

## Quality control and countermeasure analysis of highway engineering supervision in construction

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**Abstract:** Currently, the process of urban-rural integration construction in China has been rapidly promoted, which has led to the rapid integration of urban-rural infrastructure construction. As a result, communication and connections between cities and rural areas have been strengthened, which is more conducive to the further connection and integration of urban and rural economies. The construction of urban and rural highway engineering needs to consider multiple different aspects, in order to further improve the capacity and level of highway infrastructure construction, ensure the quality of urban and rural highway engineering construction, and thus improve the efficiency and economic benefits of highway construction. This article explores the quality control and countermeasure analysis of engineering establishment in construction, and will explore the characteristics and demand points of highway engineering construction. At the end of the article, several feasible solutions will be proposed.

### 1. Introduction

In recent years, with the continuous improvement of the efficiency of urban and rural road construction in China, the difficulties in the development of urban and rural road transportation have been solved. With the increasing requirements for highway construction in our country, especially the high pursuit of high-quality construction of highways, higher requirements have been put forward for the construction work and tasks of urban and rural highways in our country. In this process of construction and development, if we want to better promote the construction of urban and rural roads, we should continuously improve the capacity and quality of road construction. Highway engineering supervision is the main person in charge of highway construction management, shouldering the heavy responsibility and responsibility of highway construction. Highway engineering has an important impact on social and economic development, serving as an entry and exit point for promoting urban and rural construction and development. Therefore, strengthening the construction of urban and rural roads is very important and an inseparable part. Highway engineering supervision is one of the main means to strengthen highway construction, which can effectively control the level of highway construction and plays an indispensable role. In the process of highway engineering construction, in order to complete the construction work on schedule and carry out the construction with high quality, and to proceed smoothly, highway engineering supervision has very strict construction requirements for construction quality control. Only in this way can we truly ensure that highway construction work can proceed efficiently, meet construction requirements, and control costs. However, at present, China's urban and rural highway engineering technology construction is still in a slow development stage, and there are deviations in the understanding of some technical supervisors and construction personnel, which leads to certain problems in China's engineering supervision and construction work. This will inevitably lead to multiple constraints and influences on China's engineering construction work from different aspects. Vigorously researching such construction is a problem, and continuously improving the level of highway construction in China is of great significance. This has also become an important issue that construction units and supervisors must face at present.

## **2. The importance of highway engineering construction quality management**

In the actual construction process, in order to continuously improve the quality and management level of highway construction, and at the same time, it is necessary to continuously strengthen the maintenance and management of highway construction in the later stage, so as to truly do a good job in highway management. Through a series of improvement measures, fully implementing the management of highway construction and optimizing the construction process, a good management goal can be achieved, which can save various costs required for highway construction, improve the effectiveness of highway construction, comprehensively combine the economic and social benefits of highway construction, continuously enhance the development of urban and rural economy, and achieve the maximization of interests in all aspects. In the process of designing urban and rural highway construction, multiple operational and management issues need to be taken into account. At the same time, active attention should be paid to the carrying capacity of the highway after its opening. Firstly, once the highway is opened, the traffic flow will become larger, and it also has a relatively high operating speed. Therefore, in construction management, the management of engineering construction quality should be continuously strengthened, ultimately ensuring the safety of vehicle operation. At the same time, it can also prevent the quality of highway construction from failing to meet the standards, leading to operational problems and major traffic accidents. Highway transportation, engineering quality, and highway construction quality are largely influenced by construction quality and management. The establishment of highway engineering should always adhere to the concept of reasonable management and high-quality construction development, fully ensure the management quality of urban and rural highway construction, fully guarantee the safety of traffic vehicle operation, and thus achieve the goal of extending the service life of highways.

## **3. The important meaning of highway engineering supervision quality control in construction stage**

During the process of highway construction, the daily management behavior, operation mode, and effectiveness of engineering construction units are one of the main evaluation indicators, and also one of the main reference criteria for whether the construction is standardized. So, only by establishing corresponding construction supervision management system and construction construction system and ensuring construction safety, can we meet construction requirements, standardize construction work, ensure the smooth progress of highway engineering construction units, and fully guarantee construction safety. Highway construction engineering supervision is a major success in quality control during the construction phase, which can facilitate the orderly progress of highway construction work, coordinate various aspects of engineering construction work, and have a very important reference role for engineering construction work. At the same time, attention should be paid to the quality control construction methods during the construction phase of highway engineering supervision. For example, relevant measures should be combined to develop corresponding methods, complete the highway construction management and control system, and actively implement various management measures in order to standardize the quality control of highway engineering supervision during the construction phase.

