

Quality Management Strategies in the Construction Phase of Housing Projects

Chunfeng Zhang

Anhui Kaibu Construction Co., Ltd., Bozhou, Anhui, 236800, China

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Abstract: This article focuses on quality management during the construction phase of housing projects. It elaborates on its importance, analyzes factors affecting quality, and discusses in detail quality management strategies from the construction preparation stage to the completion acceptance stage. These strategies include the establishment of a quality management system, personnel management, material management, and specific quality control measures for each stage. Through practical case analysis, it demonstrates the application effects of effective quality management strategies and proposes suggestions for improving the quality management level during the construction phase of housing projects, aiming to provide reference for enhancing the quality of housing projects.

1. Introduction

Housing project is an extremely important infrastructure of social development, and the quality of housing projects directly relates to the life safety, property safety and living conditions of residents. The most important phase of building work on a housing project is the construction period. Quality control in project phase is of great importance to the quality assurance of projects, proving the economic benefits and social benefits of enterprises while reducing the cost of project. However, quality problems in housing projects occasionally happen under the influence of a variety of factors leading to a certain degree of adverse effects in actual construction practice. So, it is significant for the practice to carry on a more in-depth study of quality management strategy of housing construction evolution phase.

2. The Importance of Quality Management in the Construction Phase of Housing Projects

2.1 Ensuring Life and Property Safety

Housing projects, being the primary environments within which people live and work on a day to day basis, very much has a property which speaks to their life and property security. 1Setting strict standardsStarting from foundation works, effectively control of key indicators such as bearing capacity of piles and strength of concrete could bear natural disasters such as earthquakes and strong winds, thus ensuring the safety of building structure. In the main structure construction phase, through strict control of reinforcement bars specifications and standards, concrete pouring and curing process to prevent structural cracks, insufficient strength caused by major accidents (such as during the usage stage of collapse) ^[1].

2.2 Improving Functional Performance

Activity CoachFor housing projects, the functional performance is practice for living and working needs. This is why it allows for a quality supervision and management during the construction, that ultimately decide on realizing the will of functions with which we designed our Building's. From the perspective of interior decoration, reasonable selection of materials and precise construction process can ensure the flatness of the wall, the wear resistance of floor and airtightness of door/window so that people could have a comfortable living/working environment ^[2]. During the process of installing various kinds of equipment (such as plumbing, electrical, and HVAC (Heating, Ventilation and Air Conditioning), stringent quality management helps to ensure that it works normally when the building is used without some problems such as water leakage, electrical leakage,

poor ventilation system occur in order to improve the convenience and comfort level of using buildings.

2.3 Promoting Sustainable Development of Enterprises

Sustainable development lies in quality control during the construction phase of construction enterprises. Great projects will help the enterprise create a good brand image, gain trust in owners and recognition in the market. In today's competitive construction market, reputation is an important assist to help enterprises win more projects. Once the quality of construction is a problem, it will not only rework increases, but also have to pay for additional costs, and reputation hurt the enterprise's position in market competitiveness.

2.4 Promoting Socio-Economic Development

Quality management during construction of housing works is one of the most crucial parts in socio-economic field, contributing to the implementation, completion and success for funds that are always a necessary need for promoting socio-economic development. This can facilitate the efficient utilization of land resources and promote the construction and development of urban housing projects ^[3]. Doing this saves on future maintenance and renovation and thereby, makes building high-quality buildings less of a waste of social resources. Housing projects consist of related industries factories, such as building materials products, mechanical equipment and labour service can drive the development of all these related enterprises (factories) are also created a large number of employment opportunities for society to promote economic growth.

