

Analysis of Optimization Measures for Road and Bridge Construction Management based on BIM

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Abstract

Road and bridge engineering is a type of project with complicated procedures in municipal engineering, which requires a long construction period. Therefore, in the process of road and bridge engineering construction, supervision and management should be strengthened, technological innovation should be carried out around the characteristics of the project, and the construction of the engineering construction system should be strengthened to implement responsibilities. system and implement incentive policies, thereby improving the overall quality of the construction team and promoting the healthy and stable progress of bridge projects. However, roads and bridges involve a wide range and are affected by many factors, so that there are still many problems and deficiencies in construction management, which affect the further construction and improvement of my country's infrastructure. Road and bridge construction management plays an important role in national infrastructure construction. This paper is based on BIM. In the construction industry, the application of BIM technology can improve the visualization, feasibility and accuracy of architectural engineering design on the one hand, and on the other hand, it can also strengthen the communication between engineers, designers and users, which is conducive to the construction of buildings. The engineering design is carried out in an orderly manner.

Keywords

BIM; Road and Bridge Construction; Management Optimization Measures.

1. Introduction

With the continuous development of social economy, my country's road and bridge construction is very likely to cause serious economic losses to both parties [1]. Therefore, the number of utilization projects has gradually increased, which provides a comprehensive and scientific construction management method for my country's engineering construction industry, which can control engineering risks and have a better development space [2]. In recent years, my country's roads and bridges have also achieved leapfrog development under the background of rapid economic development. However, with the acceleration of the development speed, there are potential safety hazards in the construction of roads and bridges, and these problems will threaten the safety of people's lives and properties [3]. To strengthen the innovation of construction management concepts of bridge and road projects, dynamic and comprehensive project supervision should be carried out around modern information technology, a sound construction management system should be established, the project management system should be improved, modern construction technology should be applied, green construction materials should be selected, and the accuracy of construction procedures should be improved. Therefore, reinforced concrete can meet the needs of bridge and road operation and improve the stability of engineering quality [4]. Nowadays, the construction safety of roads and bridges has received the attention of governments at all levels, and has also become a research hotspot in academic circles. At the same time, strengthen the inspection and maintenance of

later projects to avoid long-term corrosion and weathering caused by corrosion of steel bars and concrete damage [5]. Roads and bridges are one of the urban and rural infrastructures in my country. The construction progress and construction quality of such projects are directly related to people's daily travel and the achievements of socialist construction. However, from the current point of view, some construction companies have not fully realized the importance of roads and bridges, and have failed to strengthen management during the construction process, thus exposing many shortcomings [6]. In order to promote socialist construction, it is necessary for us to carefully analyze a series of problems existing in the management of road and bridge construction, and take relevant optimization measures for the purpose of improving the management effect [7].

2. Problems Existing in Construction Management of Road Bridges

2.1 The Construction Management System is Not Perfect

The concept of road and bridge management has been applied in our country for decades. Compared with the advanced engineering management mode, this mode is very backward [8]. For example, the supervision mechanism currently used in our country is still mainly based on the quality control of engineering quantity and construction process, which is quite different from the management mechanism of advanced countries. The construction management system is imperfect, the construction site lacks a strict management system, and there is a lack of supervision, management and technical guidance for each process link [9]. For example, when there is a problem in the process, the construction personnel shirk each other and cannot find the corresponding person in charge. There are many drawbacks in the management of the engineering team; the use and storage of engineering materials lack professional management, and the workers have insufficient sense of responsibility, resulting in a waste of material resources; Construction equipment is not turned off in time, resulting in energy waste and equipment damage [10]. This is all caused by the lack of a professional and systematic management system and poor management execution ability. During construction, the construction unit should adhere to the principle of safety first, the safety alarm bell should always ring in everyone's heart, and always pay attention to their own safety and the safety of others. At present, the management mechanism adopted by western developed countries is mainly based on an all-round dynamic management mode based on project decision-making, engineering design, construction management, and maintenance planning. It is very backward in terms of aspects, and this is also a major reason for various problems in the process of construction management of most road and bridge engineering projects in my country [11]. The management mode of the construction site is relatively simple, lacks the application of information technology, lacks information collection and analysis for the relevant details of the construction process, and lacks a scientific safety management system for bridge and road projects, resulting in potential safety hazards in construction operations, and the environment around the construction. cause impact and pollution. In the actual construction process, due to time or cost issues, in order to save time or cost, there will be a paralyzed mind, ignoring safety issues, resulting in loopholes in safety management, and even serious safety liability accidents.

