

Maintenance Management for Buildings



ISBN: 978-81-924713-8-9

S. Arunachalam
Anna University

1. Overview

Building maintenance is technical and associated administrative actions. Maintenance activities are steady state activities involving close watch and immediate remedial action. It is largely governed by quality based actions. Indian standards code of practice 15183(Part 1, 2, 3) provides guidelines for maintenance management in buildings. Economic appraisal, performance appraisal and market value appraisal of building require maintenance management organization. Currently buildings are of vertical growth nature. The involvement of maintenance management organization is on demand from project feasibility stage till life span of the building. Nevertheless the building permit authority is not insisting for an inbuilt registered maintenance management office or organization to clear the sanctioned plan for execution. Rarely the government based organizations, e.g. Public Works Department, have maintenance management office section to involve in building planning and budget committee to sanction the project and then to monitor all stages of execution. Buildings built a few decades earlier have fallen for maintenance currently. Regular maintenance shall avoid repair and rehabilitation.

It is the role and duty of the maintenance management organization responsible for the building project. The maintenance management organization budget shall be inbuilt in the total project cost. It has to be a part of project formulation job. The management organization will have quality assurance and quality control of overall project from inception to execution to completion and further chain link of maintenance monitoring till the life span of the buildings. Currently the building safety is a threat for the old buildings. In the current building project, building surveillance systems, building health monitoring, smart building intelligence monitoring are combined as building maintenance management role. International residential code and the local code of our government and the state level local authority guidelines to be totally reviewed and systematically integrated and rules and regulations are established for building maintenance office for every tall building projects in India.

2. Introduction

In a perfect world every building would be laid exactly as specified. In the real world people make mistakes. Many specifications say nothing about what happens due to human mistakes. When problem occur, there is no clear course of action. The designer may try to reject a whole building for one or two minor flaws. The builder will want to repair the building as cheaper as possible, (or) may argue that it is usable despite its defects. Sometimes the two parties reach a compromise which may or may not meet the user needs. At other times there is no meeting of minds, and the matter goes to court (or) orbit ration. Many controversies can be prevented by deciding on the remedy before the problem occurs. Total solutions including "Formulate – Design – Build – Commission" expertise, advanced system like building information modules, a global supply chain and unrivalled project management expertise is essential. Thus a management organization is a must in every construction company and the local authority issuing permit also should essentially have such organization to check all agencies clearances, quality specifications, quality assurance, quality control and to have quality audit.

3. Quality Construction Management

Quality Construction Management in construction project advocates commitment to customer satisfaction through continuous improvement and innovation. It is an organized approach of management for total quality, for effectiveness and competitiveness, involving each and every activity and personnel at all levels of an organization.

Quality in the Building Construction Industry has to meet the requirements of the owner, architect, designer, contractor, building officials and regulatory agencies. A high quality building project can be adjudged by the management team in terms of clarity of the project proposal which contain clarity on the budget and finance flow and emphasis on the market value of the project; Clarity in the clearances, rules, regulations, contractual obligations and documents clarity in the drawings, plans, details and specifications; Clarity in the optimistic construction management systems and energy efficient maintenance systems like equipment selection and operation and maintenance management; material selection, inventory and resource planning, resource levelling, clarity in various construction packages, their integration and optimistic network of construction techniques, activities and time management in construction and quality control on the product at all levels of the project and clearing wastes and quality, keeping clean and safe for human safety and environmental aspects.

Assurance in the construction demands the conceived and designed products to be finally achieved. In such cases the finished building confirms the project requirements and performs satisfactorily throughout its life span fixed.

In such case there is no necessity for repair rather than only maintaining daily and periodically checking the perfectness in all respects. This role is the part of the quality management organization, which is lacking in most of the construction industries, leading to quality sacrifice, development of complexity problems during completion and after completion of the project. The

owner is not knowledgeable and so he has to be made clear the importance of the management team and the budget art of it and its value.

For quality control codes are available. Quality control in construction involves minimum standards of materials and workmanship by testing and acceptance criteria. Quality Audit examines the quality activities comply with the requirements control.

Quality of design is important that the design team in a project identifies the tasks which are necessary to assure quality, and insists that these be included in the project's design phase costs. The owners expect quality in the completed project, but are unaware of the effort required to deliver it. Hence, the implications in loss of quality in accelerated projects, fast-track and informal procedures, rejection of recommendations by professionals or cutting the budget midway should be explained to the owner.

To establish a formal QA programme, the procedure below can be followed

- Develop the project procedure manual. This document, prepared under direction of the project manager, describes the requirements related to the performance of the project.
- Develop the written project programme. This describes the owner's requirements, design parameters, codes, standards, materials, design concepts and constructability.
- Standard procedures should be established to define the checks to be carried out, to identify the checker and to determine approval requirements. It is necessary to check the design calculations, drawings, specifications, estimates of construction cost and relevant construction documents. The checking should be performed by qualified individuals/third party not directly involved in the design or supervision of the work.
- Review coordination of the work performed by various disciplines. Many projects contain drawings and other documents from several disciplines such as civil, structural, heating-ventilation-air-conditioning (HVAC) and electrical. A procedure should be established for checking the document from each discipline and integrating them as a single set of construction documents to achieve the desired result.

Finally, the following may be performed before releasing the construction documents.

- Review by project manager
- Review by design professional
- Third party proof check / peer review
- Final acceptance by the owner.

Quality control in construction typically involves ensuring compliance with minimum standards of material and workmanship. The minimum standards are contained in the specifications. Quality requirements should be clear and verifiable, so that all parties in the project can understand the requirements. In construction, random samples and statistical methods are commonly used as the basis for accepting or rejecting batches of materials.

