

Reducing Defects in Project Construction

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ABSTRACT —Construction defect are always the key concern of the construction industry. Different constructed facilities generate different types of defects and demand different level & type of quality depending on function system types, and material used. Therefore, this study has been carried out to study the defect that happens in construction projects and identify the strategies in minimizing the defect in building construction project. The studies were carried out using the questionnaires which were distributed to contractor, consultant & clients. Finally the recommendation was made based on the findings. This study helps to increase the awareness of contractor, consultant & clients towards managing and minimizing the defect works. By doing this, they will bring up their construction industry in to the next level managing construction project.

Keywords: Building Defects, Construction defects.

I. INTRODUCTION

Now a day's construction defects become common and often arising or seen in the construction project, especially in the project which has poor management or supervision in the construction site. Construction defect can be known as a problem in the construction industry that could cause the value of a building decrease eventually. Those defects incur a big cost & it is defined as the value of resource consumption for rework as a consequence of a defect. The causes of these construction defects are either because of poor design, or low-quality workmanship, or because the building was not constructed according to the design, or because it has been subject to factors not allowed for in the design or poor supervision. Construction defect can decrease and affect the value of the buildings. Other than reduces the project value, where the construction defect is apparent, it also can cause the project to delay which means not complete with in the period stated in the contract. Cost overrun can be known as one of the effect when the construction defects happen

in the construction site. Construction defect will also affect society at large due to possible danger posed and result in direct and indirect cost in repairs, abnormally high maintenance dispute and possible loss of building.

Defective building construction not only contributes to the final cost of the product but also to the cost of maintenance which can be considerable. The cost is calculated irrespective of who is going to pay. 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. 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

Types of Defects

- Structural defect
- Material Defects
- Workmanship Defects
- Electrical defects
- Plumbing defects
- Supervision defect
- Design Defects

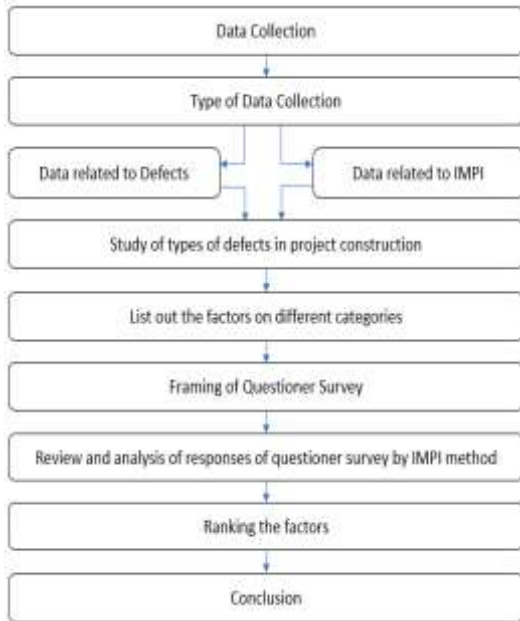
Objective

1. This study is to identify the causes of defect in construction and suggest defect reduction strategy
2. To suggest proper management system to minimize defects.
3. The theoretical aim is to increase the knowledge of why defects actually occur.
4. Prioritizing the causes by doing questioner survey and analyzing the results using Important Index Method (IMI).

II. METHODOLOGY

The research methodology of this study contains two stages. The first stage includes a

literature search and questionnaire survey. The literature review is collected through articles, internet and international project management journals.



III. DATA COLLECTION

The target population included civil engineering and buildings construction firms. The architects, contractors and developers of various targeted for survey. The details of various stakeholders and total numbers of were collected through internet. These details were considered as size of population to decide sample size of study. We distributed over a Questionnaires. The analysis of these questionnaires helped us calculate the Relative Importance Index and Important index of each clause. We received responses from a pretty diverse group of professionals.

A. Importance Index Technique -In this technique, for each cause/factor two questions were asked: What is the frequency of occurrence for this cause? And what is the degree of severity of this cause on project delay? Both frequency of occurrence and severity were categorized on a four-point scale. Frequency of occurrence is categorized as follows: always, often, sometimes and rarely (on 4 to 1 point scale). Similarly, degree of severity was categorized as follows: extreme, great, moderate and little (on 4 to 1 point scale).

