

Safety Risks and Prevention Strategies in Quality Management of Building Decoration Projects

Xiaoman Zhang

Anhui Province Nanyuan Construction Engineering Co., Ltd., Hefei, Anhui, 230000, China

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Abstract: Building decoration projects often have a relatively complex construction process involving multiple stakeholders. However, safety risks exist throughout the whole project life cycle from initiation to delivery, which directly jeopardizes engineering quality stability and construction personnel safety benefits. Within the industry, several organizations have management biases of Progress before Safety and more appearance than substance, resulting in a number of falls from height; material-induced fires and operational errors. These incidents not only incur direct losses - and in some cases are economic catastrophes - they also tarnish corporate image. This paper analyzes the multiple value of safety risk management, characterizes three basic categories of safety risk according to the characteristics of building decoration engineering and proposes executable prevention strategies for each category. It is — reference to be engineered construction enterprises establish scientific safety management system and improve the risk control ability.

1. Introduction

Urbanization has been developing, people's needs for living standards are getting higher and higher, building decoration engineering has long changed from a simple pursuit of basic housing functions to a new stage dedicated to "personalized design + quality construction + Green application". Decorative commercial complexes, customized residence remaking projects, and public building renovations involve the need for higher accuracy in construction methods, materials requirements and labor expertise. However, decoration work is often carried out after the main structure is completed, constrained by space, with dispersed workfaces and extensive use of temporary facilities. Safety risks in decoration projects are more concealed and prone to overlapping compared to those in main structural work ^[1]. Although the industry has recently placed greater emphasis on safety management, issues such as imperfect systems, inadequate implementation, and weak safety awareness among personnel persist. Therefore, based on the effective study of construction quality management in building decoration engineering, it is necessary to explore the safety risk and prevention strategies in building decoration engineering.

2. The Value of Strengthening Safety Risk Management in Building Decoration Engineering Quality Management

2.1 Ensuring Personnel Safety and Demonstrating Social Responsibility

Construction personnel are directly exposed to risks. Comprehensive safety management can minimize the occurrence of accidents like falls, electric shock and even avoid casualties. Every single accident results not only in grief for the family of a victim and ruining their financial stability but may also result in media coverage leading to losing face as an industry. Building decoration is also a labor-intensive industry with large employment volume. Protecting this cohort is an example of the stress on social responsibility by industry ^[2]. The implementation of specific safety management measures allows workers at height to use certain protective equipment, plans the operation of temporary electricity at heights and identifies potential hazards on a regular basis, enabling construction personnel to carry out their work in a safe environment that promotes feeling cared for and respected. Such respect for life promotes employees's sense of belonging,

demonstrates industry responsibility, maintains social stability and provides a good development environment for the industry.

2.2 Ensuring Engineering Quality Compliance and Enhancing Project Benefits

Safety is closely tied to quality; most safety hazards are just quality hazards. For example, uninstalled ceiling joists are risky of fall and leads to cracking and sagging of the ceilings. The use of non-standard electrical wires not only increases the risk of electric shock, but also shortens the service life of the project. With safety management, enterprises can control hazards in every link of the project lifecycle: strictly reviewing materials in the source to prevent unqualified products from entering the site; standardizing operational procedures in construction to ensure compliance during construction; strengthening acceptance inspection and control for on-time delivery of project. It minimizes work stoppages, rework as a result of accidents, and other additional expenses while preventing midterm maintenance disputes from forming. In addition, projects that conform to quality requirements that are safe and reliable meet the needs of owners, increase owner satisfaction and ensure timely delivery in order for enterprises to obtain greater economic benefits and market competitiveness^[3].

2.3 Promoting Standardized Industry Development and Building Corporate Brand Image

Various industries have moved from having price wars to fights over quality and safety. It is also true that when clients select a company they pay more attention to decoration effects and even the quotes but focus on safety management levels and project safety records primarily. By focusing on safety management, standardization of processes, adequate safeguards and zero-accident project performance a company can communicate its professionalism and reliability to potential clients thereby establishing trust, achieving a competitive edge and potentially winning more projects. Industry level on, these practices of leading enterprises can produce demonstration effect and encourage all segments to attach importance to risk control, and change the extensive development model of "pursuing cost first". Standardizing and advancing safety performance standards, complementing the advanced management technologies with inter-enterprise communication, as well as in cooperation of industry associations would promote rising safety level through guidance and lead the whole industry to refined high-quality development.