IS/ISO 9000-2005, IS/ISO 9001-2000, and IS/ISO 10005-1995, are more informative at the project team has to strictly enforce to keep quality based on the above codes and the local authority management team should audit the same regularity, frequently and stage by stage and order for progress without time delay. Given a latest style project, number of items not covered by the code is prevailing. The management team has to build additional standards on the activities which are not built with the provisions and specifications of the codes.

4. Construction Quality Management Organization

The quality management team should take the following role:

- Scope of the quality plan
- Management responsibility
- Quality system
- Contract review
- Design control
- Document and data control
- Purchasing
- Inspection and testing
- Corrective and preventive action
- Control of quality records
- Quality audits
- Training

The field administration is equally important. It includes drafting quality policies, studying customer needs, conducting surveys of prospective suppliers, preparing inspection manuals and conducting training courses.

Further it has to monitor the field and laboratory testing, work and material specification. The management team has to use the following quality management documents.

- Quality manuals: Documents that provide information, both internally and externally, about the organization's quality management system.
- Quality plans: Documents that describe how the quality management system is applied to a specific project or contract.

- Specifications: Documents stating the requirements for construction.
- Guidelines: Documents stating recommendations or suggestions for better quality.
- Procedures, work instructions and drawings: These documents provide information about how to perform the activities consistently.
- Records: These documents provide the results of activities performed.

5. Maintenance Policy

The owner's requirements are fulfilled, functional suitability is achieved and physical performance is achieved. Maintenance department budget and planning and control of finance to get return for investment by the owner. Optimizing the works to allocate minimum fund. Selection of most appropriate equipment and method of execution.

The contract plans and specifications should be checked for any testing requirements, sampling frequency, acceptance criteria and tolerances. Easy checklists should be developed to assist the field inspectors in assessing the conformance to all requirements and to ensure proper record keeping. There should be maintenance of the testing equipment.

6. Draft Model National Residential Code

A national residential code has to be drafted to safeguard the public health and safety. The code shall accommodate perspective provisions as management part and high performance provisions as technical part. National house building associations like the Confederation of Real Estate Developers' Associations of India (CREDAI) should join with building development and maintenance regulation enforcing officials like Chennai Metropolitan Development Authority (CMDA) and establish a management organization division to take the management role as discussed above from the projects initiation to completion and maintenance periods.

7. Case Studies to Thrust for Management Division in Apartment Organization & Apartment Permit Clearing Organization

Recently one of a twin tall building complex built in Chennai collapsed during construction and many people died. Another incident in Chennai of unsafe living apartment due to lack of monitoring surveillance systems. This case study is explained below.

TVH Lumbini Square, Chennai is spread over 1 million square feet and containing nine, nineteen storied blocks and around 500 residential units. It is one of the premium residential locations, which boasts of all comforts, luxuries and aesthetic appeal per the latest trends in luxury housing. The residency, despite having good physical surveillance, lacked an effective video surveillance system to commensurate with other luxuries. The society had only 30 analog cameras to monitor for safety and protection of people. Out of these 30 only 16 were functional.

Threat Perceptions

Unlike any usual residential society, the threat perception was real and grave as the locality housed rich people including many HNIS. Apart from usual incidences of burglaries, road accidents and loitering, the potential for kidnappings and harassments was significant. The safety of the kids playing in the area needed high definition surveillance.

Limitations of Previous System

The previous system relied on video surveillance with 30 analog cameras with video quality of low resolution, which was just capable of capturing the movements, but the picture quality was very poor, which in itself was considered to be out-dated. The infrastructure was made up of armored cables (RJ6 and power cable in a single medium) and coaxial cables which were prone to damage and were costly to maintain and repair. Besides, cables deprived project installers of cost cut benefits.

Expectations from the New System

Fed up long experience of security breaches and escaping of culprits, authorities felt the strong need presence of effective surveillance cameras to secure entire area with face recognition and identification. The other features they looked forward to include the following :

- Clarity vision of HD for easy recognition
- Functional surveillance cameras 24x7 availability
- Night vision CCTV cameras
- Centralized control room
- Cost effectiveness and value for money
- High efficiency of the system
- No extra cost of cabling
- Warranty and service

Factors considered before Implementing the New Solution.

The following points were of utmost importance:

- Safety measures of the client
- Covering the entire area
- Covering every possible extent of the total area for surveillance
- To fit into the client's budget while maintaining high quality
- Cost consideration, as armored cables expensive.

Important features of Deployment

This is the biggest surveillance project in Chennai till now with 162 HDCVI cameras of 1 mega pixel photo quality installed to cover the entire area. The other significant points were

- Installation of surveillance cameras at elevators
- Mainly dome and bullet cameras were used
- Rendering 3 years warranty and services

Neither the National Building code of India 2005 insists nor the local building permit authority checks above discussed facts. Thus the essential of maintenance management organization for building development and maintenance is emphasized.

8. Conclusion

The necessity of building development and maintenance management organization is emphasized. ; Especially for tall building project developers. The necessity of building development and maintenance management department is emphasized to local building permit authority. This organizations services are present as thrust for the public health and safety. It is revealed with few case studies.

9. References

1. IS/ISO 9000: 2005, "Quality Management Systems – Fundamentals and Vocabulary", Bureau of Indian Standards.
2. IS/ISO 9001: 2000, "Quality Management Systems – Requirements", Bureau of Indian Standards.
3. IS/ISO 10005: 1995, "Quality Management – Guidelines for Quality Plans", Bureau of Indian Standards.
4. National Building code of India 2005