

Research on Management Models in Supervision Quality Control of Housing Construction Projects

Erye Xu

Anhui Province Kexin Engineering Construction Supervision Co., Ltd., Hefei, Anhui, 230000, China

Keywords: Housing Construction Project; Supervision Quality Control; Work Content; Management Model

Abstract: Phenomenon, housing construction project in recent years has remained on the rise in China. Scaled from average homes to large commercial complexes and high-rise buildings has led to increased complexity of the project. Simultaneously, the society's demand for the quality of housing construction works has been increasing day by day, not only in terms of functional usability but also in terms of structural safety and durability. Supervision quality control during construction is the key link to ensuring project quality. The supervisors management mode directly affects the efficiency and effectiveness of quality control. Based on such background, in-depth research for management models of supervision quality control applied to housing construction projects and exploration of model selection scientific methods and optimization paths are becoming a pressing demand that is conducive for improving project quality and promoting the industry healthy development. We are training on data till October 2023 This article conducts an empirical study upon the management models of supervision quality control for housing construction project. The first is to specify the main work content of supervision quality control. Next, it expounds the need to improve quality control of supervision in housing construction projects. Finally, this paper focused on optimizing the management model of supervision quality control by suggesting improvement strategies. Aiming at improving the supervision quality control work efficiency of housing construction project, reducing quality risk, ensuring that project quality meets relevant requirements, providing theoretical and practical support for the industry in optimizing supervision quality control work.

1. Introduction

Housing construction projects are the most basic unit of engineering construction, they not only directly related to people's lives and property safety but also very important related to the heart of our market reputation. As an important link in engineering quality management, supervision units are the first and last line of defense to ensure project quality. Through the application of scientific management, they supervise, inspect and coordinate the entire construction process. Thus, the study of the management model in supervision quality control for housing construction projects (including clarifying the conditions for applicability to each model, proposing a path to optimize these models) is of great theoretical as well practical significance contributing to improving supervision work quality and ensuring project safety. Contributing dare responsible to high-quality development in the construction industry.

2. Main Work Content of Supervision Quality Control

2.1 Preparation Stage

At the preconstruction preparation stage, in which construction unit, contractor and design unit review construction drawings organized by supervision unit. This includes a review for design errors, dimensional differences, ambiguous technical requirements, etc., and verification of adherence to current national building codes and the actual requirements from the project. Once problems are discovered, the supervision unit immediately puts forward amendments to avoid

subsequent construction quality problems caused by drawing issues. Secondly, the supervision unit reviews the contractor's construction plan from the perspective of the rationality of quality control measures, scientificity of construction sequence and compliance with technical parameters. One example is a check of the load-bearing calculations in formwork erection schemes and post-concrete curing plans. Construction will not be allowed before the plan passes the supervision unit's review ^[1]. In addition, the supervision unit will check whether construction management and technical personnel have professional qualification certificates, and whether special operators undertake work with valid certificates. It also audits the models and performance of construction equipment used on-project to ensure that it meets project requirements, as well as its pass rate in relevant inspections to confirm the personnel and equipment can provide reliable support for quality standards during the project.

2.2 Construction Stage

Later the quality control work of supervision unit becomes more detailed. Specifically:

Material & Equipment Quality Control:

When materials (steel bars, cement, aggregates) reach the site, the supervision unit demands that the contractor submit quality accompanying documents (certificates, test reports).

Witness Sampling & Testing: Nominated representatives oversee that samples of critical materials are taken in accordance with specifications and sent for retesting to accredited laboratories. Low-quality or unsafe materials may thus never be used.

Construction Process Monitoring:

Daily supervision & site field standby: Inspection personnel to patrol daily at the site and provide information about real-time data including foundation pit digging, steel mesh binding, mould installation, concrete pouring, masonry work and roof waterproofing.

Quality check of Procedures: Construction activities and quality completed work is verified against design drawing and specification (e.g., checking the rebar specs/spacing, sequencing of concreting, requisite compaction).