3. Factors Affecting Quality in the Construction Phase of Housing Projects

3.1 Human Factors

Housing Project Construction Training: Personnel The effective quality, competency of personnel plays a decisive role in project quality. Anyone from management levels to frontline operators, have the ability to influence project quality. Management cadres (project managers, technical leaders, etc.) should have enough project management experience and professional knowledge, so as to be able to work out scientific and reasonable construction plans and management methods ^[4]. In case management personnel make wrong decisions or issues during the management, that may cause a rigorous construction progress and a reduction of quality standard. The operator skill level and sense of responsibility at the frontline are equally essential. The technical level of masonry is directly related to the flatness and verticality of walls, and whether they operate with reinforcement bar workers according to regulations directly relates to the tying quality and structural safety. Operator awareness of safety and quality also contributes to project pursuit. Safety accidents may cause project progress and quality problems if safety operating procedures are not strictly followed by operators.

3.2 Material Factors

Materials are the macro-physical substrate of the housing project. Material quality directly influences the overall project quality. In ordinary housing construction projects, if the performance indicators of cement (including strength grade and stability) do not meet relevant provisions, it will directly lead to concrete strength that cannot meet requirements because the load-bearing capacity of the structure is insufficient; in addition, if the mechanical properties of subsequent-used steel fall below the passing line, then long-term stress on structural parts may cause brittle fracture and endanger building safety; if mud content or gradation of sand and gravel are unreasonable, it can also affect compactness and durability of concrete. This provisioning of material quality is also influenced by links such as procurement, transportation and storage Poor quality building materials (e.g. sourcing counterfeit or inferior materials, being damaged in transit or during storage) can adversely affect quality at project level.

3.3 Mechanical Factors

Tools are mechanical equipment used for housing projects. It plays a big role in determining project quality due to its performance and condition. Different types of mechanical equipment are suited for different types of housing projects. Specification for mechanical equipment: tower cranes, concrete mixers, reinforcement processing with performance parameters to meet construction requirements (eg lifting capacity and height of crane, mixing capacity and duration of mixer). If not, it will be a hammer on construction efficiency or might even affect the completion of set construction tasks ^[5]. Keeping your mechanical equipment maintained is another critical thing to do. Maintenance keeps the equipment operational under normal conditions and minimizes chances of failure. Poor mechanical equipment in long-term operation state, not only can affect construction quality, but also may induce safety accidents severely.

3.4 Environmental Factors

The influence of environmental issues with respect to the erecting of the housing project also shouldn't be forgotten. Environmental factors are mainly divided into natural and social environments; from the perspective of the natural environment, there are temperature, humidity, wind, rain, lightning and other factors that impact construction execution and project quality. So if you pour concrete in the heat, water can evaporate out of that slab very quickly. For the last sub-class, the social environment which includes surrounding environment of construction site and traffic can affect on progress. For example, if the construction area is close to residential areas, noise and dust pollution during the construction process will cause dissatisfaction among local residents.

4. Quality Management Strategies for the Construction Phase of Housing Projects

4.1 Quality Management in the Construction Preparation Stage

The construction unit shall set up a quality management system, clearly define the responsibilities of various departments related to quality management and establish quality management objectives and plans so that there are regulations to follow in quality management work. Enhance the monitoring and evaluation of the performance of the quality management system; ensure its effective implementation.

Managers need to have enough quality management experience, good organization and coordination capabilities, integrity; technical personnel should be familiar with professional technical knowledge, normative standards; construction personnel must go through strict screening and professional skills training to master construction techniques and operating procedures, ensure that they have corresponding qualification capabilities; strictly control material procurement, choose reputable quality suppliers that meet standards, for incoming materials must do a good job of inspection testing to meet the quality requirements. Robustly reject and retrieve non-conforming materials. At the same time, you should organize materials that are harmless to human health and effectively store and preserve them with better conditions; based on construction requirements, reasonable selection of construction machinery is also required, adjusting construction machinery when arriving at the site combined with checking and repairing devices make sure that machinery works well in accordance with standards ^[6]. In the stage of using, keep machinery in good condition (regularly through maintenance and service), let professionals carry out joint reviews of construction drawings to ensure that the design processes together with planned drafts are reasonable and implementable; based on project characteristics as well as actual conditions, support reasonable and scientific construction environments along with technical factors; write special building schemes for key procedures plus special links in addition to promptly ensuring that construction personnel are mindful of the points along with quality specifications for execution; explore sensitive factors or natural environment collectively with social environment near all over building site normally formulating corresponding environmental management measures. Such as, install enclosure around the construction site to ease the influence of construction activity on the

surrounding environment; implement prevention measures during heat-stroke when work in high temperature season; do well with mitigative work before construction in rainy season.

