Measures for the Party A in Construction Engineering to Effectively Conduct On-site Technical Management

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Abstract: In the implementation process of construction engineering projects, the Party A, as the project leader and responsible entity, has its technical management capabilities directly impacting project quality, construction safety, and economic benefits. This study focuses on the Party A's comprehensive coordination and supervision functions in technical management. Starting from key aspects such as pre-construction management and construction process management, it proposes targeted solutions. The objective is to assist the Party A in clarifying key points of technical management, addressing common issues such as regulatory deficiencies, poor collaboration, and delayed risk warnings, and ensuring that projects are implemented in strict accordance with technical specifications, ultimately achieving the dual goals of investment efficiency and project quality.

1. Introduction

In the overall control system of construction projects, the construction site serves as a critical link for technical implementation and quality and safety supervision. As the entrusting party and the ultimate responsible entity in engineering construction, the Party A's professional technical management level is not only related to the construction progress but also closely tied to the post-delivery safety, functional suitability, and return on investment of the project. Currently, some Party A units exhibit a management bias where progress takes precedence over technology, and results are prioritized over processes. This leads to frequent issues such as inadequate implementation of technical plans, miscoordination among multiple work types, and potential defects in concealed works during on-site construction. These problems not only result in increased costs due to rework but may also pose safety accident risks and operational maintenance risks in the later stages. Based on the Party A's functional positioning and management content in engineering projects, this study proposes practical implementation plans. The research aims to assist the Party A in clarifying the scope of technical management rights and responsibilities, ensuring the implementation of technical specifications, meeting quality requirements, and controlling risk factors in all construction stages through systematic and precise management methods, thereby promoting the achievement of safe, reliable, high-quality, and efficient project goals and providing practical guidance for improving the Party A's technical management system in the construction field.

2. Key Points for the Party A in Construction Engineering to Conduct On-site Technical Management

2.1 Coordination and Communication

As the individual volume of construction engineering projects continues to grow, the multi-party collaboration and information exchange involved in construction stages have become increasingly complex. Delays in information transmission often lead to cognitive biases in progress planning, which in turn cause disorder in on-site operations [1]. To ensure the orderly advancement of core aspects such as personnel deployment, equipment scheduling, material supply, technical implementation, and environmental control, the Party A needs to strengthen on-site coordination

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management of these key elements [2]. By establishing an efficient information collection and transmission mechanism, accurately summarizing and promptly conveying the technical key points at each construction node, all participating parties can reach a consensus on information sharing, thereby improving on-site collaboration efficiency and ensuring the smooth implementation of engineering construction.

2.2 Safety Management

On-site safety management during the construction process of construction engineering projects is a core aspect of the Party A's management work, directly related to the achievement of overall project benefits and the implementation of safety responsibilities [3]. As the main responsible entity for engineering construction, the Party A should select representatives with a high sense of responsibility and professional qualities to be stationed on-site based on the project characteristics and construction progress requirements. These representatives should comprehensively supervise construction safety, civilized operations, and project quality, and implement various safety control measures in stages and by discipline [4]. In terms of specific implementation, the Party A needs to focus on identifying safety hazards and management shortcomings. Through measures such as conducting safety responsibility training, strengthening the management of labor personnel, preventing safety accidents, improving the safety responsibility system, clarifying safety responsible personnel, and strengthening supervision of key links, the Party A can effectively enhance the safety management level throughout the construction process [5].

2.3 Progress Management

The construction process of engineering projects involves multiple links and cumbersome procedures. The Party A's on-site control usually starts from the construction preparation stage, urging all participating units to systematically prepare detailed construction organization designs based on their technical capabilities and human resource allocations, providing a basis for subsequent process supervision [6]. In daily management, the Party A mainly relies on documents such as construction organization designs and operation instructions to monitor project progress and on-site image in real-time. The Party A implements a daily tracking mechanism, providing necessary resource support to participating units while closely monitoring policy adjustments and fund availability. In the face of project delays caused by unforeseen circumstances, the Party A needs to organize special discussions and formulate response strategies. By means such as back-scheduling key nodes and optimizing progress plans, the Party A can improve management efficiency and ensure that each stage's goals are achieved on schedule and with guaranteed quality [7].

