

# IN-DEPTH RESEARCH ON QUALITY CONTROL OF ROAD AND BRIDGES IN HIGHWAY CONSTRUCTION

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**Abstract:** Due to the large scale, long construction period and complex geographical environment of highway construction, the construction quality of roads and bridges directly affects the overall construction quality of highways. This paper analyzes the main problems and reasons affecting the construction quality of roads and bridges, and proposes control measures to improve their construction quality, in order to strengthen the construction quality of highways and promote the healthy development of the transportation industry.

**Keywords:** High-speed construction; Roads and bridges; Quality control

## 1 MAIN ISSUES IN ROAD AND BRIDGE CONSTRUCTION

### 1.1 Quality of Construction Materials

In any construction project, the quality of construction materials is the core of the overall construction quality. In the construction of roads and bridges, high-quality construction materials are the guarantee and focus of road construction quality. When purchasing specific raw materials, especially reinforced concrete materials, relevant personnel must strictly follow the standards and strictly inspect their quality to provide basic guarantee for later construction. Resolutely prevent some units or personnel from using substandard construction materials for immediate or their own economic interests, thereby causing serious hidden dangers to the construction quality and later safe use of roads and bridges.

### 1.2 Cracks on Roads and Bridges

Highway construction will face different weather and geographical environments, and the weather environment will have an important impact on highway construction. During the construction of road bridges, cracks of varying degrees often occur in road bridges due to changes in temperature, which affects the overall quality of the construction. When the temperature is below 0°C, water will condense into ice. Therefore, when the construction temperature of roads and bridges is below 0°C, the moisture in the concrete will automatically condense into ice, directly reducing the overall strength of the concrete and affecting the structure of the concrete. Quality has serious consequences. At the same time, due to changes in the structure of the concrete, shrinkage stress occurs inside the structure. When it exceeds a certain range, cracks will appear in the concrete structure to varying degrees, which seriously restricts the improvement of the construction quality of roads and bridges.

### 1.3 Problems with Mechanical Construction Equipment

Mechanical construction equipment is the basis for improving the efficiency of road and bridge construction, and its quality and operation are the key to ensuring the construction cycle. In the current road and bridge construction, some construction units lack a complete mechanical construction equipment supervision system, which makes some mechanical equipment malfunction more and more frequently during the construction process. This not only delays the completion of the construction plan, but also affects the construction quality. There is a direct impact.

### 1.4 Corrosion Problem of Steel Bars

The quality of steel bars plays a decisive role in the quality of the entire road and bridge project and the safe use in the later period. If the steel bars are corroded during construction, it will directly reduce the quality and service life of the road bridge, and even threaten people's lives and property. Usually, there are many factors that cause the corrosion of steel bars, mainly the specific construction environment and construction technology, as well as the harsh natural environment (exhaust gas, acid rain or other corrosive environments) during the construction process, which will cause corrosion of the steel bars, thereby directly reducing the strength of the steel bars. Durability and durability have a negative impact on the overall construction quality.

## 2 BASIC REASONS FOR QUALITY PROBLEMS IN ROAD AND BRIDGE CONSTRUCTION DURING HIGH-SPEED CONSTRUCTION

### 2.1 Construction Personnel Lack High Professional and Technical Levels

Construction workers lack corresponding professional knowledge and operating skills, making their own professional skills generally low, which has a certain impact on the quality of expressways. Due to the lack of professional skills of the relevant

construction personnel, it directly led to problems with the overall construction quality, shortened the original safe use period, and also increased the later maintenance costs. The construction personnel of some enterprises do not have the corresponding professional knowledge, and some even do not construct according to the design drawings but based on their own experience; some construction personnel lack the corresponding professional ethics and do not obey the arrangements of the management personnel or directly refuse to implement them. its requirements; some construction workers do not respect new technical personnel, etc., which will have a negative impact on the overall quality of the construction bridge.

## **2.2 Errors in Actual Construction Lead to Deviations in Measurement and Calculation**

With the rapid development of the construction industry, higher requirements have been placed on the professional skills and comprehensive quality of construction personnel. But this is not the case. Most of the front-line workers in road construction in our country currently do manual labor and generally have low educational levels. At the same time, construction companies neglect to provide professional construction technology training to workers. , making professional skills and comprehensive literacy generally low. Therefore, there are certain difficulties in understanding the specific construction plan, and it is easy to make mistakes during the actual operation, causing deviations in relevant measurements and calculations, and giving wrong guidance to later work. At the same time, due to the low education level of construction workers, some construction workers will only operate based on subjective consciousness and ignore relevant construction operation requirements, which will inevitably directly affect the overall quality of the construction.

