

# Discussion on the Problems of Municipal Road Construction Management and Its Countermeasures

Jinghan Huang\*

School of Civil Engineering, Fujian University of Technology, Fujian, China

\* Corresponding Author Email: xupiao@ldy.edu.rs

**Abstract.** With the rapid development of China's economy, the state has put forward higher requirements for urban and rural construction planning. The construction of municipal roads has entered a high-quality development stage. However, affected by the construction environment, construction period, facilities, and other factors, municipal road construction still has a series of quality problems. This paper focuses on problems in municipal road construction, analyzing issues comprehensively from the perspectives of construction management systems, construction safety supervision, and equipment management. Countermeasure proposals are then provided to address these issues and improve the safety management of municipal engineering projects. The insights gained also offer valuable references for the construction management of municipal road projects in the industry. In conclusion, this paper aims to identify and address key challenges in municipal road construction through a comprehensive analysis of construction management, safety supervision, and equipment management. The proposed countermeasures not only contribute to enhancing the safety management of municipal engineering projects but also offer valuable insights for the industry's overall construction management of municipal road projects.

**Keywords:** Municipal roads, construction management, construction equipment management.

## 1. Introduction

With the rapid development of China's economy and the overall requirements of urban and rural construction planning, the construction of municipal roads is also in a high-speed development stage. Municipal roads are the arteries of urban development, and the basis of urban transport, and their construction quality has a significant impact on the public's travelling safety, convenience, and smoothness, and is also an important symbol of the city's image. At present, due to the construction of municipal roads by the construction environment, time constraints, construction facilities, and other factors, the quality of the project is difficult to control. Therefore, it is very important to do a good job of management to improve the quality of construction, construction managers should actively promote the standardization of municipal roads, improve the level of construction management and efficiency, to better serve the development of the city, to provide protection for urban road construction. Guo Yuwei [1] proposed that China's building construction safety management awareness, technology, supervision and improvement of the work of the government, society, enterprises, practitioners and other parties to make joint efforts and exploration. People should adhere to the policy of safety first, prevention first and comprehensive management, actively advocate the awareness of construction safety culture, endeavor to upgrade construction safety technology and strengthen construction safety supervision. Zheng Xi [2] proposed that it is necessary to increase the strength of China's bridge-building construction supervision and quality control management. In addition, it is not only necessary for construction managers to be aware of the significance of the problem but also for the construction personnel of bridge construction projects to be aware of the importance of the management of the implementation of the project from the ideological point of view, so that it is also constructive for the cause of China's bridge construction."

Road construction faces various quality problems, including local subsidence of the roadbed, slope landslides, embankment instability, waterlogging, uneven pavement, and pavement cracking [3]. The quality of construction management work determines the quality of the project, and through scientific and reasonable municipal road construction management, the construction process can be effectively

standardized to ensure that the construction is carried out by the design requirements. This helps to avoid quality problems caused by improper construction and improve the quality of the project. Municipal road construction management is an important part of the project and should be paid attention to. Relevant personnel should raise awareness, carry out systematic management of municipal road construction, and adopt effective methods to solve problems in construction.

The purpose of this paper is to discuss the current problems of construction management. At the same time, this paper is mainly from the perspective of construction management, construction management systems, construction safety supervision, construction equipment management, and other aspects of a comprehensive analysis of the problem and countermeasures proposed for discussion. The research in this paper also has a certain reference significance for the management of municipal road projects in the industry.

## **2. Status of Safety Management in Municipal Engineering Projects**

Municipal road construction has several significant characteristics: municipal road projects are usually located in the urban core, and the construction environment is quite tricky, including high-density traffic flow and complex underground pipeline network; municipal road projects usually need to be completed within a limited time, so the required construction cycle is quite tight; municipal road projects are part of the city's infrastructure, which is critical to urban transport and economic development, so the construction quality requirements are extremely high. The quality of construction is extremely high. Municipal road project construction usually needs to be carried out in the heart of the city, so the potential safety risk is very great; in the construction process of municipal road projects, there is a need to strictly control the impact on the environment, especially noise, dust and sewage, etc. The municipal road project is government-invested, so cost control is particularly important to ensure the quality of the project under the premise of trying to reduce costs. These factors have led to increased difficulty in the construction of municipal road projects.

Municipal engineering projects include urban utility projects such as urban roads and bridges, rail transport, water supply and drainage, sewage treatment, urban flood control and drainage, landscaping, street lighting, underground pipe networks, and so on. Urban roads are in turn infrastructure to meet urban transport needs.

First of all, there are still problems with the construction management system in urban road construction, and the construction management system is particularly important as a guideline for all construction behaviors. However, in reality, there is a widespread phenomenon that the management system is not perfect. The management system is not perfect, which will lead to the site construction personnel's responsibilities are not clear, and the coordination of the implementation of the work is not in place, affecting the quality of construction. At the same time, there is also the situation that the implementation of the system is not in place, so in the construction, the construction personnel can not well carry out the operation of the safety norms, there are no good protective measures, there is not wearing a safety helmet, accidental fall at height and other safety issues, to the safety of the personnel to bring a hidden danger.

Secondly, poor construction safety supervision has become a common problem in the current construction industry. The regulatory bodies lack sufficient manpower, material resources, and technical means to effectively supervise and manage the safety conditions of individual construction sites. In addition, some construction organizations have taken chances and neglected to attach great importance to safety, failing to remove potential safety hazards in construction on time. In this case, the life safety of laborers cannot be effectively guaranteed, and at the same time, it also brings economic losses to the whole society that cannot be ignored [4,5].