2.4 Quality Objective Management

During the project construction process, different task indicators need to be set for each construction stage, which is an important management measure for the Party A to ensure the project is completed on schedule and with guaranteed quality. Task indicators, as the core elements for the Party A to control the project, must be refined into operable specific requirements and implemented through systematic management methods. At the same time, the task indicators for each stage should be closely integrated with the overall project progress [8]. The Party A should use modern information technology means, including data mining and cloud computing technologies, to scientifically evaluate the feasibility of project implementation. A professional project management team should be established to be specifically responsible for the decomposition and demonstration of project indicators, ensuring that the on-site construction situation remains highly consistent with the established task indicators [9]. In addition, the Party A should regard quality management as a core task indicator, continuously optimize the project progress arrangement, introduce innovative management thinking, and adopt efficient management models to enhance the rationality of project task objectives.

3. Measures for the Party A in Construction Engineering to Conduct On-site Technical Management

3.1 Pre-construction Stage Management

In the preparation stage before project initiation, as an important prerequisite for engineering construction, it plays a decisive role in the smooth development of subsequent operation procedures and the control of project quality. At this stage, the Party A needs to make comprehensive arrangements from multiple dimensions to create favorable conditions for the orderly progress of the project. First, a comprehensive construction organization plan should be prepared. The Party A needs to clarify the start time node, overall project duration arrangement, task division for each construction stage, and human and material resource allocation strategies based on the project characteristics and volume. A scientific and reasonable construction organization plan can not only effectively control the overall progress but also pre-emptively avoid various potential risks.

The pre-preparation of construction materials and mechanical equipment is also crucial. The Party A needs to strictly follow the project progress arrangement and complete the procurement of various building materials and the rental of construction equipment in advance to ensure that all materials and equipment can arrive at the site on time. This proactive preparation work can effectively avoid project delays caused by material shortages and lay a foundation for the smooth progress of the project. During this process, establishing a clear on-site management rights and responsibilities system is particularly important. The Party A must establish a sound on-site management organizational framework, clearly define the work content and authority scope of each functional position, and appoint core positions such as on-site commander-in-chief, safety supervision specialist, and quality control supervisor. By assigning responsibilities to individuals, the standardized management of the entire construction process can be ensured.

3.2 Alternating Construction Quality Management

During the engineering construction process, multiple complex construction tasks often need to be handled. To ensure that the project progresses on schedule, various professional construction teams must reasonably arrange cross-operations. In this regard, the Party A should optimize the on-site management mechanism, enhance quality control awareness, and strictly control the quality requirements during the construction process. The Party A and its on-site representatives should deeply understand the technical key points of construction and pay special attention to the construction specifications of key processes. Although these details may not manifest problems in the short term, they can cause irreversible hazards to subsequent projects.

For example, during the project implementation stage, the Party A should use modern testing instruments to periodically measure the verticality of walls to ensure that the deviation values comply with regulatory standards. During staged acceptance, if the verticality is found to exceed the allowable range, the construction unit must be required to make immediate corrections. Each sub-project during the construction process may have a chain reaction on the overall quality. If not addressed in a timely manner, it will eventually lead to serious quality defects. Therefore, the Party A must take effective measures at the initial stage of the problem. In response to the quality risks that may arise from multi-work type cross-operations, the Party A's management personnel should strengthen the quality early warning mechanism, increase the frequency of random inspections on the basis of routine inspections, and implement dynamic monitoring to ensure the construction quality of alternating operation links.

