International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 04 Issue: 08 | Aug -2017 www.irjet.net p-ISSN: 2395-0072

Construction standards of Residential Buildings Post-Handover

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Abstract - *The Construction industry in India is an important indicator of the development of the country. The construction industry contributes to an estimated of US$ 308 billion to nation's GDP in the year 2011-12 (around 19%). The major flaw of the industry is that it is fragmented; there are a handful of major players involved in construction across all the segments; Resulting in decreased quality of construction. To study the situation we used Post handover Evaluation (PoE) technique. It includes collecting the data from the end users about the product. One of the major benefits of this technique is that it involves the end users, which have no technical whereabouts or any knowledge of execution procedure. Hence the data collected would be genuine. Earlier studies have shown water as a major cause of defects. It causes many defects to structure, starting from minor paint peeling of seepage marks to major structural defects like cracks on structural members like beam and column.*

Keywords: Post-handover Evaluation, residential building, defect, defect analysis, survey

1.Introduction

Construction sector employs to about 33 million people and there are various different sectors which are deeply dependent on construction industry such as cement, steel, skill-enhancement, technology etc. It is ranked second on the list of employment providing sector only after agriculture in India, and is the third ranked amongst the top sectors which contribute to the Indian Economy. This industry is sub classed into namely housing, retail, hospitality and commercial. Housing is the major contributor of the construction sector. It contributes to about 5-6% of GDP of country. Residential construction is a huge sector for employment as well as income. But a major drawback of the sector is that mostly builders and employee are uneducated and hence are been exploited.

There are many players involved in a project: Client, Builder, Contractor, Consultant and Architect. And each one has their own personal interests and responsibilities.

Moreover due to no proper knowledge of procedure and the importance of steps are neglected by the labors, foreman and supervisor. This negligence result in deterioration of building condition and also reduces the service life of a structure.

These flaws in structure are generally termed as defects or construction defects. Defects are been defined in different was by different researches one of which is: Defect is been defined as non-fulfillment of a requirement related to an intended or specified use. This definition states that defect is also a state of mind which gives a feeling of dissatisfaction.

There are various classifications done by different researchers but the most common one is,

Structural Defects

The defects occurring in the structural elements: beams, column.

Non Structural Defects

The defects observed in non structural element such as wall, Plaster.

Other

These are not in dwelling directly but in secondary necessities. For example leakages or improper working of doors and windows

Few of the previous study show that few of major reasons for these defects to occur were lack of knowledge or the quality of material or negligence in workmanship. The study the prospective of residents influences hugely to the outcome of research; as the residents are the ones identifying defects and mentioning its severity.

2.Literature Review

2.1 General

Some study has been on this topic in few foreign countries like United Kingdom, China and Spain. And in those researchers have used the method of POE to find out the different defects in construction, its causes and the reasons for not using modern techniques of construction. Although post-occupancy evaluation (POE) is an old tool with huge numbers of studies on it, yet is far from becoming routine in the housing industry. The growing complexity of the structures and various emerging trends in industry further reinforces the need to carry out more of POE studies. Though few studies exist, a holistic approach is yet to be given

priority in the industry. POE is defined as "a systematic evaluation of the opinion about buildings in use, from the perspective of the people who use them." POE fulfills the objective of determining what is needed to be avoided and what needed to be repeated in their future designs. POE can also be used to document failures and successes of different building projects; this would also justify requests for renovations, additions, or simply new construction.

2.2 Earlier Papers

Zuber R. Thaddi et al. [2015] has defined post occupancy evaluation as a survey or a set of data which involves an systematic evaluation of different opinions about the buildings in use, from the perspective of the occupants who use them. The quality of residential building was directly related to the number of defects found in the construction at occupancy. These defects have majorly two reason design decision and workmanship. Post occupancy evaluation (POE) majorly depends on costumer's satisfaction which is the feeling of disappointment or pleasure resulting from comparative analysis of a product. To fix these defects we need to work on these defects. This process was referred to as "rework". It was defined as "the unnecessary effort of redoing an activity or process that was incorrectly implemented the first time."

According to the study conducted most common defects were the incorrect fixtures, incompletion of tile grouting and toilet fittings. Moreover defects like soil settlements, wall finishing problems, waterproofing issues, cracks, staining, lack of knowledge and expertise on maintenance aspects. He also proposed that defect repairs should focus on impact of weather, poor design, chemical attacks, structural movements, environmental conditions, soil, installation methods, workmanship, and maintenance and on site working conditions. In his review he has stated that Building management is done in Operational phase a building's life cycle. These involve various management activities amongst which Technical Maintenance is very sensitive. In case of abandonment these may limit the functional ability of structure further in extreme cases; there could be shortening of overall building's life cycle.

Muizz o Sanni- Anibire et al [2016] categorized the POE with its perspective i.e. Occupant's satisfaction, environmental performance and the economic value. And stated that POE helps in fulfilling all the objective of determining what are the things or activities that are needed to be repeated and which ones are needed to avoided in future designs. He divided POE into four stages or levels:

a) Indicative POE- It provides information about different major failures and successes of building's performance.
b) Investigative POEs- They are often carried out for the issues that requires to be further investigated; which were found out or defected through Indicative POE.
c) Diagnostic POEs- This is a comparison of traditional and in depth research with a specified scope and limit. This usually takes several months, sometimes a year or more to complete.