Finally, there are more problems with construction equipment management. Common road construction equipment includes excavators, bulldozers, concrete mixers, and so on. These equipment often have problems such as equipment aging, insufficient number of equipment, and irrational equipment configuration. Firstly, aging equipment and an insufficient number of equipment will lead

to decreased construction efficiency and a longer construction period, which will bring additional cost and economic loss to the project; secondly, unreasonable equipment configuration may affect the construction quality; in addition, aging equipment increases the cost of repair and maintenance. In short, problems with construction equipment can directly affect the project in terms of duration, cost, and quality.

### **3. Control Measures for Problems in Project Management**

#### **3.1. Improvement of the Construction Management System**

Improving the construction management system is an important measure to ensure the smooth and efficient completion of construction projects. In the process of improving the construction management system, the following measures can be taken:

(1) Establish a sound construction process and management norms to ensure that all the work in the construction process is carried out in an orderly manner. For example, in large-scale construction projects, detailed engineering progress plans, division of construction tasks, and workflow are formulated, and responsibilities and authorities are clarified to avoid waste of resources and delay in the schedule [6,7].

(2) Strengthen personnel training and technology upgrades to improve the professionalism and management ability of construction managers. Organize skills training and safety education for construction personnel to enhance their technical level and safety awareness, reducing the possibility of accidents.

(3) Strengthen communication and coordination with relevant departments and partners to form a good collaboration mechanism. For example, in the construction of urban infrastructure, timely communication with relevant departments such as traffic and environmental protection, coordination of construction plans, and safety protection measures in the construction process, to ensure the coordinated development of construction activities and the surrounding environment [8].

#### **3.2. Implementation of Whole-process Safety Supervision**

First of all, a detailed risk assessment and safety plan must be carried out before road construction [9]. For example, when carrying out highway construction, it is necessary to take into account the characteristics of large traffic flow and high speed and formulate a corresponding traffic management plan to ensure that the traffic order is well maintained during the construction period. In addition, it is also necessary to conduct a comprehensive survey of the construction area to determine the geological conditions, drainage, etc., to avoid geological disasters.

Advanced information technology and management tools can be introduced in the construction process to improve the scientific and intelligent level of construction management. For example, IoT technology is used to achieve real-time monitoring and data analysis of various parameters at the construction site, so that potential problems can be discovered and solved promptly, and the quality and efficiency of construction can be improved [10,11].

Regular safety inspection and assessment of the construction process is an important part of ensuring road construction safety [12]. For example, when carrying out bridge construction, the acceptance inspection of the bridge needs to be carried out following the specified time and steps to ensure that the structure of the bridge is solid and reliable and can withstand the expected traffic load. At the same time, the construction unit should also establish a sound safety management system, set up a special safety supervision department, strengthen the inspection and monitoring of the construction site, and promptly discover and correct the existence of safety hazards [13].

#### **3.3. Enhancement of Equipment Management**

Equipment selection is the first step in equipment management, and suitable equipment should be selected according to the characteristics and specific needs of the construction project. For example, in road construction, how to choose a suitable asphalt paver depends on the success of the whole

project. An experienced construction company will take into account factors such as the size of the project, foundation requirements, and construction period when purchasing an asphalt paver, and select a machine with excellent performance and easy operation to improve construction efficiency and quality.

Equipment use is the core of equipment management. Reasonable use of equipment not only requires operators to master the operating skills of equipment but also needs to be based on the requirements of the project for reasonable scheduling. Take road construction as an example, the reasonable scheduling of equipment use includes a reasonable arrangement of equipment working time, avoiding mutual interference between equipment, reasonable distribution of equipment workload, and so on. Only through scientific and reasonable equipment scheduling, can people maximize the performance of the equipment and improve construction efficiency.

Regular maintenance and overhaul of equipment is also an indispensable part of equipment management. Equipment managers should establish a perfect equipment maintenance plan and regularly overhaul and maintain the equipment to ensure normal operation and prolong the service life of the equipment. For example, in road construction, the transmission parts of asphalt pavers are easily eroded by dust and other impurities, and if they are cleaned and lubricated promptly, the failure rate of the equipment will be greatly reduced, and the continuity and stability of the construction work will be improved [14].

#### 4. Conclusion

In municipal road construction, reasonable and effective management measures are very important. The quality of the project is affected by the quality of construction management. For such important infrastructure projects as road construction, improving the quality of construction management needs to improve all aspects of the influencing factors. Advanced construction technology needs to be combined with advanced construction management systems to better enhance the social and economic benefits of the project. In the specific construction project, the construction unit should use the management program that meets the requirements of the project according to the characteristics of the project to improve the quality of construction. Relevant personnel should manage scientifically, standardize construction, and pay attention to both property safety and construction quality.

(1) The construction management system is the constraint of all construction behaviors. A sound and perfect construction management system, and good collaboration mechanism can ensure that the project is carried out in an orderly manner. In terms of the enterprise, not only to achieve good economic benefits, but also to enhance the enterprise's reputation; in terms of the industry, to set a benchmark for the operation and development of the industry; in terms of the society, can improve the image and quality of the city, and contribute to the sustainable development of the city.

(2) Safety supervision is a key measure to ensure safety and smooth progress during road construction. In the process of formulating the program, it is necessary to comprehensively consider all kinds of safety risks that may occur during the construction process, formulate emergency plans, and take corresponding preventive and countermeasures. Investigate and rectify the safety hazards of municipal road construction to ensure the safety of construction personnel and reduce the occurrence of safety accidents.

(3) In the construction project, the effective implementation of equipment management can guarantee the quality of the project, improve the construction efficiency, and ensure the smooth progress of the project. A good equipment management program should include the purchase, use, and maintenance of equipment, and focus on safety performance and economic benefits.

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