3.3 Material Management

Building materials, as the basic elements of engineering construction, directly determine the safety performance and service life of the project. To ensure that the project quality complies with regulatory requirements, the Party A must strengthen the whole-process supervision of building materials, implementing comprehensive control from the procurement source to on-site application, thereby ensuring the reliability and stability of building materials. First, a complete procurement management system should be established. During the material procurement stage, priority should

be given to suppliers with formal qualifications, and their production and operation licenses and production capacities should be verified. The Party A can formulate in advance formulate detailed procurement technical specifications, clearly stipulating the technical parameters and quality indicators of various materials to ensure that the purchased materials fully meet the actual needs of the project. Secondly, the Party A needs to implement a strict material acceptance system. When materials arrive at the site, sampling inspections should be carried out, and comprehensive tests should be conducted on the physical properties and chemical indicators of the materials. Through this quality control method, potential quality defects can be effectively identified, preventing non-compliant materials from entering the construction site and thus affecting the overall project quality. Finally, during the construction stage, the Party A should closely monitor the material usage link. Construction personnel must strictly follow the material usage instructions for operation, and violations or the mixed use of different materials are prohibited. During this period, BIM technology can be used to inspect, verify, and screen materials. Once unqualified material quality is detected, the entry of materials should be immediately stopped, and the responsible personnel should be held accountable.

3.4 Design Change Management

During the engineering construction process, design changes are inevitable. If a design change occurs, the Party A's relevant personnel must promptly revise the construction organization design and progress arrangement to ensure that the project progress is not disrupted. The Party A should strictly control the design change link and prevent the increase in construction standards or scale expansion due to changes, keeping the project investment within the budget range. For changes caused by objective factors such as geological condition changes and abnormal material supply, the construction unit can make local adjustments. In other cases, changes are not allowed in principle. If a change is indeed necessary, the construction unit must calculate the project quantity and cost adjustment plan, which can only be implemented after approval by the Party A. During the change implementation stage, the Party A needs to collaborate with the construction unit to control costs, standardize the preparation of change budget documents, and fulfill the review procedures to prevent false reporting of project costs. The determination of project change prices should follow the following criteria: ① When the change content matches the project characteristics in the bill of quantities, refer to the bill price for execution; ② When the change content belongs to the bill project but the characteristics do not match, re-price based on the original unit price.

3.5 Technical Management Supervision and Inspection

During the implementation of construction engineering projects, on-site technical management plays a key role, and its quality directly affects the construction effect and project duration control. To ensure the smooth progress of the project, the Party A must strengthen the audit and supervision of technical management, focusing on verifying whether the scheme content is consistent with the design drawings, whether it is operable, and whether it can truly meet the engineering construction needs.

First, to ensure the smooth implementation of the project, the Party A must establish a complete technical scheme review mechanism. During the preparation of the technical scheme, a professional team should be organized to conduct a systematic review, focusing on verifying the matching degree between the scheme content and the design drawings, while considering its applicability in actual construction. The review team members should have a solid professional background and be able to comprehensively evaluate the scheme from both theoretical analysis and on-site practice dimensions. Secondly, the Party A needs to establish a regulatory system for the technical implementation process, establish a regular review system, and continuously track and manage the construction technical documents submitted by the contractor to ensure that on-site operations strictly follow the approved technical scheme. Supervision work should cover key links such as project progress control, construction quality control, and production safety supervision. Immediate response measures should be taken for any abnormal situations detected. The Party A needs to maintain close collaboration with the contractor to ensure the effective implementation of various

construction technical measures. Both parties should fully discuss specific technical requirements and operation procedures, promptly coordinate and handle potential problems, and jointly ensure the orderly progress of the project. Finally, the Party A should establish a standardized technical scheme revision mechanism. During the project implementation stage, if there is a need to adjust the technical scheme, it must go through a strict review procedure and can only be implemented after professional evaluation and formal approval. This effectively prevents engineering quality and project duration risks caused by arbitrary changes.

4. Conclusion

In summary, during the engineering construction process, the Party A, as the project leader, must effectively fulfill core responsibilities such as on-site coordination, progress control, and safety supervision. In current construction management practices, the Party A generally faces prominent problems such as a lack of technical standards and a loose management system. To this end, the Party A should make improvements from multiple dimensions such as pre-construction preparation, process control mechanisms, technical integration and application, and safety risk prevention, thereby significantly improving on-site control efficiency and ensuring the smooth implementation of engineering projects.

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