situation, for example, to construct a kind of cantilever pouring connected bridge, this kind of bridge costs less construction funds, but also more practical, when this type of bridge once proposed, has been approved by the broad personnel, and has begun the construction in various parts of the country.

Cantilever pouring construction refers to the construction method of setting the working platform on both sides of the pier, and balancing the cantilever pouring or assembly beam segment to the span section by section until the bridge span structure is closed. The cantilever construction method has many outstanding advantages, such as not using or less support, not affecting navigation or traffic under the bridge during construction, and breaking through the restrictions of regional factors, etc. And it is suitable for the construction of bridge structure with variable section, for the bridge with negative bending moment on the pier top. The stress state during construction is basically the same as the stress state after completion, so it can reduce a part of the construction materials, or even directly save a part of the construction materials. In addition, the cantilever pouring construction has strong practicability, it can that the vehicle driving on the bridge when the road feels very flat and very stable, at the same time, in the later stage of the engineering care, the cost of money is more favorable than the original bridge, so it is widely used.

3. THE REASON AND METHOD OF STRESS CONTROL IN LONG SPAN CONTINUOUS BEAM CASTING CONSTRUCTION.

3.1 Reasons for construction stress control of long-span continuous beam suspensions

The reason why stress control is used in the construction of cantilever cast bridge is that the stress of key sections at each stage needs to be accurately measured. The stress data measured and analyzed and calculated according to the structure of the stress situation are compared, if the results of the gap is relatively large, then it is necessary to immediately stop the construction,

accurate analysis, find the cause of the deviation, timely correction and adjustment, to ensure that the stress of each stage of the key section of the construction and design data is similar, To ensure the structure of the bridge internal force and design requirements are consistent, so as to ensure the safety of the bridge and stability. When the continuous beam cantilever is poured, it makes full use of the software that meets the requirements and actively calculates the structural internal forces of the bridge in each construction link. In addition, the internal force value of each bridge segment should be accurately calculated by using conventional calculation methods, and the internal force value data calculated by using conventional calculation methods and software should be compared to test the reliability of the internal force value data calculated by software [2].

3.2 Methods of stress control for suspension casting of long-span continuous beams

The stress control in the suspension pouring construction of long-span continuous beam is mostly carried out by using the stress measuring points arranged on the control section above the bridge, or by burying the stress meter, as shown in the figure below. In the actual bridge construction, the staff should carefully observe the change of the control section, and finally find the stress distribution and stress change on the control section. The traditional measurement method is often used to paste the resistance plate on the steel bar. This measurement method cannot be accurately measured, because the resistance plate is easy to be damaged in the process of construction. In addition, the method of burying the strain sensor in the concrete may also be adopted. It cannot be monitored for a long time. Therefore, the steel string strain gauge is used to measure the stress situation

Condition detection, so as to effectively and reliably monitor the stress situation. Because the steel string strain gauge is to convert the strain on the surface or inside the member into the working frequency change of the steel string and measure. The steel string is fixed by two fulcrum points, which vibrate along the direction of the magnetic field plate under the action of short pulses generated by the current flowing through the electromagnetic coil. When the distance between the fulcrum changes, the tension and vibration frequency of the steel string also change. By observing the change of vibration frequency of steel wire, the stress change of concrete or steel is measured, and finally the stress change of concrete or steel is obtained.

4. TECHNOLOGY RELATED TO CONSTRUCTION CONTROL OF LONG SPAN CONTINUOUS BEAM CANTILEVER POURING

In most cases, hanging basket is a special tool in the process of cantilever pouring construction of long-span continuous beam, which is widely used in the construction industry at present. With the wide application of hanging basket, the technology is constantly developed and improved [3].

4.1 Types of hanging baskets

According to the query of relevant information and practice, it can be analyzed that the hanging basket is divided into different types. For example, according to the structure of the hanging basket, it can be divided into four types, cable-stayed type, truss type, steel type and mixed type; The design principle of hanging basket is simple structure, solid and stable, very convenient to move forward and disassemble, with strong reusability, small deformation after stress and other characteristics, and enough space under the hanging basket, can provide a large construction surface, conducive to the construction operation of steel formwork; If hang according to Basket walking mode can be divided into sliding type and rolling type two; If it is classified according to the balanced way, it can be divided into three types: self-anchoring type, full pressure type and half pressure type. Different types have different characteristics.

4.2 Construction control of hanging basket cantilever pouring

When cantilever pouring concrete, it will affect the deformation of the hanging basket system. The reason for the deformation of the hanging basket system is because of the loosening of the tools of the hanging basket system, or the geometric deformation caused by the elastic deformation of the concrete after bearing enough weight. Generally speaking, the elastic deformation of the hanging basket system can be controlled, but there are many reasons affecting the geometric deformation, so it cannot be well predicted. Although the geometric deformation cannot be predicted, it can still control the deformation of the hanging basket system. In case of elastic deformation, various procedures can be used to deal with the problem of elastic deformation. In case of geometric deformation, bolts can be tightened and preloading test of hanging basket can be used to reduce the influence of deformation.

5. FACTORS INFLUENCING THE CONSTRUCTION CONTROL OF CONTINUOUS BEAM CANTILEVER POURING

The material of concrete will affect the construction control, because the bridge project is a relatively long period of construction, the construction environment is complex, so the shrinkage of concrete in the construction process will seriously affect the structure of the bridge, the rational use of the calculation model and reference data in the process of control. In addition, the change of climate and temperature will also affect the continuous beam cantilever pouring construction control, in different temperatures, the state of the measurement structure, the result will be different, therefore, in the continuous beam cantilever

pouring construction control also need to control the temperature factor.

6. CONCLUSION

In a word, with the development of the economy, the construction industry is also developing rapidly. It has gradually become one of the industries in people's life, but also a complex industry. Because in bridge and highway engineering, large span continuous beam cantilever pouring construction stress control technology is very complex, the application process needs to pay attention to a lot of problems, therefore, the need for relevant staff to learn the technology seriously, and master the technology, so as to be applied to the actual construction, so as to ensure the safety and stability of highway and bridge.

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