

Defects and Post-Construction Defects Effect in Residential Building

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Abstract—Defects in the building play pivot role in the performance of the building during post construction stages i.e. in the occupancy stage. There is no need to develop specified method to measure quality due to lack of quality measurement methods. It is noticed that there are a number of problems in the construction Industry caused by bad quality control, and the situation seems to getting worse. Projects are frequently late, over budget and suffer from poor workmanship and materials. Conflict is increasing, resulting in litigation and arbitration with depressing regularity. There may be failure of contracting firms happen due to poor buildings performance problems. Understand the aspects related to defects for the building construction projects and its impacting factors will make it possible to handle the quality problems much better. In this paper to work out remedial measures on causes of under consideration so as to minimize post-construction defects

Keywords— *Defects, Post Construction defects, failure, Impact Index.*

I. INTRODUCTION

Defects within buildings are areas of non compliance with the building code of India, various Indian Standards and published acceptable tolerances and standards. Defective building construction not only contributes to the final cost of the product but also to the cost of maintenance which can be substantial. Defective construction may lead to complete failure of structure. The construction industry all around the world is getting modern, advance and growing day by day with the help of information technology age. Housing Project represents a significant part of our society. Construction defects become a global issue facing by practitioners and researchers around the world. Defects can affect success of construction project significantly. More specifically, it has major impact on construction cost, construction time, and productivity and sustainability aspects also on customer satisfaction. The aim of this paper is to contribute to the knowledge of defect profile of residential buildings regarding defect number, type, location, severity and responsible trades. It also identifies various factors causing construction defects and hence to find mitigating measures to reduce defects. Therefore, eliminating defects and maintaining good quality have an important cost benefit for the society.

Features of construction industry

Construction projects are constructed by either Govt. organizations or by the private sector. Most public work projects are awarded in a competitive bid. Professional designers and constructors are engaged in separate contracts. The contractors usually would not be involved until the designs have been completed. The private sector is usually following the same approach in executing its construction projects.

One of the competitions which construction industry facing is people want to pay more to buy better quality houses for the better living. To build an affordable and good quality housing schemes government has to use the strategic planning to overcome this issue. Another important aspect of the construction industry is the residential part, the planning and the development of residential properties which hold special interest for estate management surveyors. The construction industry's reputation has been diminished by poor quality performance. Overall impact of construction defects are dissatisfaction of property owners and erode the confidence of the financiers, buyers, and end users of construction projects.

POST-CONSTRUCTION DEFECT:

1 Defective concrete, Spelling or lose plaster in ceilings

Symptoms:

- ❖ Surface with water/rust staining, water leakage
- ❖ Patterned Cracking
- ❖ Bulging, falling of concrete patches with reinforcement exposed
- ❖ Falling off of plaster/tiles

Causes:

Defective concrete as a result of ageing is commonly found in old buildings. Persistent water leakage may affect the steel reinforcement. Weak concrete caused by the use of salty water in concrete mix, or overloading are common causes in spelling.

2 WATER SEEPAGE FROM EXTERNAL WALL, WINDOW, ROOF, OR FROM CEILING:

Symptoms:

- ❖ Water staining
- ❖ Peeling off of paint or wall paper
- ❖ Water dripping ❖ Growth of fungus
- ❖ Defective concrete, Plaster or tiles
- ❖ Rust staining

Causes:

External Water Seepage could be due to a variety of reasons including cracks on external wall, honey comb concrete, defective water proofing membrane at roof, defective external water and drainage pipes etc.

3 Structural cracks in walls:

Symptoms:

- ❖ Cracks that penetrate through finishes into the concrete or bricks
- ❖ Long, continuous cracks across width of wall
- ❖ Diagonal cracks at corners of windows or door
- ❖ Cracks with rust staining

Causes:

Structural cracks may be caused by many factors e.g. Excessive movement of the building structure, unwanted ground settlement, serious overloading, weakness caused by corrosion/deterioration of materials, or damage by accidents, or poor design/construction etc. Detailed investigation must be carried out to identify the causes which must be removed or rectified before the cracks are repaired

RESEARCH OBJECTIVES

- i. To identify the factors responsible for the defects in construction.
- ii. For each important defect identified, the contributions of sources or causes are to comp.
- iii. To work out remedial measures on causes of under consideration so as to minimize post-construction defects.

SCOPE OF STUDY:

Scope of study will cover how to avoid or minimize the defect in construction project. The study is needed to apply those defects concept in planning, scheduling and field operation. As India developing country this study is essential to develop future infrastructure under economical basis. So that it will contribute to the importance of growth rate potential and also to increase competitiveness of economy.