3. Core Safety Risks in Quality Management of Building Decoration Engineering

3.1 High-Altitude Operations and Structural Modification Risks

Jobs that involve working at height such as ceiling installation, perimeter wall and light fixture placement outdoors require work at height, which overall is subject to very high protective and operational requirements. On the other hand, in order to save cost or accelerate time schedule, several companies usually simply their protections: no base plate or cross bracing for scaffold to assure stability; excess of pole separation resulting in vertical instability; temporary platform used without previous load check-up verification; safety harness not used or used but improperly anchored against the "high anchor point low use" rule. In high-rise projects, such failures in protection can lead to falling often with dire consequences. At the same time, some workers exaggeratedly modify load-bearing structures without calculation and approval to achieve a decorative effect, which seriously jeopardizes the safe use of buildings and reduces structural stiffness, deformation resistance, seismic resistance and other performance indicators in amplification; so that hidden dangers are buried in the decoration layer^[4].

3.2 Material Quality and Usage Risks

Decoration materials form the project's foundation. Substandard quality or improper use can easily lead to accidents. During procurement, some companies choose unqualified suppliers, acquiring inferior materials: artificial boards with excessive formaldehyde or insufficient fire ratings affect air quality and increase fire risk; ceiling joists with insufficient wall thickness and weak compression resistance bend or break under load; wires and cables with thin insulation or fine

cores easily short-circuit or overload, igniting materials. During use, workers unfamiliar with material properties often violate rules: using dry-environment boards in bathrooms/kitchens without moisture proofing, causing deformation and layer detachment; mixing adhesives, resulting in weak bonds and no fire resistance, accelerating fire spread; using wood without fire-retardant and anti-corrosion coatings, making it prone to insect damage and acting as combustibles, exacerbating accident severity.

3.3 Personnel Safety Awareness and Competency Risks

Personnel are the core of construction. Weak safety awareness and insufficient competency are significant risk sources. Many workers have a complacent mindset, treating safety rules as formalities: entering sites without hard hats; stepping over guardrails at height without securing themselves; throwing tools/materials from height, ignoring safety below. Some managers "prioritize progress over safety," treating safety management as an add-on task, compressing time for safety checks and protection; discovering violations only leads to verbal warnings, not thorough rectification; systems become mere formalities, not tailored to the project, causing management-risk disconnection. Furthermore, high industry turnover and extensive use of temporary labor mean some companies provide safety training only covering tasks, not risks and emergencies, leaving temporary workers with weak protective skills as a high-risk group for accidents ^[5].

4. Response and Prevention Strategies for Safety Risks in Quality Management of Building Decoration Engineering

4.1 Building a "Specialized Plan + Process Control + Technical Support" System

Building decoration enterprises need to focus on managing these risks, forming a closed-loop system. Prior to project commencement, specialized plans need to be formulated through communication between technical department and construction and safety teams, which include requirements according to various construction scenarios: ceiling installation plans should stipulate the spacing between scaffold poles, ledger spacing, base plate locations and plank fixing methods to ensure load-bearing capacity; exterior wall decoration plan should decide on installation acceptance procedures of gondola selection and anchor point for safety harnesses as well as inspection frequency prohibiting anchoring to railings or non-load bearing elements. Structural changes require the plans to be calculated by a structural engineer, approval from the client and supervisor, and potentially expert review; work is strictly forbidden before approval is complete ^[6].

In construction, project management should set up a three-level control mechanism: Safety officers conduct daily inspections of high-altitude work areas to check loose scaffold poles, whether hangers are wearing harnesses and (when they disassociate from scaffolding) if temporary platform standstills have been built; inspectors will immediately stop the work on-site and ask the workers to rectify any problems found. Project managers lead weekly organizational checks that leverage comprehensive visual inspection by checking whether scaffold settlement is suitable for as-built project conditions and whether structural modifications were made according to specialized plan quality verification scheme requirements. Finally, agree at key development nodes organizing multi-party (client + supervisor + contractor) acceptance; only after passing acceptance assessment, signing can subsequent processes start. In addition, enterprises should regularly train high-altitude workers to understand the standard procedures for high-altitude operation, with typical accident cases and emergency drills, so as to improve the risk awareness of high-altitude workers and their ability to resist risks.

