A CASE STUDY ON REQUIREMENTS OF QUALITY WORKMANSHP IN CONSTRUCTION PROJECTS

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ABSTRACT

Construction building projects has complexity in its nature because it is related to many factors such as quality, safety and resources. Quality workmanship is a comprehensive approach to bolster the durability, serviceability and safety aspects of the construction. Workmanship with higher standards is a positive and humanistic approach to productive management designed to bring together all levels of workforce and experience in an organization for setting standards of excellence and achieving better outcomes. With the evolving competitive market scenario, quality workmanship prepares the employees and workmen to meet the challenges of the changing time and conditions. The purpose of this study is to check the effectiveness of the quality work in view of improving quality, safety & reduction in wastage of resources in a construction project. This study reviews the implementation of quality circle and analyses the perspective of workmen and employees regarding quality of workmanship in construction process. This paper reports a case study of a residential building constructions of located in India and analysing the extent of quality workmanship achieved. Improper compaction and honeycomb issues and handling of materials and safety measures are found to be degrading the effectiveness of workmanship involved. The defects are documented and the causes for that particular problem is analysed upon. This study provides suitable remedial measures for rectifying the defects occurred within the structure and acts as a tool in executing the corrections as soon as possible.

Keywords: Quality, Workmanship, Productive, Defects, Durability.
A Case Study on Requirements of Quality Workmanship In Construction Projects


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1. INTRODUCTION

Construction has important role in their country’s development and prosperity. The requirements of quality workmanship have been widely implemented in construction projects throughout India. Quality is defined as “Fitness for the intended use”. Workmanship is may be defined as “The quality of work that is done by a concerned person”. Negligence of personnel at work is the major reason for most number of defects occurring in construction projects. Building Research Establishment (BRE) indicates that 90% of building failures occur due to improper execution in the workmanship defects, design and construction stages. They include very poor communication, inadequate information, and irregular controls.

Durability and Serviceability are major concern in construction projects. These can be ensured only through quality materials and quality workmanship, as they have a greater impact over quality workmanship. The construction projects in India to introducing quality workmanship due to clients argument they are providing quality assurance up to certain period. The rate at which the work is accomplished is lower as the rapid rate of major defects in building occurs as a result of poor quality materials and workmanship, identified as the prime cause of defects in building projects. This will affect the quality of life of occupants and also giving bad image of the parties involved in the construction projects. Poor supervision on site also contributes to poor workmanship during construction and lack of experience and issue of labour competency.

2. LITERATURE STUDY

Hanifi Binici et al. (2006) have reported the occurrence of many defects caused due to usage of low quality of concrete and improper gradation of aggregates. The aggregate utilised is not clean and the quantity of cement is not sufficient and heavy masonry building buildings constructed using heavy rocks must be avoided. A.S.Ali et.al (2011) investigated the performance of construction projects and the development of workmanship through a structured questionnaire among top personnel. Lack of experience and competency of labours are the prime factors affecting the quality of workmanship. N.A.Othman et.al (2014), studied the extent of workmanship among low cost housing. About 90% of the project failures occur due to poor communication, inadequate checks and controls and lack of technical expertise relating to the respective construction projects. Neha.V.Bagdiya (2015) improved the quality and minimises the cost of construction examining the defects along the construction site considered. Lack of maintenance and ineffective usage of materials are also found to be the most primitive issues degrading the quality of many projects.
3. METHODOLOGY
The methodology adopted in this study is shown in the following figure.

![Methodology flowchart](image)

4. DATA COLLECTION
The defects arise due to the workmanship in construction projects are identified considering various case studies pertaining to residential construction projects. The case studies were considered with the percentile of defects found, which provides as a base for study. Three real life case studies were considered and the site details were collected. The sites were surveyed completely and the defects were photographed and documented.

**Case 1: Brigade enterprises limited, Bangalore, India**
The building under consideration is a residential structure having seven blocks, each of fifteen floors. The structure is in its final stages of completion and the defects identified are photographed and documented.

**Case 2: Jain Constructions, Chennai, India**
Residential apartments in the southern part of Chennai, have a number of defects occurred due to poor workmanship and the work went on to its final completion along with these defects. This structure needs attention to its rectify flaws and the details of the defects are analysed to administer suitable remedies so as to increase the building’s efficiency.

**Case 3: SRMT Homes, Kakinada, India**
The building under study includes both residential and commercial buildings which contains many defects and finished work with low quality workmanship. This project needs to be monitored in order to identify and rectify the defects caused before the completion of the entire work.
5. COMMON DEFECTS AFFECTING QUALITY OF WORK

Compaction Defects
Not utilising proper methods of compaction at the time of execution and hence affects the quality of the finished product to a greater extent as seen in the pictures given below.

![Compaction defects along the structure](image)

Defects in the Reinforcement
Suitable measures are not adopted to prevent the chemical attack and providing proper ties and joints leads to movement of steel over the concrete matrix and hence developed deteriorate in the entire structure. The following figure shows the errors caused due to improper handling of reinforcement at the construction site.
6. PLASTERING AND FINISHING ISSUES

Honey Comb Issues
The honeycomb issues governing the problems related to plastering from the case studies are shown below.

Defects Due To Improper Shuttering Used In Construction
Presence of inadequate joints and the method of handling shuttering affect the efficiency of the final product which deteriorates the life of the entire structure.
7. DISCUSSION

Compaction Issues
Due to improper compaction techniques, partial expulsion of air and improper settling of aggregates in the building component occurs and develops further with time. Proper internal, external and surface vibration methods should be executed with skilled personnel and under experienced supervision. In current scenario, needle vibration is found to be most effective, economical method of compacting cement concrete as it comes in different sizes and the rate of vibration is optimum compared to other compaction methods available.

Steel Reinforcement Issues
The quality and depth of concrete in the cover zone of the concrete component are of prime importance in minimising the risk of reinforcement corrosion. Optimum size of cover need to be provided as per the exposure conditions in which the structure is being executed. Coating of reinforcement using epoxy resins is recommended as an effective method in preventing the steel reinforcement from getting corroded.

Honeycomb Issues
Adopting appropriate design mix, optimum workability at the time of concreting, nominal cover for the steel reinforcement and effective vibrating methods reduce the honeycomb formation along the matrix to a greater extent. Surface pressure grouting with cement based chemicals can be adopted to prevent honeycomb issues. Materials such as polymer-cement slurry, epoxy resins, urethane and high-molecular-weight methacrylate (HMWM) are utilised as the grouting materials.

Plastering and Finishing Issues
Improper adhesion due to low adsorption on the surface leads to development of issues during plastering of concrete surfaces. The mix with limestone or aggregate containing traces of granite indicates higher risk of failure as the thermal expansion property is very much lower.

8. CONCLUSION
Poor workmanship constitutes most of the defects and failures occurring in the building structure. Out of all the structures, the residential building tends to be the victim of poor workmanship during construction. Problems arising out of improper compaction techniques, reinforcement issues, and other failures occur due to negligence of the supervision of the concerned organisation. Optimum remedial measures are discussed to counteract the failures.
and delicate supervision over the construction works is mandatory in achieving higher quality workmanship in executing the proposed work. The workers employed in construction of well trained and having good awareness on the concepts of quality workmanship.

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REFERENCES


