

# Analysis of Quality Control Measures in Highway Project Construction

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**Abstract.** During highway construction, project quality and construction related to the level of construction enterprises. Meanwhile, the project quality and the safety of intrinsically linked, and even have an impact on social stability. Road construction enterprises in the construction process, in order to ensure compliance with highway construction standards, and place in a highly competitive market, we must strengthen the construction quality control. However, in the highway construction, but there are many problems adversely affect the development of highway construction enterprises. Therefore, for highway construction in quality control measures to expand the analysis put forward concrete measures so as to provide reference for improving the quality of highway construction project.

## Introduction

At present, China's economy growing trend, in order to promote the comprehensive development of the country, increased infrastructure construction, and then to provide effective protection for the people's production and life. Highway project is a major project, road transport hub of the town, improve the regional economy in the process, should strengthen highway construction be highly valued. During the construction of the road network tends to improve, more and more large-scale highway projects, then, in order to extend the life of highways, highway construction enterprises in the construction process of the project quality must be strictly controlled to ensure quality to meet the requirements of highway engineering. When the highway construction project includes many links, so construction workers must follow the norms, through the improvement of all aspects of construction, to ensure project quality control in a reasonable range, and the indicators are in line with the road standards provide a favorable environment protection....

## Role of quality control during road construction process

In highway construction process, the construction quality control has been dominated, creating favorable conditions for economic lift highway construction enterprises. Be controlled during highway construction quality, we need to be controlled and other construction schedule and cost, in order to ensure project quality to be safeguarded, and highway construction companies to get more economic benefits.

Currently, some of China's highway construction in the building, because of the funds, facilities and construction technology and other factors, for the highway construction has security implications, engineering quality is difficult to be guaranteed. Therefore, when our country highway project planning, we must carry out systematic and scientific construction, construction personnel in accordance with specifications. At the same time, supervisors strengthen the project construction supervision and management, thereby ensuring the quality of highway projects, and maintain safe society and the people. Highway engineering construction process quality control, to extend the service life of the highway, to protect people's safety and improve highway engineering enterprise market competitiveness has played a pivotal role. Thirteen Five countries in the planning process, the highway construction as the focus of content, thereby improving infrastructure construction, then during highway construction, to control the quality of the project, both to ensure compliance with the relevant provisions of the state highway projects, but also for the road Construction companies can gain more economic profits play an important role, with guidance for the highway construction.

## **Factors affecting the quality of highway construction**

### **Construction materials and equipment**

Early in highway construction, engineering, procurement and construction companies need materials and equipment based on the overall situation of the construction, pave the way for road construction. However, part of the construction enterprises in order to obtain more economic profit, there is a phenomenon of shoddy work by reducing engineering costs to improve profitability. Enterprise purchased material or equipment exist shoddy conditions, both specifications and quantity of material or equipment so failed to meet the basic requirements of quality of the project, although road construction enterprises to maximize their own interests, but the Highway Engineering Quality there is a significant decline in the life of the road has been reduced. Overall, construction materials and equipment is a major factor affecting the quality of highway engineering.

### **Comprehensive quality of construction personnel**

In highway construction process, construction workers dominate the overall quality of construction workers directly affects the quality of the project, if the technical level of construction workers is not high, so, it will pose a threat to the quality of highway engineering. Thus, during road construction, construction companies must have comprehensive quality education construction workers, in order to achieve a reasonable control of the quality of highway construction projects. At the same time, even if the designer to design a very scientific and detailed drawings, if construction and technical personnel failed to have a solid theoretical and practical basis, are very difficult to ensure consistent highway construction and design drawings, it will be difficult to guarantee the quality of the project. From the current situation of highway engineering construction point of view, for our construction workers most highway projects, the existence of low technical level of the case of some construction workers, construction workers in the actual construction process, there are often not in accordance with standard operating conditions, and Failure to follow the guidance of supervisors to conduct their work, resulting in a certain impact on construction quality control of highway engineering.

### **Belittle concealed work**

During highway construction, the relevant personnel need to do other tests, inspection and evaluation in the construction process, although increased the supervision and management of all aspects of quality, but does not pay attention to the hidden works, it will be in the overall project there are many security risks, a certain impact on the quality of highway projects. Generally speaking, the common workers contain covert and lap steel banding, welding, etc., such as poor quality of welded joints, lap steel banding quality does not meet specifications. In addition, if the spacing of stirrups hook angle and there is not a symmetrical situation, then, in the course of road construction projects, because of neglect caused by the hidden works to reduce safety engineering. Therefore, in order to improve the quality of highway engineering, construction must take into account the hidden factors engineering, and hidden factors to be reasonable engineering quality control to ensure highway construction compliance.

### **Environmental factors**

When highway construction, will face a complex environment, engineering, under the influence of environmental factors, if relevant personnel failed to take effective measures to deal with, will lead to highway construction are subject to different degrees. So, in a certain range, the impact of highway engineering quality environmental factors mainly includes the following aspects: first, engineering and technology environment. Highway workers in the construction process, site field geological, hydrological and meteorological quality of the project and so will cause a certain impact, so construction workers must be carried out according to the scene investigation, indeed highway engineering construction technology targeted. Second, the work environment. Construction site, construction and other environmental organizations, are construction workers during highway construction needs to be considered. Third, the climate factor. Climate highway engineering quality construction site will have a great impact. For example, temperature, rain, cold, and this will to some extent affect the construction schedule highway project, and even pose a threat to the quality of highway engineering. Therefore, in the course of road construction projects, construction workers in

order to strictly control the quality of the project, construction workers must be fully taken into account climatic factors, and then take the best construction program to ensure highway construction quality be safeguarded.