DATA ANALYSIS

IMPACT INDEX:

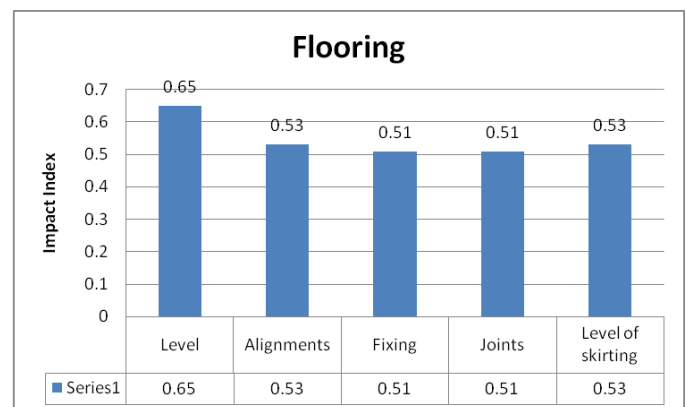
Factors causing defect overrun were identified during literature review and interviews with client, engineer, contractors and consultants. These factors were then ranked according to their impact with an equation developed as impact Index. It's defined as the ratio of product of frequency of getting the same score (here, low, medium or high) to the no of total number of responses. Impact Index is helpful in determining the impact of factors causing defect

It's used to rank the factors. In this report factors are ranked according to impact index. Impact Index (I.I) is given by

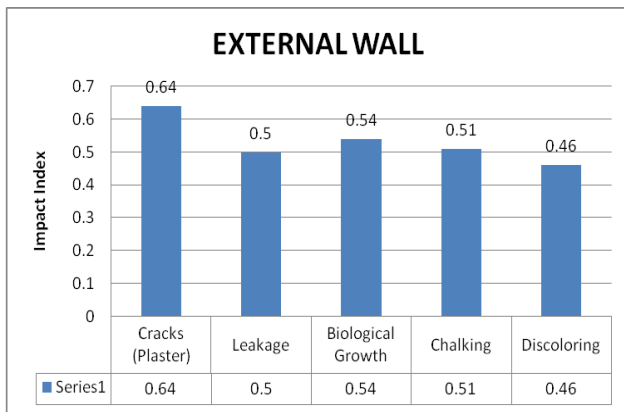
$$I.I = (\sum F r \times r / N),$$

Where, r= severity score Low=1, medium=2, high= 3 F= frequency of factors getting score r. N= total no of respondents

| FACTOR ID | FACTOR DESCRIPTION | IMPACT INDEX |
|-----------|--------------------|--------------|
| FLOOR | | |
| A-1 | Level | 0.65 |
| A-2 | Alignments | 0.53 |
| A-3 | Fixing | 0.51 |
| A-4 | Joints | 0.51 |
| A-5 | Level of skirting | 0.63 |



| FACTOR ID | FACTOR DESCRIPTION | IMPACT INDEX |
|---------------|--------------------|--------------|
| EXTERIOR WALL | | |
| B-1 | Cracks (Plaster) | 0.64 |
| B-2 | Leakage | 0.50 |
| B-3 | Biological Growth | 0.54 |
| B-4 | Chalking | 0.51 |
| A-5 | Discoloring | 0.46 |



CONCLUSION

Defects found in flooring and external wall occurring greatly (widely) in Flats. While the percentage of defects occurring in flooring and external wall in flats are same and in appearing in large percentage that is 18.35% in flooring and 17.7% in external wall.. The main reason behind this may be because many services are done here. So special care should be taken during construction stage for these building areas.

RECOMNDATIOAN:

From the above conclusions it can be observed that wetted areas are more prone to defects so it is recommended that these areas should be given more attention during the construction stage, also use of good quality materials as well as skilled supervision must be provided. So a five step process for managing the construction defects is suggested and they are as follows,

- Awareness
- Investigation
- Discovery
- Evaluation
- Treatment or remedy

These process can be termed as the life cycle of the investigation and resolution of a construction defect issue

Awareness.

The identification of the manifestation of the defect represents the initial step in the process of awareness. Confirmation and cure is the methodology by which the defect will be properly addressed and remedied.

Initially, the manifestation of the defect is usually the first clue that something is not quite right with the building and is an indication that further investigation is warranted. It is important to understand that any defect in a building is most likely the result of a failure of a specific building system. Failure can be broadly defined as the breakdown in the operation, function, quality, or appearance of a structure, system, component or material. Furthermore, it is important to understand that a failure is not synonymous with a defect. A defect causes something to become unsuitable for the purpose

it was intended. A defect is often a condition, quality, characteristic, or component that caused the failure. Failure is the term that is applied to the "inner mechanism" of the defect, that is the process by which the defect becomes manifest. This is called the failure mechanism and determining the failure mechanism is an essential element in the understanding of how a construction defect manifests itself.

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