2.2 Road and Bridge Steel Bars are Easily Corroded

Reinforced concrete materials are the basic elements of bridge road construction, and steel bars, as the skeleton of bridge roads, are the core part of supporting bridge road projects, bearing the natural stress and external stress of the entire road surface. After long-term rain erosion and exposure, the steel bars will corrode and rust, which will greatly reduce the density and firmness of the steel bars, shorten the service life, and seriously threaten the safety of traffic. In addition to concrete, the core part of road and bridge construction is steel. The quality and service time of road bridges are affected by the quality of steel bars, and the steel bars of road bridges are easily corroded during use. There are many reasons for corrosion, including: the selection of raw materials, the influence of ambient temperature, and the technical means of operation. This requires strengthening the control of various factors in the construction process to avoid such problems as much as possible. If the structure of the

bridge is not strong enough to withstand the gravity and other additional forces acting on the bridge, each part of the bridge must be properly sized so that it does not lose stability when subjected to axial pressure. Road and bridge engineering is an important municipal project carrying transportation, so it bears a huge weight in the long-term operation process, the pavement layer will continue to crack and fall off, and the steel structure is exposed to the air. Bridge safety is gradually reduced. In addition, due to the dispersion of material strength and the randomness of applied loads, various structural diseases may be caused. In the process of road and bridge construction, since the bridge and the road are two separate projects, after the construction is completed, if the connection is not good, it will seriously affect the normal running of the vehicle. Once the steel bars of the road and bridge are corroded, it will seriously endanger the service life of the road and bridge, and of course, will seriously threaten the safety of people's lives. There are many reasons for the corrosion of steel bars, such as the selection of raw materials, harsh environmental factors, and insufficient construction. Therefore, this is a complex mechanism problem that requires comprehensive management in many aspects.

3. BIM-based Road and Bridge Construction Management Optimization Measures

3.1 BIM Technology and its Application Advantages

In the traditional field of construction engineering design, there are problems such as poor communication of design information of various disciplines, poor coordination in the construction process, and weak integrity. To solve these problems, it is necessary to realize the integration of collaborative design and construction of various disciplines. It is such a powerful tool platform to provide collaborative design and improve design efficiency, which can effectively improve the architectural design cycle, design efficiency and design quality. BIM technology is a modern and digital technology. In recent years, it has been widely used in the construction industry, which has greatly promoted the reform and development of the construction industry. In today's construction engineering, the complexity of construction project design is increasing, and the design cycle is short and the construction period is tight. The traditional construction engineering design method is faced with an insurmountable bottleneck, and there are poor communication of design information and low data reuse rate, problems of communication difficulties among the project participants. In the construction industry, the application of BIM technology can improve the visualization, feasibility and accuracy of construction engineering design on the one hand, and on the other hand, it can also strengthen the communication between engineers, designers and users, which is beneficial to the construction engineering design. proceed in sequence. The technical core of BIM is the database formed by the three-dimensional computer model. These data information are dynamically changed and adjusted in the whole process of construction, and various data in the system database can be called in time and accurately, so as to speed up the decision-making progress and improve the quality of decision-making, thereby improving the quality of decision-making. project quality and reduce project costs. The application of BIM technology in the construction engineering industry can bring great benefits and effectively reduce the problems existing in the construction engineering.

3.2 Optimization Measures for Road and Bridge Construction Management

When designing the construction of road and bridge engineering, the designer must evaluate according to the actual situation of the construction site. According to the relevant system of road and bridge engineering, it is the basic premise to carry out engineering construction to make reasonable planning of its engineering design. In the fill area, carefully carry out the base treatment. The slope is smooth and dense; the berm is built according to the design requirements. Pavement engineering construction strictly controls the cement dosage, mixing quality and mixture gradation of the base mixture to ensure the accurate cement dosage, uniform mixing and reasonable grading of the mixture. During the construction of the surface layer, the mixing quality of the cement concrete shall be ensured, and the vibrating and compacting shall be carried out during the construction to ensure various inspection indicators such as flatness. Generally speaking, if a road and bridge construction

project cannot be completed as scheduled, it will inevitably affect the economic and social benefits of the project. In order to ensure maximum profits, the construction unit must refine the progress management. When designing roads and bridges, it will be affected by many factors. Based on this, relevant designers should pay more attention to the surrounding environment and geological influences before construction, and conduct in-depth observation and understanding of them before starting. Carry out construction. In this way, a lot of unnecessary troubles can be effectively avoided. At the same time, the cutting time is strictly controlled to prevent the cracking of the concrete slab caused by the untimely cutting. Strengthen the health maintenance of the grassroots and surface layers, and close the traffic during the health preservation period to ensure that the strength meets the requirements.

Strengthening the education of road and bridge construction personnel can not only improve the responsibility of the construction personnel, but also provide an effective guarantee for the construction quality. Combined with the quality requirements of bridge construction personnel, the author believes that: first of all, construction personnel must constantly update their knowledge reserves and improve their professional and technical capabilities in order to meet the practical needs of bridge construction technology. Because the content of the work assigned by different departments is different, the training should be carried out according to these aspects, and the content of the training should also include construction technology and construction safety and other aspects, because these affect the quality of roads and bridges. key factor. The construction unit should regularly organize the study and training of professional knowledge. Before the construction personnel take up their posts, their qualifications should be assessed to ensure that every member of the construction team can be calm in the face of emergencies and find solutions in time. measure. The manager competency model is shown in Figure 1.