## **Problems in highway construction projects**

### **Technical construction workers should be improved**

Highway engineering and construction quality of people's lives and safety are closely related, so the technical level of construction workers must be guaranteed in order to ensure construction compliance. In highway construction process, we should ensure that the measurement precision in place, and in accordance with the "Highway Route Survey procedures" were wire retest, construction workers can accurately additional benchmarks, the existence of an error to be corrected. Meanwhile, in the roadbed construction, construction stakeout and must implement embankment berm work in accordance with the specifications. In short, in many aspects of the construction period, due to the technical level of some construction workers should be improved, resulting in road construction failed to meet the standards, resulting in the quality control of highway engineering presence unreasonable.

### **Insufficient project supervision**

Currently, the highway construction process, some construction companies due to lack of project supervision efforts, highway subgrade construction will severely affected. Highway subgrade highway construction is a major part, but the situation on the construction project supervision personnel and insufficient supervision and management, and even the existence of the phenomenon is not strict supervision [1]. During highway construction, due to lack of project supervision efforts to create quality problems highway projects mainly in the following aspects: first, the casing of the trench backfill. Construction workers in the construction, if not taken correctly in accordance with standard construction techniques, and supervision is not strict, so that there is a security risk for Highway Engineering. Second, residual water trenches have not been adequately addressed. If the trench is not clean residual treatment, the water content within the trench is too high, the construction can not meet the requirements. Third, due to lack of supervision efforts, construction workers will use concrete blocks and chunks of old material backfilling trenches, resulting in greater landfill void, if not compacted in a timely manner, the vehicle will cause subsidence occurs after the groove part of the phenomenon, thereby reducing the quality of highway projects.

### **Improper construction methods**

Due to improper construction methods will result in the highway construction process, the project quality control is difficult to achieve good results. For example, during the construction, construction workers filling in controlling the thickness, failed to ensure the bridge abutment back slope ratio of 1:1 ratio to dig stairs, then backfilled and compacted layer by layer, leading to settlement of backfill and structures , Highway Engineering Quality severely affected. In addition, the pore pressure drop during prestressed structure, in the preparation of mortar with a certain gap between standard consistency and bleeding rate, etc. So in highway construction projects, due to the construction method is not appropriate, it will be difficult to achieve the quality of the project reasonable control.

## **Effective measures to control the quality of highway construction**

### **Strict control for construction materials and equipment**

A highway construction enterprise in order to improve project quality, and to get more economic benefits, through the construction materials and equipment were strictly controlled, so as to ensure the quality of the project within a reasonable range. Before the highway construction, the relevant staff to develop robust material procurement and management plans in accordance with regulatory requirements, in accordance with sound procurement staff plans to purchase equipment and materials. In the construction materials and equipment to strictly control the process, we should ensure that material and equipment specifications, quantity and so meet the requirements. After all the procurement of materials and equipment to complete, relevant personnel must be properly handled,

the equipment is stored in a secure location, and of different sizes and types of materials placed separately [2]. In addition, in order to ensure the quality of highway construction, the officer must do the preparatory work material rain, to avoid steel and cement and other materials by rain erosion, thereby affecting the quality of the project.

#### **Utilize proper construction methods**

In order to carry out stringent quality control of highway engineering, construction workers in the construction process should take proper construction methods, thus extending the life of the road. With the increasing scale highway projects, there is a higher demand for technology. For example, during foundation construction, construction workers should be right under catheters and pouring concrete. Before use of the catheter, the catheter needs to be rigorous inspections and tests to check whether there is leakage phenomenon catheter, and whether catheter has a strong tensile strength, thereby ensuring the catheter has good penetration effect. At the next conduit, construction workers must be such that the mouth of the hole from the bottom end of  $\leq 40 \sim 50\text{cm}$ , avoiding catheter buried in the mud. Meanwhile, in the pouring of concrete in accordance with the specifications, pouring process, buried in the depth of the catheter within the range of  $2.0 \sim 4.4\text{m}$ , complete pouring can bury conduit  $1.0\text{m}$ . In addition, in order to effectively avoid subgrade settlement, highway engineering in the construction process, it should be strictly stratified filling, layer thickness and so meet the requirements [3]. In dealing with soft ground, to be compacted layers, and then within the height range of  $1 \sim 2\text{m}$  from the ground not more than fine-grained soil reclamation, using rubble stone chips and small caulking and compaction [4]. In short, take the right construction method able to control the construction quality of highway projects play an important role.

#### **Improve comprehensive quality of staff**

Improve the overall quality of personnel has a certain significance to strictly control the construction quality of highway engineering. First, to increase the level of personnel. Construction workers in the construction process, we must correct their attitude, serious work, theoretical knowledge and practical grasp of the organic combination, in the role of highway construction enterprise training, learning experience and advanced construction techniques, technology, ensure during highway construction, strictly regulate safety-related construction. Second, improve the overall quality of supervising staff. Supervisors highway engineering quality control has a corresponding effect, so supervisors must work under the guidance of related systems and learn a wealth of management knowledge, enabling highway engineering quality control [5].

#### **Conclusions**

Since the reform and opening up, China's economy has been gradually increasing, so that the transport sector has been good development. In order to ensure the flow of goods, promote people travel convenience, the state has increased highway construction efforts, and then by strengthening the infrastructure, so driving through highway construction to enhance the national economic level. In the course of socialist modernization, the number of highway projects is gradually increasing, and people on the highway construction quality put forward higher requirements, so the construction quality control of highway engineering become the focus of attention. Therefore, in the highway construction project must assess the quality control, thereby enhancing the life of the road, lay a good foundation for the development of the country.

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