

Review Paper On Building Maintenance Strategy And Property Management Framework

Mr. Rutvik M. Kandalkar¹, Prof. H. B. Dahake²

¹PG Student, Civil Engineering Department

²Assistant Professor, Civil Engineering Department

G H Raisoni University, Amravati, Maharashtra, India

Abstract

This paper presents an extensive literature review on building maintenance and property management strategies with a focus on improving the lifecycle performance of buildings. Rapid urbanization and infrastructure development have increased the need for effective maintenance management systems. This review analyzes past studies related to maintenance strategies, inspection methods, structural defect identification, preventive maintenance planning, and digital building management systems. Different international practices and research contributions from 1990 to recent years are examined to understand the evolution of maintenance approaches. The review highlights the importance of preventive and predictive maintenance, systematic inspection procedures, and data-driven decision support systems in modern building management. The study also identifies key research gaps in maintenance planning for small and medium-scale buildings, particularly in developing cities. The findings suggest that integrated maintenance frameworks and digital information systems are essential for sustainable infrastructure management and improved building performance.

Keywords: Literature Review, Building Maintenance, Property Management, Preventive Maintenance, Structural Defects, Maintenance Management Systems

1. Introduction

Buildings represent one of the most valuable assets in urban infrastructure and require continuous maintenance to ensure safety, durability, and functional performance. Over time, building components deteriorate due to environmental exposure, aging of materials, poor workmanship, and lack of timely maintenance. Without systematic maintenance strategies, minor defects can develop into major structural failures, leading to high repair costs and safety risks.

In recent decades, the importance of building maintenance management has gained increasing attention from researchers and industry professionals. Maintenance activities include inspection, repair, replacement, and monitoring of building components to maintain the structure in safe and serviceable conditions. Effective maintenance not only prolongs the service life of buildings but also improves occupant safety, comfort, and overall property value.

The objective of this paper is to review existing literature related to building maintenance strategies and property management practices. The review focuses on identifying common maintenance challenges, inspection methods, maintenance planning techniques, and the integration of digital technologies in modern maintenance systems.

2. Concept of Building Maintenance

Building maintenance refers to the combination of technical and administrative activities required to retain a building in a condition where it can perform its intended function. According to BS 3811 standards, maintenance includes actions such as repair, replacement, servicing, and inspection of building components to maintain operational efficiency.

Maintenance activities are generally classified into different categories including routine maintenance, preventive maintenance, corrective maintenance, and predictive maintenance. Routine maintenance involves regular inspection and minor repair activities such as cleaning, painting, and servicing mechanical systems. Preventive maintenance focuses on planned activities carried out periodically to avoid major failures. Corrective maintenance is performed after defects or failures occur, while predictive maintenance uses monitoring techniques to predict future failures based on the condition of building components.

The adoption of appropriate maintenance strategies is essential to ensure long-term sustainability and minimize lifecycle costs of buildings.

3. Review of Previous Studies

Horner, El-Haram, and Munns (1997) conducted one of the early studies on building maintenance strategies and highlighted the importance of identifying critical failure components in buildings. The study suggested that maintenance planning should focus on high-risk elements such as structural components, roofing systems, and building services.

Olanrewaju (2010) defined building maintenance as a systematic process that ensures the building continues to perform its intended function throughout its lifecycle. The research emphasized that maintenance should focus not only on the physical condition of buildings but also on the needs of occupants and users.

Wright (1990) introduced façade inspection regulations in several major cities including New York and Chicago. The study emphasized mandatory building inspections to prevent structural failures caused by deterioration of exterior building components.

Small (2009) discussed the importance of preventive maintenance programs and concluded that regular inspections and early defect detection significantly reduce long-term repair costs. The study recommended structured maintenance schedules to ensure efficient resource utilization.

Kangwa and Olubodun identified major constraints in building maintenance activities, including lack of skilled personnel, inadequate financial resources, and poor maintenance planning. Their research highlighted the need for improved maintenance management systems.

Recent research studies have also explored the integration of digital technologies such as Building Management Systems (BMS), facility management software, and data analytics for improving maintenance decision-making. These technologies allow building managers to monitor building conditions, track maintenance history, and optimize maintenance scheduling.

4. Building Defects and Maintenance Challenges

Building defects are one of the major concerns in maintenance management. Common structural defects observed in buildings include cracks in walls and beams, water seepage, concrete spalling, corrosion of reinforcement, and deterioration of finishes. These defects occur due to several factors including poor construction quality, environmental exposure, improper material selection, and aging of building components.

Water seepage is one of the most frequently reported problems in residential and commercial buildings. It occurs due to defective waterproofing systems, cracks in external walls, and damaged drainage pipes. Structural cracks may develop due to excessive loading, settlement of foundations, thermal movements, or corrosion of reinforcement.

Effective maintenance strategies require early identification of these defects through visual inspections, non-destructive testing methods, and condition assessment techniques.

5. Modern Maintenance Management Systems

Modern building maintenance practices increasingly rely on digital technologies and integrated management systems. Building Management Systems (BMS) are widely used to monitor and control building services such as lighting, heating, ventilation, and air-conditioning systems. These systems provide real-time information about building performance and help maintenance managers detect potential failures.

Facility management software and digital maintenance records allow organizations to maintain detailed information about building components, maintenance history, inspection reports, and repair schedules. This data-driven approach improves decision-making and reduces maintenance costs.

Predictive maintenance techniques based on sensor data and condition monitoring are also gaining popularity. These methods enable early detection of component failures and allow maintenance teams to plan repairs before major damage occurs.

6. Research Gap

Although numerous studies have explored building maintenance practices, several research gaps still exist. Most existing research focuses on large infrastructure projects or commercial buildings, while limited studies address maintenance management for small and medium-scale residential buildings.

Another important gap is the lack of integrated maintenance frameworks combining technical inspection, property management practices, and digital information systems. Many developing cities still rely on traditional maintenance approaches without proper documentation and data management.

Future research should focus on developing comprehensive maintenance frameworks that integrate modern technologies, systematic inspection procedures, and sustainable maintenance planning strategies.

7. Conclusion

This literature review highlights the growing importance of building maintenance and property management in modern urban infrastructure. The review of previous studies indicates that preventive maintenance, systematic inspections, and digital maintenance management systems are essential for improving building performance and extending service life.

The analysis also reveals that many developing regions still face challenges related to inadequate maintenance planning, limited financial resources, and lack of skilled personnel. To address these issues, integrated maintenance frameworks and data-driven decision systems should be adopted.

Future research should emphasize sustainable maintenance strategies and the application of smart technologies to improve efficiency in building management.

References

1. Horner, R.M.W., El-Haram, M.A., & Munns, A.K. (1997). Building maintenance strategy
2. Olanrewaju, A. (2010). Building maintenance processes and practices.
3. Wright, R. (1990). Building façade inspection regulations.
4. Small, E. (2009). Preventive maintenance strategies for buildings.
5. Kangwa, J., & Olubodun, F. (2003). Maintenance management challenges.
6. Seeley, I.H. (1987). Building maintenance management.
7. Rawlinson, S., & Brett, D. (2009). Lifecycle management of buildings.



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