He summarized POE methods to be heavily dependent on occupant responses alone, which are sometimes over exaggerated as proven in studies through instrumental measurements of building indoor environment. POE methods include walkthrough, indoor environmental quality (IEQ) physical measurements, questionnaire survey and focus group meetings. Walkthrough is just a tour around entire facility meant for identification of issues that may be requiring immediate attention. IEQ is assessment of energy consumption and the indoor environmental conditions made with the use of instruments. Questionnaire survey is recognized as a key component of any building performance evaluation study. A survey that can be used to communicate with effectiveness about building system with facility's users and facilities management. Focused group meeting are also used to draw out more qualitative information, usually done after problem area is identified through the questionnaire survey.

Benefits of POE

It provides authenticate information collected from the persons that are influenced by the building to serve as basis for decision geared towards better housing projects in future in terms of current housing stock and design. The POE ensures that there remains accountability and responsibility from the housing managers, designers and policy makers. It helps designers avoiding all the pervious mistakes; helps the educating students; Change the prospective of the building owners, developers , occupiers, facilities managers and policy makers.

3. Methodology

1) The survey was been conducted for this research. In this survey the occupants of newly constructed building were enquired about their satisfaction, dissatisfaction and their views about the dwelling.
2) An questionnaire was prepared containing different aspect of dwelling and its amenities. This included structural, non structural and other hardware fitting. This questionnaire was prepared with the help of professionals and educational scholars.
3) The occupants were requested to mention defects besides the particular heading and were asked to rate its severity of the defect with in scale of 1-5 where 1- negligible or could be neglected and 5- very severe and needed to be attended as soon as possible.

This collected data would have a major influence of respondent's prospects and way of thinking, these residents are an important aspect of construction industry

representing the end users. They are unaware of proper techniques and process of construction.

4.Results

The survey of 25 Flats was carried out and these were the results commuted:

The following chart shows the appearance of number of particular defects. It can be observed that leakages in flats may it be external or internal is the most common defect, followed by cracks and poor finishing.

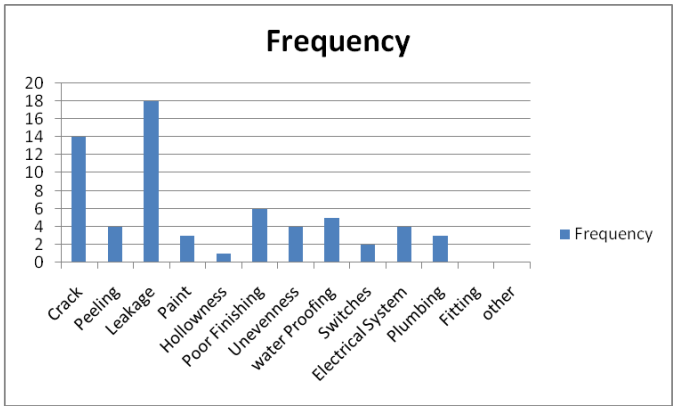


Chart -1: Frequency of defects

The following chart shows the frequency of the defects occuring at a particular room. It is clear from the values that major area of flows are Kitchen, W.C. and Bathroom, where the major chances water damages is constant threat.

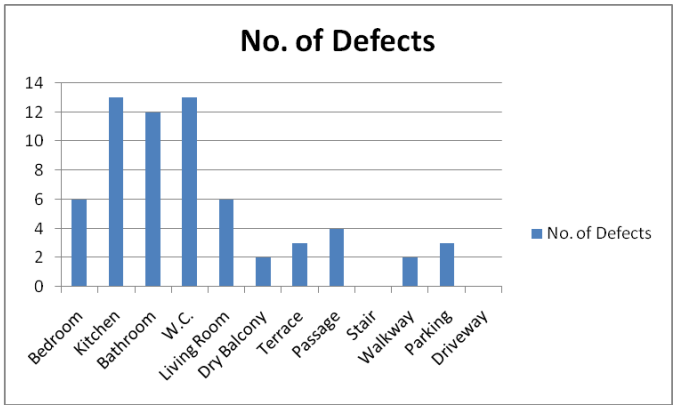
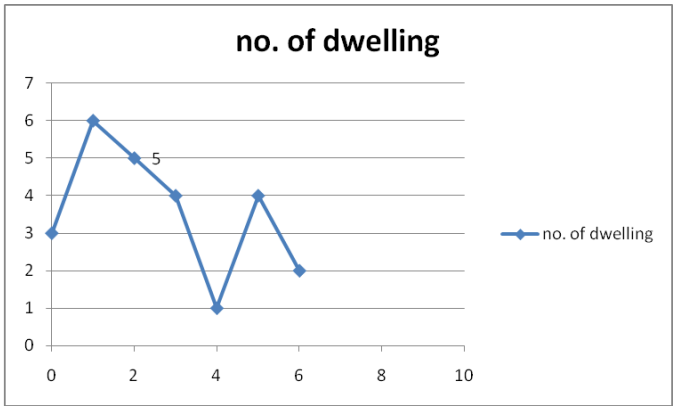


Chart -2: No. of defects vs locations

The following chart show the number of defects that are observed in a single dwelling and its mean. It was observed that the dwelling surveyed and having a single defect are mosting in the sample space.



5.Conclusions

Having gone through the obtained result, It can be concluded that leakage and cracks are the most occurring defect. And the location of maximum number of defects is kitchen, w.c. and bathroom, these are the area which has all the plumbing connections and maximum chances of leakage or plumbing issues. The reason for these defects could be poor quality of materials or poor workmanship. It is necessary for all the involved personals to come forward and be part of this type of study to raise the standards of overall construction.

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