## **4. Problems in quality control of highway engineering supervision construction**

### **4.1 The supervision personnel participates in the highway construction the degree to be insufficient**

The degree of participation of supervisory personnel in highway construction is insufficient. There are many highway traffic construction projects, which are difficult to construct, and the time span is usually large. At the same time, many construction projects have cross operations, and are also affected by natural factors and social events. These different characteristics to some extent determine the need for multiple professional departments to participate together, especially for

many supervisory and management departments. For example, when some highway construction new technologies are applied, due to insufficient understanding of the technology by the supervisory and management departments or unreasonable supervision and management methods and means, supervision and management may make mistakes in the process of supervision and management, and fail to correctly judge the quality of construction. At the same time, due to the lack of work responsibility and safety and quality management of the supervisory personnel, their participation in highway construction is insufficient, and they have not followed up on project supervision in a timely manner.

#### **4.2 The overall quality inspection and evaluation of highway construction are not comprehensive**

Highway engineering supervision has a lot of management work in construction, and the testing projects are also relatively diverse. Quality testing work should be considered as relatively complete with the construction of the project. After the construction of the project is completed, attention will be paid to the inspection of the project, and the specific test results will be separately included in the technical project data. However, currently, many testing projects are not fully included in the specialized engineering testing information archives, resulting in a lack of data, which affects the final testing evaluation of the project and cannot measure the effectiveness and scientificity of the overall evaluation of the engineering data.

#### **4.3 Supervision and management system is not perfect**

In the process of highway construction management, supervision bears important responsibilities and many work management tasks. The main job of the personnel of the supervision unit is to supervise and manage the construction of the project, and also to conduct spot checks on the self inspection of the construction unit, such as supervising and inspecting the project, in order to further improve the quality of highway construction and improve the construction effect. However, in the actual process of highway construction, some supervision and management personnel are not adequately equipped, coupled with a lack of work experience and inadequate establishment of management systems, which affects the normal implementation of supervision and management systems. Therefore, in the new era, it is necessary to continuously strengthen the construction and management of engineering supervision management systems, and at the same time, continuously improve the quality of testing management.<sup>[1]</sup>

### **5. Quality Control Countermeasures of highway engineering supervision in construction**

#### **5.1 We should strengthen the pre-construction management preparation**

In the process of highway construction, the supervisor should make sufficient management preparations, especially during the construction process, which involves many contents and links, making it relatively cumbersome overall. This not only includes the design of drawings and material management, but also involves related technical equipment. Supervisory management personnel should participate in the design of drawings, propose reasonable design schemes and management issues, and then choose the best design scheme based on the actual situation. At the same time, supervisory personnel should actively participate in the inspection of drawings, understand different technical design parameters, and highly integrate design with the specific situation of engineering construction. After designing the drawings, it is necessary to determine the specific construction organization work and complete the technical disclosure work. In addition, safety and quality training should also be provided to construction personnel. For personnel engaged in high-risk engineering projects, they must undergo strict special training and assessment. Only after obtaining qualification certificates can they work, such as high-altitude workers<sup>[2]</sup>. In the construction site, relevant specialized quality supervision personnel and safety management construction management personnel should be equipped to constrain and manage the behavior of construction personnel<sup>[3]</sup>. For supervisory personnel, in the process of work, they should establish

correct professional values, work in accordance with relevant ethics, continuously improve the moral quality of relevant practitioners, regulate their work behavior, accept supervision from enterprises, and conscientiously carry out their supervision and testing work during their tenure, strengthening quality control of highway construction projects. During the construction of highway construction projects and engineering supervision, construction management work should be strictly carried out in accordance with corresponding procedures, problems in construction should be strictly controlled, and corresponding measures should be reasonably formulated to ensure that all management work can proceed in an orderly manner. The first point is to reasonably set up specialized highway engineering supervision personnel and management departments. The second point is to carry out technical disclosure work in a planned and procedural manner. The third point is to fully carry out various engineering counting data and corresponding disclosure work, and to do a good job in storage and preservation.

