

Effective strategies of construction project management and construction quality in the new era

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Abstract: It is clearly pointed out in the report of the 20th National Congress of the Party that "we must speed up the construction of a new development pattern and strive to promote high-quality development" and "we must adhere to high-quality development as the theme". In the context of China's sustained economic growth, the construction industry has experienced many years of rapid development dividend period, and along with the national economy from speed to quality transformation, and into the high-quality development stage. The high-quality development in this stage has the characteristics of green, digital and industrialization, which is also a new feature of the development of the construction industry in the new era. Based on this, on the basis of the new characteristics of the development in the new period, based on the actual construction project management and construction quality management, this paper explores the effective path of the development of the construction industry.

Construction project management and construction quality is an important part of the development of the construction industry, and plays a decisive role in the high-quality development of the construction industry. Based on this, it is not only necessary to form a correct subjective understanding on the basis of understanding the significance of construction project management and construction quality, but also to start with the factors affecting the significance of construction project management and construction, to explore ways to improve the quality of construction in the construction industry, to promote the stable and efficient development of the construction industry, and to contribute the strength of the construction industry to the development of the overall national economy.

1. The necessity of construction management and construction quality

1.1 Improve the construction process

In the traditional construction process, there are often various equipment "fighting" and unreasonable material stacking. One of the important reasons for this situation is that there are unreasonable conditions in the traditional process. Through the management of the construction project and the improvement of the construction quality, it is conducive to the adjustment of the existing construction process. For example, the use of BIM technology can "preview" the overall

construction process in advance, and find the existing construction process problems. In combination with the specific construction drawings and construction practice, the corresponding construction process adjustment can be carried out to achieve the orderly construction of the project.

1.2 Promote technological change

In order to achieve efficient construction management and improve construction quality, various modern technologies will be introduced into project management and quality improvement, effectively realize the visualization and foresight of project management, constantly improve the accuracy of construction, and make full use of technical dividends in the new era.^[1]

1.3 Improve economic benefits

The third function of construction project management and quality improvement is to help improve economic benefits. Through the optimization of the process and the change of technology, it is beneficial to realize the effective use of construction space, resources and equipment, save the necessary manpower, material resources and financial resources, and improve the quality of construction projects and obtain good economic benefits on the basis of reducing costs.

2. Construction project management and construction quality influencing factors

2.1 Material factors

Material factors mainly include two aspects, one is construction materials, the other is construction equipment. Construction materials have an important impact on the quality of construction, especially on the structure and performance of the project. To this end, it is necessary to choose high-quality construction materials, such as sand, steel, cement and so on. Construction equipment is another important factor affecting the quality of construction and project management, which mainly affects the progress of construction, but also includes the quality of construction and construction structure.^[2] Common construction equipment includes crane, mixer, pile machine. Before construction, during construction and after construction, it is necessary to carry out scientific operation, regular maintenance and regular inspection of construction equipment to ensure the progress and quality of construction.

2.2 Management factors

Management factor is a recessive factor, which has an important influence on the progress of construction. The reason is that the management factors aim to promote the optimization of the allocation of various resource elements and maximize the improvement of the quality and efficiency of the construction. There are many common management contents, mainly including construction safety management, construction quality management, construction cost management and construction schedule management. Based on the diversity and importance of management content, management factors are one of the important factors affecting the progress and quality of the project.

2.3 Environmental factors

Environmental factor is a kind of non-human factor, with strong uncertainty. Therefore, it is necessary to carefully consider the relevant aspects involving environmental factors. The environmental factors of engineering construction mainly include geographical location, topographic conditions, geological conditions, and external weather conditions. Before the

construction, it is necessary to deeply study the above conditions of the corresponding construction area, rationally choose the best construction location, maximize the construction quality, and the efficiency of construction management.

2.4 Personnel factors

The personnel factor is one of the important factors affecting the construction of the project. The main body of its design includes two parts, namely, the construction technician and the construction management personnel. The work of the construction technician directly affects the progress and quality of the construction, while the construction management personnel plays an important role in the entire construction plan and the distribution of human and financial resources.^[3]Therefore, it is necessary to strengthen the management of construction technical personnel, shape the quality of construction management personnel, maximize the control of personnel factors, and improve the quality and progress of the project.

3. The effective management measures of construction project management and construction quality

3.1 Coping strategies based on material factors

3.1.1 Strictly control the quality of construction materials

Strict construction material quality mainly includes the following links: First, in the procurement link, choose high credibility suppliers, and ensure that the construction material certificate is complete; Second, in the sampling and testing link, it is necessary for the construction enterprise to submit the raw material inspection plan to the supervision engineer, and the sampling is witnessed by the construction unit and the supervision party. After that, the quality supervision station needs to report the signature of the supervisor before the construction materials can be used to start, so as to ensure that the quality of the construction materials does not affect the quality of the overall project.