## **2.3 Failure to Pay Attention to Hidden Projects during Construction**

Under normal circumstances, after the construction of a road bridge is completed, professional institutions and staff will conduct strict acceptance and evaluation. However, often only the external structure and quality of the road bridge can be inspected. The internal structure of the road bridge Some hidden problems cannot be discovered and inspected in time, which will bring safety risks to the later use of roads and bridges. Therefore, during the final acceptance and evaluation, the relevant departments should strengthen the inspection of hidden works in the project, such as the binding of steel bars and the fixing method of welded joints, etc., to conduct careful and comprehensive inspections to try to avoid these problems. The overall quality of roads and bridges is damaged. If any emergencies occur on the bridge during transportation, it will cause serious harm to the bridge, traffic and people. Even after effective repairs, it will also bring safety hazards to later use. Therefore, during the initial construction process of the bridge, the construction quality should be strictly guaranteed to avoid cracks in the bridge and ensure the construction quality.

# **3 MAIN MEASURES TO IMPROVE THE QUALITY CONTROL EFFECT OF ROADS AND BRIDGES**

## **3.1 Strictly Supervise the Specific Construction Quality of Roads and Bridges**

- 1) During the specific construction process of roads and bridges, construction companies should pay attention to the supervision of construction quality, arrange professional supervisors in a scientific and reasonable manner, and strictly supervise the quality of various construction projects in strict accordance with the construction standards and requirements of roads and bridges. If any problems are discovered, they will be pointed out and rectified promptly to ensure construction quality.
- 2) Construction enterprises should comprehensively improve the professional knowledge and skills of construction supervisors, improve their safety awareness and professionalism through training, examinations, etc., so that supervisors can serve project supervision in a better state and promote the improvement of project construction quality. .
- 3) In the long-term construction of roads and bridges, construction companies must avoid artificially lowering the construction process requirements due to the lax subjective consciousness of construction personnel, and relax the quality inspection of hidden projects during construction, which may bring hidden dangers to safe use in the later period.
- 4) The construction unit can improve the work enthusiasm and construction efficiency of construction personnel and ensure the overall construction quality by establishing a reasonable performance appraisal system.

## **3.2 Scientifically Deal with the Problem of Bridge Cracks**

During high-speed construction, bridge cracks will directly affect the service life of the bridge. Construction companies should attach great importance to and effectively deal with bridge cracks through scientific means to ensure bridge quality. During the initial construction of the bridge, especially during the pouring of concrete, attention should be paid to the quality monitoring of construction details. For example, for concrete that has been mixed, temperature control measures should be taken in time before entering the mold to avoid excessive temperature differences. The concrete expands from the inside out, causing cracks in the bridge. Secondly, during the concrete pouring process, the layered pouring operation method should be adopted, combined with corresponding auxiliary measures, to ensure the pouring quality and improve the quality of the bridge construction. In addition, attention should be paid to the operational details and related maintenance measures during the construction process to ensure that the concrete is vibrated evenly during the pouring process. Sunshading and water replenishment measures should be taken for some construction projects to ensure the construction quality and extend the safe service life of the bridge.

## **3.3 Timely and Efficient Construction Supervision**

1) Timely and efficient construction supervision by project supervisors is an important aspect to improve the quality of road and bridge construction. Construction companies should reasonably divide the supervision areas of supervisors based on the characteristics of the project to ensure the quality of supervision. Establish and improve construction quality supervision and rectification measures and systems to provide basis and guarantee for the specific work of project supervisors. 2) Timely records should be made of quality problems during specific construction to provide a basis for later rectification. 3) Construction companies should pay attention to the training of professional knowledge and skills of supervisors, comprehensively improve their own professional ethics and comprehensive qualities, and ensure that specific engineering construction and project supervision can be carried out harmoniously.

### **3.4 Construction Enterprises Strengthen the Training and Introduction of Professional Talents**

The current serious overloading, excessive vehicle speed and other factors will directly affect the service life of road bridges, so it will make subsequent road and bridge maintenance work more difficult. Therefore, strengthening the training and introduction of professional talents by construction companies is not only the basis for ensuring construction quality, but also the key to improving the quality of subsequent road maintenance. Construction enterprises should strengthen professional skills training for construction personnel, provide more opportunities for exchange and learning, introduce new talents with advanced concepts in a timely manner, establish a scientific assessment mechanism, improve the work skills and enthusiasm of construction personnel and management personnel, and ensure Overall construction quality.

## **4 CONCLUSION**

Road and bridge construction in high-speed construction is an important part of my country's infrastructure construction. To effectively improve the construction quality of roads and bridges, scientific control measures should be taken, construction technology should be optimized, and relevant resources should be reasonably allocated to ensure the overall construction quality and promote traffic. Sustainable development of the transport industry.

## **COMPETING INTERESTS**

The authors have no relevant financial or non-financial interests to disclose.

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