B. Frequency index: A formula is used to rank causes of defect based on frequency of occurrence as identified by the participants.

$$\text{Frequency Index (F.I.) (\%)} = \frac{\sum a (n/N) * 100}{4}$$

Where, a is the constant expressing weighting given to each response (ranges From 1 for rarely up to 4 for always), n is the frequency of the responses, and N is total number of responses.

C. Severity index: A formula is used to rank causes of defect based on severity as indicated by the participants.

$$\text{Severity Index (S.I.) (\%)} = \frac{\sum a (n/N) * 100}{4}$$

Where a is the constant expressing weighting given to each response (ranges from 1 for little up to 4 for

D. Importance index: The importance index of each cause is calculated as function of both frequency and severity indices, as follows:

$$\text{Importance Index (IMPI) (\%)} = \frac{[F.I. * S.I.]}{100}$$

Table 1 Frequency Index Table Form

Sl.no	Rarely (a=1)	Sometimes (a=2)	Often (a=3)	Always (a=4)
Question Number	Frequency (n)	Frequency (n)	Frequency (n)	Frequency (n)

Table 2 Severity Index Table Form

Sl.no	Little (a=1)	Moderate (a=2)	Significant (a=3)	Immense (a=4)
Question Number	Frequency (n)	Frequency (n)	Frequency (n)	Frequency (n)

Table 3 Important Index Table Form

Sl.no	SI%	FI%	IMPI%

IV. ANALYSIS AND INTERPRETATION

Analysis of data collected using check list, questionnaire and reports was done. Based on the analysis there were in depth discussions on the analysis and then finally conclusions were made from the discussion made in the research and recommendations are given for reducing construction defects.

Table 4: - Summary of construction defect from case study

QUESTIONS	SI%	FI%	IMPI%
Wall cracking /wall finishes	80	77	61.6
Water seepage through joints between window & door frame	66	64	42.24
lifting and cracking of concrete	58	58	33.64
Detachment of plastering	52	60	31.2
Cracks on column, beam	55	56	30.8
Electrical switches or outlets not working	60	55	33
Difficulty in opening and closing of glass panel	55	63	34.65
Spill of the concrete cover	56	54	30.24
Improperly sloped gutters and Rainwater runoff from roof	56	55	30.8
Dampness on ceiling, wall floors, Ceiling and wall joint	67	52	34.84
Plinth Settlement	61	57	34.77
Improper Ventilation	66	68	44.88
Uneven painting	75	66	49.5
Kitchen unit	51	55	28.05
Toilet	52	47	24.44
Improper Staircase design	59	59	34.81
Improper Tiles work	70	66	46.20
Leakages in Piping work	71	73	51.83
Drainage Broken or leaking	77	71	54.67
Tap leakages	68	68	46.24
Improper roof waterproofing	83	84	69.72

Wardrobes/Shelves	54	48	28.92
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V. RESULT AND ANALYSIS OF THE CASE STUDY

Based on the ranking, the major and the minor causes of construction delays by Importance Index (IMPI %) were:

NO.	QUESTION	IMPI %
1	Improper roof waterproofing	69.72
2	Wall cracking /wall finishes	61.6
3	Drainage Broken or leaking fixtures and Signs of leaks or clogged drains	54.67
4	Leakages in Piping work	51.83
5	Uneven painting	49.5

This studies Frequency Index, Severity Index, and Importance Index of the factors that are affecting the time line of the constructions projects. The importance index of each factor is evaluated as the product of the both frequency and severity indices of every factor. 22 defects are identified through survey. The data collected was analyzed by the frequency, severity and importance index. Results are based on the importance index and this method pointed out that Improper roof waterproofing (IMPI% = 69.72), Wall cracking /wall finishes (IMPI% = 61.60), Drainage Broken or leaking fixtures and Signs of leaks or clogged drains (IMPI% =54.67) are the major factors

VI. CONCLUSION

It can be concluded that there are various most effective strategies of minimizing the defect in building construction project are improve workmanship quality, all parties take responsibilities, frequent progress meeting, select the good quality of the materials, use modern construction method, improve ability to read and understand drawings, compliance with specification, do proper inspection, improve quality control and improve oversight in inspection. It is expected that by the better understanding regarding of the type, cause and strategies of minimizing defect in building construction project. In line with the objective, it helps to increase the awareness of

contractors towards managing and minimizing the defect work. By doing this, contractor will bring up construction industry into the next level of managing construction project effectively and efficiently.

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