3.1.2 Strengthen the maintenance of construction equipment

In the maintenance of construction equipment, it is necessary for the equipment maintainer to sign the corresponding maintenance table and take the corresponding maintenance photos, especially to ensure that the equipment is maintained to the person, determine the specific maintenance time, and truly ensure that the equipment is maintained.

3.1.3 Introduce advanced construction equipment

In addition to the application of existing construction equipment, advanced construction equipment can also be introduced to improve construction quality and efficiency. Here, the main list: first, the robot. Robots are introduced for a variety of construction tasks, including demolition, cleaning, wall building, steel bar bending, mapping, etc., aimed at reducing the risk of dangerous work areas and improving work efficiency.^[4] The second is the electric steel bar lashing machine, which changes the traditional manual operation mode, effectively improves the work efficiency, realizes the automatic conveying, lashing, cutting, binding, improves the work efficiency and fastness. The third is the CNC automatic stirrup processing machine, which mainly realizes a variety of automatic processes, including cutting, bending, sizing, correction, saving material resources, manpower, financial resources, and improving processing accuracy and production

efficiency.

3.2 Coping strategies based on management factors

3.2.1 Information-based construction project management platform

The information construction project management platform in this paper mainly refers to the project management software under the BIM technology, which has the characteristics of high coordination, strong simulation and high visualization, and can be used for the all-round monitoring of the construction project management, to achieve the improvement of the management quality of the composition and improve the construction quality. In the specific application of BIM technology, it can be started from the following perspectives:

3.2.1.1 Applied to collision inspection

Through the application of BIM three-dimensional technology, collision inspection is realized, that is, through the way of "rehearsal" in advance, timely detection of various "conflicts" in the construction process, including the conflict between architectural design and structural design. Specifically, the 3D technology of BIM can be used to conduct 3D modeling of architectural design drawings and structural design drawings, calculate the conflict between the two, check the corresponding construction structure or building number, and obtain the corresponding file data, effectively avoid the conflict between the structural drawing and the building drawing, realize the scientific management of the building project and accelerate the construction progress.

3.2.1.2 Applied to virtual construction

Through the application of BIM technology, the model in this system is used in advance to "rehearse" the construction scheme, and the corresponding solutions are formulated in combination with possible construction problems, so as to achieve the purpose of "nip in the bud". To be specific, through virtual use, first, construction technicians can grasp the process as a whole, improve the accuracy and predictability of the construction process, and promote the improvement of construction efficiency through the visualization of construction methods and working conditions presented by BIM technology. The second is to allow the construction management personnel to find the existing construction problems in time, especially the construction design personnel, construction management personnel, etc., to focus on the same construction problem, to achieve efficient communication, reach a consensus on construction, efficiently solve construction problems, avoid unnecessary construction problems, improve the quality of construction, progress, and enhance the effectiveness of construction project management.

For example, Country Garden Group Qingyuan New Town project in the northern Hebei region put forward clear requirements for BIM deepening in the fire bidding project. Through the deepening of drawings and the establishment of BIM model, the collision analysis of the basement electromechanical pipeline is carried out, the pipeline path is optimized in advance and the principle of reservation and pre-embedding is used to reduce the hidden dangers of demolition and rework in the later electromechanical installation process, and the ineffective cost is avoided in the subsequent construction process. At the same time, in the construction stage according to the BIM model can directly export the list of materials, combined with the cost analysis software, the use of "zero inventory" production management mode, limited material acquisition construction, can maximize the benefit of capital, to achieve cost fine control.

3.2.1.3 Improve the accuracy of material distribution

In the traditional accurate distribution of materials, human experience plays a decisive factor, but in reality, there are often certain errors in human experience, resulting in the failure to accurately distribute the required materials, resulting in project interruption, and then cause serious economic losses. In this regard, by using the associated database of BIM technology, it can accurately locate the type of materials and the remaining amount in each construction area, and combine these data and the data required by the actual construction to make targeted comparison, and provide the comparison data to the procurement, which is conducive to the accuracy of material distribution.

3.2.2 Develop the management concept of green construction

"Beautiful China" was proposed at the 18th National Congress of the Communist Party of China, with special emphasis on putting ecological civilization in a prominent position and integrating it into political, economic, cultural and social construction. The concept of green construction management is the concrete embodiment of beautiful China in construction projects. In order to adapt to the green characteristics of the engineering field in the new era, the concept of green construction management needs to be integrated into it. Specifically, we need to practice the concept of "four sections and one environmental protection".

