

Research on Risk Identification, Assessment, and Control Strategies in Construction Project Management

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Abstract: Modern construction projects are often large-scale with numerous construction phases. To effectively ensure project quality and benefits during project management, it is crucial to conduct thorough risk identification. By assessing and controlling risks, the controllability of the entire construction process can be enhanced, which is key to ensuring the smooth implementation of the project. Therefore, it is necessary to identify specific risks involved in construction projects and develop targeted project management plans to effectively recognize and control various risks in engineering construction. Based on this, this paper starts with an analysis of the characteristics of construction project management in the new era and conducts targeted research on risk identification, assessment, and control strategies in project management.

1. Introduction

The current development status of China's construction industry is one of the most important components of the national socio-economic structure; In the meantime, modern construction project scale has been continuously expanding and with that, the processes associated with construction and management of a building have become more complicated than ever before, which makes project lifecycle management exceptionally difficult. Risk control is the need when a construction project management implementation specific to operations. The real-world problems encountered in engineering construction can also be analyzed with targeted risk identification and assessment, which helps to solve complex problems and obtain good project quality. At present, the risk identification in construction projects is facing a series of problems such as complicated and difficult risk identification process, inadequate communication between responsible departments and low accuracy of risk assessment results Thirdly, it makes project management of construction projects more complex. Thus, this requires in-depth research on risk identification, assessment and control strategies in construction project management.

2. Analysis of the Characteristics of Construction Project Management in the New Era

In the new era, with China economy and society in a higher level of development and construction industry less sexy scale increasingly broader. In light of this new trend in construction projects, with the aim of promoting sustainable development within China's construction enterprises and industry generally, there is an urgent need to adopt multiple management dimensions when managing engineering projects by imposing strict requirements and higher standards on every aspect. At present, the characteristics of construction project management in the new era are mainly reflected in:

The "dual carbon" strategy obviously boosts exploration of green transformation projects, thus attracting more investments. China's construction industry has faced its own set of challenges, especially with the relatively serious ecological and environmental problems that have emerged in practice, so they recognize their heavy responsibilities during operational development and gradually treat promoting green transformation in construction as an industry trend. At present, there have been targeted green construction management plans for the whole process, which has set up a construction technology system with green and energy conservation attributes. At the same

time, targeted suppression measures have also been taken for on-site construction noise pollution, dust pollution and light pollution. For example, the continuous optimization of green and environmental thinking as well as eco-conception in construction project construction are also becoming more and more outstanding, which has brought a great reduction effect on carbon emissions over time in every stage of the project life cycle.

Secondly, more focus on lifecycle management of engineering construction. Currently, in Modern Construction Project Management Implementation, the Management capabilities are still upgraded throughout the lifecycle of a project. But the internal competition pressure of construction enterprises continues to increase, many enterprises will appear in operation and development process severe capital chain pressure. This is exactly what has led the heightened pressure on capital chain, which in turn enterprises proactively innovate traditional project management model to approach for engineering management from all fronts like construction progress control, cost control and risk prevention. Simultaneously, they align on motivating interfacing across divisions and improving team coordination capabilities. Only in this way can construction enterprises maintain a stable competitive position under the current fierce industry competition, and achieve win-win cooperation between multiple bodies and responsible subjects.

3. Risk Identification in Construction Project Management

3.1 Cost Budget Risk

Cost budget risk management is one of the crucial aspects in risk management (in terms of modern construction project management implementation), primarily because project cost impacts directly on the final construction benefits as shown by lyric. For this reason, we need to focus on control of the cost budget in several aspects including decision-making of a construction project, design and on-site construction, combining with all kinds of potential risk factors that could cause cost budget risks. At present, although the cost budgeting stage in construction project management is considered to be an important part, and some control methods have been proposed for various risks in this phase, effective control of risk has not yet been realized, and there are still gaps in management, which directly affect the economic benefits of projects ^[1]. An instance is quantity surveying which is extremely important in cost budgeting when it comes to contemporary construction projects. But when formal quantity surveying takes place, the measured data may not match how things actually are on the project site, which can lead to inadequate fund allocation plans that incorrectly estimate specific quantities for a project. Therefore, due to the above situation, the chance of exceeding project budget remarkably rises in future construction.

3.2 Green Construction Risk

Despite the fact that green house and earth-safe development has been generally connected to contemporary building builds, as a result of the handy impacts of different components (for example, lacking green development work design plan designs, public strategy necessities to advance green improvement structures, lacking specialized procedures amid current advancement stretches out in China," nearby heads are supported with respect to improving some proficient variables of related working specialists), eco-friendly structure operations still enjoy specific perils. In particular, China has started to feel some urgency and vigorously implement the strategic policies of "carbon peaking" and "carbon neutrality", which is really in terms of innovating those old construction project concepts with specific management plans. But for many construction sites under way now, while pollution prevention and control measures on the surrounding ecological environment during construction were included in national strategic policies and green construction standards, targeted green construction management methods of construction project also introduced specially ^[2]. The current situation shows that the environmental awareness of many enterprises in the construction industry is still relatively weak, and energy-saving and environmental protection measures are often not well implemented. In this way, though the idea of green construction is proposed in project construction practice link, but a lot of project execution link and various

indicators has not reached the national green construction standards. This is exactly because of the above situation, many construction enterprise green ecological development more stays in surface and cannot bring enterprises sustainable get new kinetic energy for steady state ^[3].