Handling of Non-conformance In the event that procedure quality is inadequate, the supervisory unit promptly issues written rectification notice to contractor requiring them to cease work and rectify situation. The next procedure can only be performed after remediation and re-examination ^[2].

Quality Record Management: The supervision unit carefully records all inspection and test data, rectification status, etc. during construction, forming a complete supervision quality file for project handover and future quality traceability.

2.3 Completion Acceptance Stage

Preliminary Acceptance:

The supervision unit performs initial quality acceptance based on design drawings, standards and the contract. Some of them include appearance quality, structural safety and functional performance (wall/floor flatness, doors/windows opening smoothly, plumbing system functioning properly and electrical appliances are working).

The supervision unit is responsible for reviewing the completeness, correctness and standardization of the completion handover documents submitted by the builder (e.g., construction record template, test reports, quality assessment).

If any quality issues are identified during preliminary acceptance, a rectification request is triggered for the contractor. Following the correction, completion is re-verified ^[3].

Formal Completion Acceptance Participation: When the project is completed and meets acceptance criteria, the supervision unit will participate in the formal completion acceptance organized by the construction unit. It conducts inspection on paper and promotes acceptance inspection work.

Completion Acceptance Filing: After acceptance is successful, the supervision unit assists the construction unit in completing the filing procedures for project completion acceptance. This fulfills the quality control responsibilities for the supervision unit.

3. Necessity of Strengthening Supervision Quality Control in Housing Construction Projects

Importance of Protecting the Client's Investment & Objectives: Construction unit invests significant money to obtain a quality-fulfilling building. Poor quality control in the supervision can cause such issues as materials substitution or non-compliant construction, which however affect poor overall quality. This increases repair costs and delays project delivery, which affects the return on investment for the client while also potentially resulting in expensive rework or reconstruction [4].

Contractor Responsibility and Quality Enhancement: The contractor's execution ultimately dictates the quality of the final building. By continuously conducting smart inspections, the supervision unit discovers issues in process management, technical level, and quality control of the construction contractor so that timely rectification can be ordered. This forces contractors to create solid quality management systems, improve technical education and training, strictly comply with drawings and specifications, prevent errors from causing quality hazards, and then strive to increase market competition.

Protecting Lives & Property: Occupants (residents, employees) inhabit these buildings. Quality has a direct impact on their safety and property. Lack of adequate supervision control and can lead to structural hazards (cracks, leaks, lack of load-bearing). Such hazards can lead to colapses or leaks that could put lives at risk and damage property (e.g, furniture finishes) when in use.

4. Effective Pathways to Optimize the Management Model of Supervision Quality Control

4.1 Perfecting the Supervision Quality Control System

Develop Comprehensive Rules & Responsibilities:

Combined with the provisions of national laws and regulations (e.g., Code for Construction Project Supervision, Unified Standard for Construction Quality Acceptance of Buildings) as well as the operational characteristics, integrated rules covering material inspection, procedure acceptance, non-conformance handling and records management should be established by the supervision unit. Defined specific standards (such as verification of steel mill certificates, mechanical property test reports, required sampling rates) Also should be defined procedures (e.g. self-control by the contractor and a formal request for procedure review/endorsement by supervision staff prior to execution) [5].

Clearly delineate quality responsibilities for each role (Chief Supervision Engineer oversees overall quality; Professional Supervision Engineers handle specialty inspections), prevent buck-passing and ensure responsibility for the entire process.

Standardize Quality Control Procedures:

Create process manuals outlining quality control points from preparation to acceptance of completion.

Plan review, personnel/equipment verification (e.g., personnel verified on the day of mobilization and equipment verified through checklists), and drawing reviews must be included in the preparatory phase procedure with timescales and deliverables stated exactly (e.g., plan review completed within 5 working days from receipt with written feedback).

As an example, the construction phase procedure should address frequency/requirements for patrols, stand-by supervision and parallel testing (i.e., full time stand-by supervision of critical activities like concrete pouring will be a must as also with records).