3.2.2.1 Practice the concept of green construction management in "four sections"

"Four sections" : one is to save energy, including oil energy, electricity energy; The second is to save construction land resources, maximize not to waste land resources, do not destroy vegetation, do not pollute the land; The third is to save water resources, can establish a reservoir, collect surface water and rainwater for the maintenance of concrete and the dust of the sprinkler, and establish a sewage collection tank, scientific treatment of these sewage, reduce the degree of pollution to the soil; The fourth is to save materials, such as through the BIM technology in the above, to reduce the occurrence of collision prevention, to achieve the accuracy of material configuration, to achieve the purpose of solving materials.

3.2.2.2 Practice the concept of green construction management in "One environmental protection"

In construction projects, the main pollution includes waste water pollution, noise pollution, dust pollution, gas pollution and so on. This also needs attention, and through a series of reasonable measures, effectively avoid. For example, for dust pollution, fog cannon can be used to reduce haze vehicles to effectively solve the problem of dust.

3.2.3. Implement standardized construction management operations

By implementing standardized construction management operations, the controllability of management can be maximized, unnecessary construction operations and management processes can be realized, construction costs and risks can be reduced, and the progress and quality of construction can be improved. To this end, it is necessary to establish a set of construction management operations suitable for the project unit, and equipped with the corresponding supervision and management team to promote the implementation of standardized operations. In addition, it is necessary to adjust part of the standardized operation in a timely manner according to the new problems and new situations in the development of standardized operations, so that the whole project operation is more flexible and the flexibility of project management is enhanced.

3.2.3.1 Response measures based on environmental factors

(1) Carefully select the geographical location

In the construction process, the first need to consider the geographical location, especially the surrounding supporting facilities, including water and electricity resources, road resources, etc., to fully create geographical advantages for the construction.

(2) Coordinate terrain conditions

In the construction process, it is also necessary to consider the terrain, that is, choose more plain areas, and the areas that have not been in the earthquake zone, to ensure that the impact of terrain in the construction process is minimized.

(3) Study the geology

In the construction process, it is necessary to consider the geological conditions, including water damage, frozen soil, expansive soil, weak soil, karst, rock fall, etc., and resolutely avoid site selection in the above geological conditions.

(4) Analyze the construction conditions

In the construction process, it is necessary to comprehensively analyze the conditions of construction, including the above mentioned geology, location, terrain, etc., but also including funds, equipment, and the overall construction capacity of the construction unit, etc., to formulate a scientific construction plan, aimed at allowing the construction unit to maximize its own ability and improve the construction quality.

3.2.3.2 Coping strategies based on personnel factors

(1) Strengthen personnel training before work

Before construction, strengthen personnel training, especially strengthen the awareness of work rules, communication awareness and green construction concept of construction technicians and management personnel, so that the construction personnel form a unified construction concept, and promote the effective and efficient construction work. In addition, it is also necessary to pay attention to the training of BIM system for construction personnel, so that these personnel can understand the corresponding three-dimensional graphics, especially so that the construction personnel can combine the graphics to carry out the discussion of targeted construction problems, effectively solve various construction problems, and lay the knowledge foundation for the subsequent construction management and construction implementation.

(2) Strengthen the responsibility and authority mechanism in the work

In the construction process, it is necessary to strengthen the responsibility and right mechanism, clarify the work area and responsibility content of each construction personnel, and resolutely avoid the status quo of buck-passing in the construction process. At the same time, it is necessary to establish a communication mechanism, especially in the case of minor accidents, so that the construction personnel can retain the construction evidence on the basis of ensuring production, so as not to affect the construction process to the maximum extent.

(3) After the work, implement the work assessment

After the construction, the construction personnel should be assessed, especially from the aspects of construction technology, efficiency and attitude, and the results of the assessment should be linked to the salary of the construction personnel, so as to stimulate the work initiative of the construction personnel. More importantly, it is necessary to evaluate the work results of the construction personnel by way of verification, and conduct in-depth communication for the person in charge of the construction position with problems. It is also necessary to carry out an all-round inspection of all the work contents of the person in charge, and rework the unqualified areas to minimize the impact of the entire construction.

4. Summary

With the continuous progress of The Times, China's real estate construction projects are gradually increasing, and it is particularly important to strengthen the quality of construction in China under the background of science and technology. In the process of carrying out construction project management and construction quality in the new period, it is necessary to start from the whole Angle, based on various factors, to explore a comprehensive and comprehensive construction management strategy. Construction quality is affected by multiple factors such as construction materials, construction management, site environment and personnel, so in the specific construction process, it should be based on the actual problems, combined with the current construction background and construction links to analyze the specific problems, and combined with advanced construction technology to achieve a breakthrough solution to the problem, to promote the smooth development of building construction.

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