Moreover, companies can also use technical means to enhance control efficiency: Set up AI smart cameras in high places and make alarm detection for violations such as missing hard hats and crossing guardrails; Use BIM technology to model parts subject to structural changes, simulate stress, etc.

4.2 Establishing a "Procurement + Acceptance + Use + Supervision" Full-Chain Mechanism

Organizations have to balance material quality and usage risks in three cycles. Establish supplier qualification system during procurement process selecting vendors through qualification review, performance assessment and sample testing by priority giving less time to comparatively less qualified and reputation maintaining companies; Specification of material quality standard, safety of usage in contract and compensation terms in case of non-conforming materials are mitigations at source. Developing a procurement information platform that records numbers of manufacturers, batches, and certificates for complete traceability.

Joint Inspection by Technical / Safety & Materials Departments to Verify Material Certificates and Test Reports (To ensure Contract specifications compliance); Sample Send key materials to Third Party labs for Testing Property (e.g.: Fire resistance, Insulation Resistance); Reject non conforming materials and Record. Proper storage of approved materials: Flammables are stored in a fireproof warehouse that is separated from ignition sources and must be equipped with firefighting equipment, and moisture-sensitive materials should be stored in a dry and ventilated area to prevent deterioration.

During operation, also the project management team should be guidance and supervision: Before working, the technicians lead workers on materials application, applying methods and precautions; During work, safety personnel and technical personnel regularly check to detect violations to stop them for eliminating errors. Keep logs of material used including quantities and where they were applied along with any unused materials to ensure the ability to track them in case of misuse or waste ^[7]. Further, hold material training seminars regularly with supplier technicians can help improve familiarity and learn about new standards which can have reduced misuse risk.

4.3 Implementing a "Layered Training + Supervision & Enforcement + Culture Building" Strategy

Enterprises, on the other hand, must improve from 3 aspects for personnel competency. Training Must Be Layered: Worker Training Covers Basic Operational Norm and Skills, A Theory/Practical Assessment Can Then Qualify a Worker; Management System and Risk Identification, Emergency Response Given to Managers To Enable Improved Control Capability; Temporary Workers Are Trained with Less Theory on Risks On-Site, Rules Regarding Distance from Equipment Used in Movement of Material, No-Throwing Zone - Knowledge Understood is Confirmed Via a Q&A.

Establish a three-dimensional mechanism for supervision and enforcement: Build rules, such as High-Altitude Work Safety Management Rules, Temporary Electricity Methods, clarify responsibilities; Link safety performance with pay and promotion to reward compliant behaviours, while punish norm violations; Create an "Enterprise - Project - Team" supervision network: monthly auditing by enterprises, daily inspection in projects and pre-job checks at team levels followed by post-shift summaries, allowing the full involvement of everyone.

In setting safety culture into enterprises, they can establish safety culture walls at site, on which all cases and phrases are displayed; Hold monthly events performing quizzes, drills as well as model worker selections; Regularly invite people to share their stories at the weekly or monthly meetings of safety. the training records of mobile workers trained content and result should be transferred when you started in different locations, make sure that there are no break-up on the training process, these efforts will maximally increase the awareness and capability for personnel safety ^[8].

5. Conclusion

In building decoration engineering, the three basic risks are interrelated, and quality and safety can constrain each other. By implementing relevant prevention strategies against corresponding risks, with "Plan + Control + Tech" aiming at high-altitude/structural risks, the "Full-Chain Mechanism" targeting material risks and "Training + Supervision + Culture" focusing on personnel risk, risks are thus controllable. In the future, with the industry upgrading to intelligence and sustainability, deeper BIM risk simulation, systematic promoting of smart monitoring and green

materials is bound to better optimize control. It is necessary for enterprises to constantly consolidate the concept of "safety first", deeply integrate safety into the whole process of quality management, establish systematic systems, lead high-quality industry development and realize that personnel safety, project compliance and enterprise benefits are unified.

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