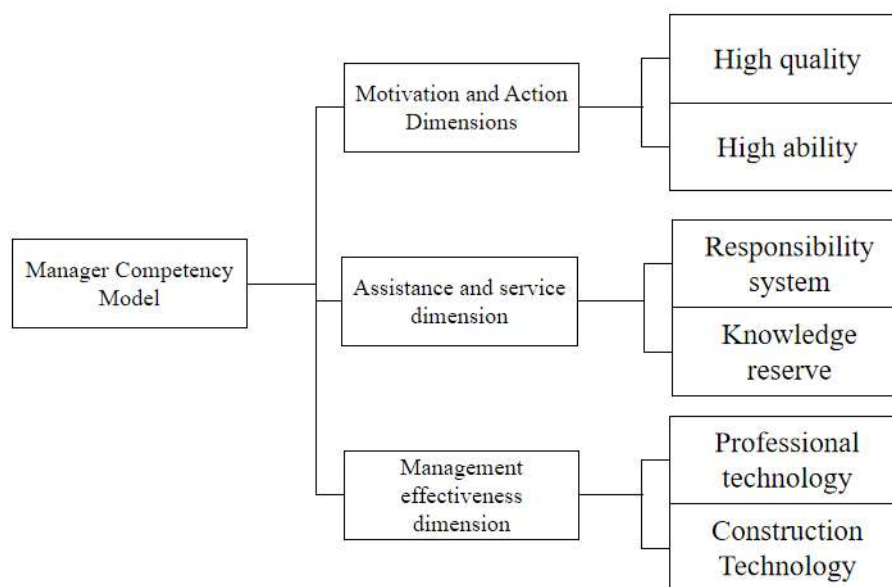


Figure 1. Manager Competency Model

The professional quality of road and bridge construction personnel is one of the key factors to ensure the final quality of the entire project. Only high-quality and high-capacity construction personnel can promote the smooth development of the project. Therefore, the construction unit should regularly carry out relevant training for construction personnel, and conduct training according to the department. The flow chart of manager evaluation is shown in Figure 2.

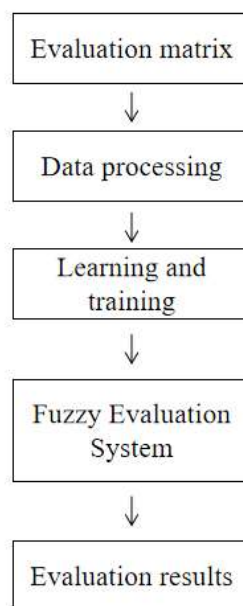


Figure 2. Flowchart of Manager Evaluation

In addition to mastering his own professional skills, an excellent construction worker should also be a "miscellaneous", that is to say, in addition to being "fine" in his own construction field, he must also be "professional" in other related fields. ", the construction personnel should have more contact with some content such as aesthetics, environmental protection, astronomy and geology, etc., so as to build better quality roads and bridges.

The improvement of the management system of road and bridge engineering construction units not only brings benefits to the construction unit, but also provides a guarantee for the construction control technology of bridge engineering. During the construction period, the midline and level measurement shall be carried out regularly to ensure that the midline, span and elevation of each part of the bridge are accurate. Whether the construction management quality of road and bridge engineering can be guaranteed depends on whether the management personnel have strong problem-solving ability. To this end, people with high comprehensive quality, strong sense of responsibility and good communication skills can be enriched into management positions, and enterprise managers can also be organized to participate in various training courses in a timely manner to expand their knowledge horizons through re-education to ensure that Learn more management knowledge, master more advanced construction site management methods, and introduce technologies or equipment that are helpful for road and bridge construction management. Construction control technology plays a key role in the construction of the entire bridge. Therefore, adding some related new systems on the basis of the original system plays a very important role in improving the system. All materials must be tested. Concrete mixing is carried out strictly according to the mixing ratio. Concrete construction in winter must comply with relevant regulations. The improvement of the construction control technology system has greatly improved the overall quality of the bridge construction and ensured that the bridge project can be successfully completed within the construction period. In addition, the construction process is the main part of road and bridge construction, and many problems appear in the construction process. Therefore, it is necessary to strictly control all steps in the construction process, and scientifically deal with the complex construction problems in the construction process.

4. Conclusion

The construction industry is a pillar industry that promotes national economic growth. Construction quality is closely related to social development, national economic level, and personal safety. Construction project management is also the core of construction projects. Deepening and

implementing road and bridge construction management is the key to ensuring the quality of road and bridge projects, and will also have a very important impact on the economic benefits and future development of construction companies. The construction of roads and bridges is closely related to people's lives, which requires the construction unit to actively improve the construction technology, improve the quality management mechanism, and also requires every construction and management personnel to do their due diligence. Only in this way can we ensure the healthy and orderly development of the country's infrastructure construction. Green construction technology plays a key role in the development and advancement of construction projects in the future. In future construction projects, awareness of green construction should be increased, the use of building materials should be calculated more accurately, and more environmentally friendly materials should be used to promote social economy and the ecological environment will develop more harmoniously.

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