Effective Strategies for Enhancing Construction Technology Management Levels in Building Engineering

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Abstract: This paper institutes a management level of construction technology in building engineering. It elaborates on construction technology management significance and then, in turn, analyzes the existing problems in current engineering technology management. Finally, effective improvement strategies are put forward from multi-dimensional aspects such as personnel training and management, technical management mechanism improvement and information technology application promotion. We hope that these references will be helpful in improving the construction technology management level of building engineering.

1. Introduction

Building engineering is an important part of social infrastructure construction, and its quality directly affects people's quality of life and the development of society. Construction technology management is of utmost importance during the building phase. Construction technology management is an important factor to ensure quality and performance of the project construction process, which can provide effective economic and social benefits for the project. Although building engineering has made some progress, the current status of construction technology management still faces many problems. Thus, it is of great practical significance to explore the management strategies and ways to comprehensively enhance the construction technology level of building engineering.

2. The Importance of Construction Technology Management in Building Engineering

2.1 Ensuring Project Quality

The quality of construction is a lifeline for the building project, which affects the function and durability of the structure. Therefore, construction technology management lays a solid technical basis for project quality by putting forward scientific and reasonable construction schemes and clarifying the construction process and the quality standards of each process. During the construction stage, through strict technical management, construction personnel operates according to specifications and standards in place whenever an operation is conducted, effectively checks raw materials and component quality before entering the site to ensure compliance with design requirements, and adopts effective inspection testing methods to promptly identify errors in quality during the building process, resolves temporary issues of certain sections at different times [1].

2.2 Controlling Project Costs

Controlling cost is an initiative that is at the centre of building engineering project management. Project cost control issues are closely related to construction technology management. Direct costs during construction can be decreased by minimizing construction plans, allocating resources more accurately and enhancing productivity of labor and efficiency of equipment utilization. Advanced construction technologies and processes can be adopted to eliminate steps of construction and duration, thus reducing labour and machinery costs [2]. Adhere to strict technical management procedures can be effective in avoiding rework and repairs due to quality problems, thereby reducing unnecessary waste of materials and the cumulative increase of costs. By monitoring and

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analyzing costs in real time during the construction process, any deviation of costs can be identified immediately and decided on corrective actions to manage project cost more efficiently and enhance the economic benefits of the project.

2.3 Ensuring Project Schedule

Project schedule is an important basis for the prompt delivery and use of building engineering projects. In general, by finding reasonable construction schedule plans and defining specific tasks and goals for each phase, construction schedule management can effectively support the control of schedules. In practical construction, the schedule plan is adjusted in real time according to the actual situation, coordinating the sequence of various trades and cooperation between different expert fields to ensure that construction remains continuous and harmonious. Now, this point is addressed by technical measures and eliminates unnecessary delays due to technical issues that can arise during construction. In the case of complex geological conditions, appropriate foundation treatment methods guarantee smooth construction of the foundation and prevent obstacles to project progress.

2.4 Ensuring Construction Safety

Building engineering construction safety is an important part of the building engineering construction period. Construction technology management provides a safe and reliable construction site for employees by rationally formulating effective safety technical measures and operation control processes. Safety technical briefings and awareness of risks are done to prevent injury and their potential impact on the workers. Focus within construction activities is on site safety inspections and supervision to ensure early detection and removal of potential hazards. By using advanced safety devices and technologies, the level of safety in the construction process is higher. Using secure protective facilities and operating platforms during work at height can prevent falling.

3. Analysis of Existing Problems in Current Construction Technology Management for Building Engineering

3.1 Uneven Quality of Management Personnel

Management personnel in construction technology management are required with high quality and comprehensive abilities. There is a wide range in the quality of management people across the sector. Some managers do not have systematic professional knowledge and practical experience, do not know much about construction technology and technical specifications, and are difficult to put forward effective solutions to complex technical problems [3]. Some management personnel have theoretical basis, but no practical on-site management experience, unable to closely combine theory with practice, resulting in errors in construction organization and technical guidance. Some managers have a weak sense of responsibility and a performing work attitude,leading to potentially hazardous technical problems not being recognized in time to take remedial measures, which brings considerable risk to project quality and safety.

3.2 Inadequate Technical Management Mechanisms

A good technical management mechanism is the basis to guarantee the smooth implementation of construction technology management. There are serious shortcomings in the management mechanisms of many building engineering projects. The existing technical management system is ineffective, with unclear technical management processes and definitions, resulting in muddled departmental responsibilities and poor communication, with no real standards being implemented. Because there are no unified standards and specifications during the technical disclosure phase, individuals have different understandings of content and requirements, resulting in construction personnel having a vague understanding of technical and quality factors. Moreover, the supervision mechanism for technical management is poorly implemented, monitoring and assessment of the technical management process are effective enough, which cannot promptly discover and rectify the violation actions in technical management. As a result, certain technical problems cannot be

properly addressed, ultimately hindering both project progression and quality.

3.3 Low Level of Information Technology Application

The increasing widespread use of IT means in construction management has emerged as a result of information technology rapidly developed. However, the application of IT in construction technology management for building engineering is still relatively low at present. However, there are still many enterprises that rely on traditional management methods (such as transmitting documents in paper form and recording data manually), which have low efficiency and high errors/losses in information transmission [4]. In the realm of technical data management, a consistent information management platform does not exist: some technical data remain isolated and prevent sharing and utilization. The application and popularization of digital advanced technologies like Building Information Modeling (BIM) in big data analysis has not been high in construction technology management, did not fully play the advantage of maximizing construction optimization, improving efficiency and quality.