Systematic closure is ensured by including completion acceptance procedure (pre-acceptance, documents verification and formal acceptance participation).

Strengthen Internal Oversight & Fix External Communication:

Set up an internal quality audit team to regularly check the supervision work of the project, whether there are regular records of authenticity and rectification implementation. The audit findings should lead to timely notification and correction of the problem [6].

Establish communication lines with client and contractor Conduct regular quality meetings — status reports, solicitation of feedback and adjustments to control measures. For chronic issues,

work as cross-functional team to root-cause stem/root-cause & take/mechanism to measure improvements.

4.2 Enhancing the Comprehensive Competence of Supervision Personnel

Elevate Professional Skills:

Stay current on industry innovations (such as prefabricated construction or green building standards) through continuing education courses led by professionals or veteran engineers.

Have personnel learn systematically through exams, promote professional qualification assessments.

Learning platforms disseminating policies, standards and peer exchange should be set up by relevant authorities to widen professional perspectives [7].

Foster Professional Ethics & Accountability:

Hold regular ethics workshops and case studies (i.e., accidents from negligent supervision) to reinforce the imperative of their role for quality and safety, clarifying duties and mission to avoid negligence or falsification.

Establish stringent social-commerce performance appraisal and outcome reward/penalty to encourage due diligence and strict quality control on one hand, while discouraging negligent behavior on the other.

Develop Communication & Coordination Skills:

Issue training (e.g., simulations, workshops) about effective communication techniques (clarity, active listening, conflict handling) that the team requires for interaction with clients/contractors/designers – such as when issuing a non-conformance report or discussing quality status [8].

Continually cycle on encouraging people to practice with engagement, reflecting and learning through doing, growing your abilities to start conversations around quality objectives.

5. Conclusion

In the summary, the applied management model in supervision quality control housing construction project is an important factor affecting the quality of the project. The model needs good selection and effective operation, which directly affect the efficiency of supervision work. Through analyzing the generally used supervision management model, elaborating on their advantages and applicable scenarios respectively, as well as putting forward optimization measures such as improving quality control system and strengthening the competence of supervision personnel, this paper shows that only through selecting a model suitable for specific conditions of the project and optimizing its operation constantly can we let supervision unit give full play to quality control function. That is basically make sure the preventive measure of quality risk to construction of housing projects in order to meet the standard. With the advancement of the construction industry towards intelligence and green scale, housing construction project supervision management models must also be continuously innovated. All of this information technology, big data analysis to optimize the focus of quality control has been actively incorporated; however, only through continuous efforts will it improve the precision and efficiency of supervision quality control.

References

- [1] Zhang Qi. Research on Site Quality Management of Housing Construction Project Supervision[J]. Urban Construction Theory Research (Electronic Edition), 2024, (23):40-42.
- [2] Zhang Yin. Importance and Key Points of Supervision Quality Control in Housing Construction Projects[J]. China Building Decoration & Renovation, 2024, (03):156-158.
- [3] Li Zeming. Analysis of the Importance and Key Points of Supervision Quality Control in Housing Construction Projects[J]. Jushe, 2024, (04):158-161.

- [4] Fu Zhiwei. Exploring Site Quality Control in Housing Construction Project Supervision[C]//2023 Proceedings of Whole Process Engineering Consulting and Supervision. Zhejiang Huajie Engineering Consulting Co., Ltd., 2023:447-451.
- [5] Liang Xiang. Research on Site Quality Control in Housing Construction Project Supervision[J]. Construction & Design for Engineering, 2023, (03):234-236.
- [6] Chen Bin. Exploration of Quality Supervision Work in Housing Construction Projects[J]. Housing and Real Estate, 2023, (02):95-97.
- [7] Fu Zhongqing. Research on Measures for Supervision Quality Control in Housing Construction Projects[J]. Construction & Budget, 2021, (07):47-49.
- [8] Yang Qian. Discussion on Management Models in Supervision Quality Control of Housing Construction Projects[J]. Real Estate World, 2021, (12):96-97.