4.2 Quality Management During the Construction Process

Construction process is the basic unit to constitute construction quality. The essence of ensuring project quality is to focus on strengthening the process quality control. Inspect construction conditions before each process and implement a certain standard; strictly follow the construction techniques and operating procedures during the construction work, strengthen self-inspection, mutual inspection and special inspection for quality, discover quality problems in time Cia ^[7]. Each process that has been completed has to be checked before the next one starts. The quality of the total project is directly related to the quality of key parts and hidden works. Establish quality control and strengthen supervision and inspection for key parts like foundation and major structure. Works covered up need to be approved before they are covered. At the time of acceptance, they record concealed works as well to trace quality: hidden work acceptance books. Once quality problems occur during the construction phase, instant evaluation of the problem. As for the problems of general quality, it can be dealt with by the construction unit itself. In case of serious quality problems, we will summon experts for demonstration and treatment plan will be drafted according to the reason & strict implementation of the plan and acceptances matters in order to ensure the seriousness of quality problems have been resolved.

4.3 Quality Management in the Completion Acceptance Stage

Completion data is a crucial indicator that underscores the quality of the projects. According to the relevant regulations and requirements, the construction unit shall be responsible for organizing and archiving various data in this stage. Completion data should be real and true, inclusive of construction drawing dimensional map, construction records, review reports; acceptance documents etc. The completion acceptance is the last procedure in housing project equipment. Construction unit (owners) with the participation of design, construction, supervision units organized the self-inspection to ensure projects meet quality requirements. Acceptability work, check strictly according to the acceptance standard. Do not hesitate and fix the problems if you find any. Handling completion acceptance filing procedures, the outcome of acceptance is qualified ^[8].

4.4 Practical Case Analysis

A housing project with a construction area of 50,000 square meters and 25 floors above ground (a special-type housing structure) using a frame-shear wall one. Here is a proper use of the new forming stage: In the phase of construction, a number of effective quality control methods were used by the construction unit such as selecting experienced managers and technicians to form project management teams and organizing systematic training for construction personnel to improve workers' awareness and capability. Meanwhile, they have also set stringent rules in purchasing and inspecting materials for construction; conducting strict inspection and test of major incoming materials such as steel, cement and bricks to ensure the quality of input material is up to the request; strengthening material enforcement quality control at each step, focusing on key steps like concrete pouring and rebar tying again so that there are alone personnel responsible for supervision of this stage. For example, monitoring and keeping track of the completion status of buildings during construction they found cracks in some walls, the construction unit immediately organized technical personnel to analyze, determine causes and treatment plans, practice tracking throughout the process. The project passed the completion acceptance inspection in the end with good quality standards and high evaluations done by the construction unit as well as related departments, bringing both social benefits and economic profits to this enterprise.

5. Conclusion

Quality management is an essential part of project success in the construction phase of housing projects. Through a set of quality management strategies that are scientific, systematic and

comprehensive, it can prevent and reduce the occurrence of quality problems and ensure that the project structure is solid, complete functions, meet the design requirements and user expectations. In the future development of housing projects, it is necessary to keep up with the pace of the times, vigorously carry out new technology and new method application, constantly improve quality management system level, strengthen communication and cooperation among all participating parties (including government departments), give full play to the integrated promotion role of quality assurance mechanism (system) in construction related fields, built a solid synergy for quality control, building safe comfortable beautiful living and working environment for human beings and Promotion of long-term healthy construction industry development.

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