4. Research on Risk Assessment and Control Strategies in Construction Project Management

4.1 Selection of Risk Assessment Methods

With the increasing complexity in construction methods, and continuing expansion of scale of modern construction projects, risk factors encountered during construction are also exhibiting diversified trends. Therefore, to properly evaluate construction risk, specific targeting methods should be used for risk assessments to enable future risk control work. In particular, the classical risk assessment approaches in construction project management can be classified into three main categories: qualitative assessment methods; support for some lack of data based scenarios. Most of these are based on the experience of experts and people working in industry. However, there are some defects with this assessment method, such as a strong subjectivity of the assessment results, which may cause inconsistencies between the final result and the actual project conditions), quantitative analysis (mainly refers to fuzzy comprehensive evaluation methods. The assessment method can be a creation of mathematical models for quantifying work risk factors and probabilities involved in engineering construction. The benefit of this assessment method is that it guarantees the objectivity of the assessment results, but it largely depends on data quality and requires high-quality preliminary research first), and dynamic assessment (mainly referring to advanced technologies such as artificial intelligence and AI for dynamic risk prediction along with the engineering construction process). The benefits of this are the ability to warn you or automatically adjust themselves based on live data. Moreover, the evaluation process is easy and applicable in diverse complicated situations. Nevertheless, its only discernible drawback is the significant upfront cost ^[4]. Different construction projects have different preset conditions and for each one, a suitable risk assessment approach should be chosen.

4.2 Risk Control Strategies

4.2.1 Establish a Regular Staff Training Mechanism and a Dynamic Evaluation System

In order to scientifically and effectively carry out the risk control work in the construction project management, it is necessary for the construction enterprises to establish a strong awareness of risk management, through effective management around the whole process of construction, set up prevention and control mechanism against various types of potential risk hazards that may occur in the implementation process. To accomplish the above work objectives, it is necessary to strengthen the training of relevant personnel on risk awareness and abilities to prevent and control risks. Hence, businesses should have a periodic training mechanism in place. In the training process, it is necessary to focus on improving the risk prediction and prevention and control of relevant technicians and management personnel, so that they can accurately identify potential risks in specific work links when they are on duty at the first instance. Then formulate targeted response plans ^[5]. Through regular lectures, publicity and education activities in the enterprise, a more stringent risk prediction and prevention and control system may be constructed to allow everyone in the enterprise to play a more active role in performing their duties, fulfilling various risks of funding risks and progress risks during the construction process as much as possible ^[6]. Moreover, construction enterprises should also establish a dynamic evaluation system, mainly referring to the periodic evaluation of professional technicians and management personnel. It has been proposed that the evaluation should be based on theoretical and practical ability and stage-by-stage work performance to retain back-bone personnel with stable foundation and strong position competence, giving them wider arrangement of appraisal opportunities for professional titles as well as promotion. You should ensure that, when assessing staff performance with digital tools, various methods of evaluation must be integrated in a specific way with intelligent monitoring systems to supervise the particular work status of officers performing their respective responsibilities such that

risk points in daily work ^[7].

4.2.2 Prioritize Fund Supervision and Establish a Multi-dimensional Supervision Network

Fund supervision is an important area of risk control in the management of construction projects nowadays. Fund supervision conditions have an immediate influence on the total expense consumption of your respective project, and also construction enterprises should formulate and best appropriate fund supervision systems to prevent incorrect use of such funds specifically. Provided that the legitimate rights and interests of workers are protected, funds should be reasonably planned to avoid wasting too much manpower and material resources in all links of project construction, especially the management of the whole life cycle use of materials and equipment. Material and equipment management in the whole process should be focused on from the early procurement link to the later warehousing allocation links, and then to the site construction management link to prevent unreasonable material equipment configuration, excessive procurement or rental lead to increased project costs. This also can create a closed-loop management plan that is specially unified. In particular, a hierarchical accountability system is implemented to categorize different fund risk problems in engineering construction fairly, specify accountable departments and individuals; therefore, the normative fund utilization will be improved ^[8]. Establish a pre-planned investigation process, that is, to hold corresponding units and persons responsible according to law, disclose the rules of the game and progress in handling cases. Meanwhile, to accurately supervise the risks of funds, a multi-dimensional fund supervision network needs to be designed as well. Such as setting up special management offices, direct petition platforms and special audit channels, establishing a reward and reporting mechanism to realize multi-dimensional supervision of fund risk throughout the construction process, so as to prevent problems such as fund embezzlement, over-claiming funds and corruption bribery among relevant personnel ^[9].

5. Conclusion

Briefly, risk identification is important in the management of construction projects. Once research and analysis identify particular risk factors for engineering management, tailored risk assessment and control plans should be created. Work can be done on four major aspects, including a sound staff training mechanism, an improvement of a dynamic evaluation system, a strengthening in the emphasis on fund risk supervision and establishment of the monitoring network among multiple dimensions to reasonably apply funds from state budget to construction project construction which is critical for ensuring safety benefits of projects and the steady development of construction enterprises. Future research should continue to innovate the technical schemes of risk identification, assessment and control in construction enterprises, as well as actively adopt advanced technologies such as artificial intelligence and big data in order to enhance risk control and prevention capabilities.

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