## **5.2 We will promote the integration of engineering quality inspection and control systems with science and technology**

In the current social development context, if we want to quickly and effectively improve the efficiency and strength of engineering construction quality control, we need to strengthen the integration of engineering construction quality inspection and control system and technology, which is conducive to improving the ability and efficiency of highway construction inspection. As is well known, quality monitoring work should be regarded as a relatively complete part of engineering construction. By using technology for analysis, it is beneficial for supervisors to conduct project inspections in an orderly and efficient manner, strengthen technical control management level, and completely break the originally fixed space, so that different control technologies and environments can be efficiently unified together. At this point, the supervisor can collect relevant data and information online. Because only by taking advantage of the Internet can we quickly obtain relevant data and materials, minimize the different losses caused by human costs, and help continuously improve work productivity. Then, all the data will be collected and processed uniformly, and all the data will be sorted and uploaded to the enterprise database. Of course, if there is no special project detection information file, the system file platform should be built in time to prepare for storing data. At the same time, more first-hand information will be provided for the next data evaluation, which will help to do a good job of highway construction quality control and supervision, and ensure that there is no quality problem in highway construction quality. For some newly adopted new technologies, the supervisor should understand and analyze the application characteristics of the new technologies and existing construction cases, or through in-depth communication with new technology development and introduction institutions, understand the technical parameters and characteristics of the technology, and then combine relevant technical characteristics to propose some objective evaluations, which can reflect that there are no problems in the construction quality of highway engineering and can accurately and scientifically evaluate it objectively. At the same time, supervision and construction teams should strengthen communication and exchange. Although supervision and construction teams have different relationships, they have an equal position of responsibility in the construction market.<sup>[4]</sup>.

## **5.3 A system of supervision and management should be established**

In the process of highway construction, many different factors both inside and outside can directly affect the progress and quality of highway construction projects, and even have a significant impact on construction safety. In the process of construction, in order to fundamentally ensure the safety and smooth progress of construction projects, it is necessary to establish a complete and sound quality supervision system and implementation methods, which should be supervised and managed by professional institutions, especially clarifying the establishment of work responsibilities to achieve construction goals and tasks. In addition, supervision and management should be strengthened to optimize the level of construction management. During the construction process, relevant construction personnel should continuously strengthen the supervision, management, and review of the operation status of testing and testing work. They should judge the

rationality of testing methods and processes, the reliability of testing results, etc. according to relevant standards and specifications, and make timely adjustments and improvements to meet the development needs of testing and supervision units<sup>[5]</sup>. Only in this way can we better implement and promote supervision and management work, achieve the purpose and goals of supervision work, further strengthen the strength of engineering testing and control, achieve full coverage of construction project testing, and leave no blind spots. Efficient integration of supervision and constraints can ensure the effective progress of various testing and inspection work, truly achieving evidence-based and evidence-based approaches, and improving the quality standards of testing work. Supervisors and supervisory departments should comply with relevant testing standards<sup>[6]</sup>, conduct work testing in accordance with these standards, and strictly follow the relevant standards.

## 6. Conclusion

In the process of urban-rural integration construction, it is necessary to take into account and consider many issues and construction matters. The primary task of construction supervision is to carry out highway engineering construction and management work. In the process of highway construction, the biggest core goal is to continuously improve the quality of engineering construction, strictly control each different link of highway construction, in order to ensure the safety of highway construction, the service life and quality of highway construction. In addition, in order to continuously improve the level of highway construction management, it is necessary to balance social and engineering construction benefits, enhance the economic value of all aspects, and achieve the maximization of management goals. Before construction, supervisory personnel should prepare construction plans and participate in various management work. At the same time, they should strengthen supervision and management of highway construction sites, use technology to analyze construction information and data, and do a good job in data storage and unified information collection. In addition, supervisory personnel should fully play their due role in carrying out supervision and management work, and should have in-depth and close communication with the technical supervision team. In particular, they should actively explore construction management issues, strengthen technical exchange and cooperation, collect important construction information, and then obtain construction quality data. They should timely understand the progress and basic situation of highway construction and do necessary supervision and inspection work. Once the supervisory personnel discover construction problems, they should report them in a timely manner and intervene in a timely manner. They are required to carry out construction according to the construction or specifications and requirements, dismantle the already constructed parts in a timely manner, stop losses in a timely manner, and start construction again. Only in this way can we enhance the quality control of highway engineering supervision in construction, improve the level and efficiency of construction, and enhance the comprehensive benefits of highway construction.

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