3.4 Insufficient Technological Innovation

Technological innovation is the most vigorous driving force to promote building engineering industry in the highly developed technological era. It is obvious that construction technology lacks strong technological innovation. Insufficient attention on technological innovation from enterprises, with little investment in technology research and development, causing new technologies, processes and materials can’t develop or apply. The atmosphere for technological innovation in the industry is not strong; lack of technical exchange and cooperation between enterprises provides little incentive to coalesce forces on innovation. Cultivating and importing technical talents are not perfect, the aspect of the lack of high-quality technical personnel with innovation spirit and capability restricts construction engineering's innovative process in construction technique too.

4. Strategies for Effectively Enhancing the Management Level of Construction Technology in Building Engineering

4.1 Strengthen Personnel Training and Management

4.1.1 Conduct Professional Training

This method should periodically organize construction enterprises technical management personnel to go out to receive professional training, inviting industry experts to teach new technologies, new construction process, new standards and so on, so as to improve the professional knowledge and skill level of managers. This can be achieved by encouraging managers to participate in continuing education and professional qualification exams, thereby continuously enhancing their comprehensive quality [5].

4.1.2 Strengthen Professional Ethics Education

Train on professional ethics education activities to help technical management personnel establish correct working attitudes and values. Make managers strictly observe relevant technical management laws and regulations, fulfill the working responsibility conscientiously, guarantee the quality and performance of technical management work.

4.1.3 Establish Talent Incentive Mechanisms

Establish scientific and rational talent incentive mechanisms, rewarding outstanding technical managers with material rewards and spiritual incentives to stimulate their enthusiasm and creativity. Groom and road-map career growth for them to retain good technical management talent.

4.2 Improve Technical Management Mechanisms

4.2.1 Clarify Division of Responsibilities

Construction enterprises ought to set up a perfect technical management organization and

structure, clarify the division of labor for each department or staff in technical management. The technical guide to responsibility, hierarchies and who does what Create technical supervisor positions responsible for overall planning and coordination of technical management work. Add positions of professional technical personnel responsible for specific tasks such as preparation of technical plan and technical disclosure [6].

4.2.2 Standardize Work Processes

Develop scientific and appropriate technical management workflows, clarifying each step of the workflow and operation process to ensure that technical management work proceeds in steps. Such as construction drawing review, report time, personnel, scope and other details, should be given feedback to design unit at the fastest speed.

4.2.3 Enhance Communication and Coordination

Coordinate departments to improve information exchange and collaborative cooperation. Regularly meet to conduct technical management work, so as to solve existing problems in a timely manner. Enhance communication and coordination with external departments (such as construction unit, design unit, supervision unit) to form good synergy of work [7].

4.2.4 Improve Supervision and Assessment Mechanisms

Establish a well done technical management supervision and assessment system. Supervise inspections and assessments of technical management work. Set clear assessment indicators and scoring standards to systematically evaluate the work performance of managers in quantitative terms. Clearly, according to the assessment result, reward excellent performers and punish incompetent managers, effectively implementing technical management work.

4.3 Promote the Application of Information Technology

4.3.1 Establish an Information Management System

Construction enterprises should actively introduce advanced information technology and establish an information system of construction technology management. The functions of the technical management system should cover construction drawing management, technical plan drafting, technical disclosure, construction process supervision and quality inspection, etc., so this system realizes informatization and digitization and intelligence for technical management. A drawing management system, through online viewing and modification, allows for an efficient and accurate use of the drawing management process.

4.3.2 Promote the Application of BIM Technology

Construction enterprises to take the initiative to promote and apply BIM technology, in the project planning, design, construction and operation stage building of BIM model for engineering information sharing. Here more construction exercises can be done, such as construction simulation, collision detection and schedule optimization by BIM technology to detect potential problems in advance so that the quality and efficiency of the construction are improved.

4.3.3 Strengthen Data Management and Analysis

The methods of information are used to generate a variety of construction process data collection, organization and analysis, effectively providing the basis for technical management decision-making. Construction schedule can be proactively analyzed and identified by comparing construction activities data to the planning process progress. By studying quality inspection data, it is possible to find the patterns and reasons for a certain quality problem in order to implement targeted preventive measures [8].

4.4 Encourage Technological Innovation

4.4.1 Establish Technological Innovation Incentive Mechanisms

Construction enterprises should establish a technological innovation incentive mechanism, rewarding those who achieve remarkable results in innovation within their teams and individuals so that technical personnel can actively participate in conduct of innovation activities and propose new construction technology, process schemes. To reward personnel who obtain patents, construction methods and other technical achievements if you can set up special innovation reward funds.

4.4.2 Strengthen Industry-University-Research Cooperation

Increase cooperation with science and technology research institutions, universities, establish industry-university-research collaboration platforms, carry out the research and application of new technologies and processes together. Such cooperation can give full play to the scientific and technological advantages of research institutions and universities, provide technical support for enterprises and provide innovation vitality. You may conduct research in fields like prefabricated construction technology with various universities and initiate its application in engineering projects.

4.4.3 Promote the Application of New Technologies and Processes

Seek out industry trends, proactively implement and market the use of new technologies and processes. In the process of project implementation, encourage technical personnel to apply new construction technologies and processes to improve construction efficiency and quality. Advocate and use new technologies such as 3D printing to usher in new changes in building engineering construction.

5. Conclusion

In conclusion, improving the management level of construction technology applicable to building engineering is directly related to ensuring project quality and schedule. The construction technology management currently has many issues. By enhancing personnel training and management, improving the technical management mechanism, promoting information technology applications in construction projects, and driving technological innovation, we can help advance the level of construction technology work. Construction enterprises should deeply realize the significance of technical management, and proactively adopt effective measures to improve the level of technical management, in order to promote building engineering industry breeds development.

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