International Journal of Mechanical Engineering and Technology (IJMET)
Volume 9, Issue 3, March 2018, pp. 367–374 Article ID: IJMET_09_03_036
Available online at http://www.iaeme.com/IJMET/issues.asp?JType=IJMET&VType=9&IType=3
ISSN Print: 0976-6340 and ISSN Online: 0976-6359

EVALUATION OF MAINTENANCE MANAGEMENT IN CONSTRUCTION TO REDUCE THE MAINTENANCE COST

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ABSTRACT:

Each and every building in the construction scenario is designed for effective and happy living. When the lifecycle of building increases so the age of the building should be increases so there should we have particularly gone for building maintenance like repairs, plumbing, sanitation, painting works etc. Strategic planning and implementation of the aspect determine the effectiveness of the output. In this paper set of maintenance problems are identified in a particular study area of building and the solutions for those maintenance problems are identified by using a brainstorming technique. In the brain storming technique a set of 10 technical and non-technical people were called to do brainstorming to identify the solutions for the raised problems. The people includes a tenant persons (architects, maintenance managers), regular persons. Suggestions were taken from each and every person without any hesitation. On those above solutions also repeated for the brainstorming technique for effective solution to complete the collected data the final suggestion will be given to partial solution .If two solutions are in same manner the solution is passed to all group members that called ranked by them based on the ranking solution is finalized.

Keywords: Maintenance Problems, Brainstorming, Value Management, Questionnaire survey, engineering defects.

Cite this Article: P. Bhargava Reddy, B.S.S. Ratnamala Reddy and SS. Asadi, Evaluation of Maintenance Management in Construction to Reduce the Maintenance Cost, International Journal of Mechanical Engineering and Technology 9(3), 2018. pp. 367–374.
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1. INTRODUCTION:

Buildings are meant to construct too provide sufficient and effective facilities, safety to the people. Reasons like design problems, negligence, improper knowledge on utilization of various things. In today's construction scenario the maintenance budget is going higher .to reduce the maintenance problems we should take care of each and every stage of construction. Building repairs works leads to high budget requirement of the construction maintenance .to overcome the defects of the building some major techniques should be used based on questioner survey should be performed from the architects and maintenance managers. People should know the utilization of emanates provided to them on their hours. Workers should be aware and have knowledge on cleaning of their resources.

The value of the project for a building is not for cost of the project .It is to be satisfactory usage of the customer. It depends on the how the customer falls about the project. To improve the value of the building firstly we should identify the customer needs. To overcome the customer needs the value engineering concepts will help us to increase its project value .there are lot of techniques to solve the problems of each activity in value engineering .Those are morphological analysis, brainstorming, Gordon techniques ,problematic approach etc. For the overall satisfaction of the customer we have to overcome to reduce the cost of the maintenance activities for building from beginning stage. To get the solutions for maintenance problems for existing building a technique named as brainstorming technique was used to reduce the maintenance cost of the ongoing construction projects.

1.1. Technique Used:

1.1.1 Brainstorming:

Brainstorming is a technique in value engineering .It is similar to group discussion. In this technique we have a various sub techniques like

- Nominal brainstorming,
- Guided brainstorming,
- Group passing technique,
- Electronic brainstorming
- Direct brainstorming,
- Individual brainstorming.

1.2. Details of Model study:

For the project we have considered two apartments for that we have considering an already existed apartment, and to know the loggings in the existing apartment .firstly we have to identify the various problems and defects in already existed building. Later we have selected an ongoing under construction apartment.

The existed building/apartment which is named as keerthi vihar located at Govardhangiri, near Tadepalli, Guntur (district), Andhra Pradesh. This is constructed in the year 2017 January. The apartment having five floors and each floor having 6 flats on these 6 flats 2 are

double bedrooms and 4 are triple bedroom .The major maintenance problems occurred are lift repairs, water logging, sanitation, and dampness on exterior walls. The built up area of the apartment is 9600sft.

2. OBJECTIVES:

The research study of the paper is

1. To determine what are the maintenance issues that are undergoing on existed building/apartment
2. To decrease the maintenance activities and issues of a building/apartment from design or decision making stage
3. Finding best solution to reduce the maintenance and to reduce the maintenance cost of a building by using value management technique.

3. METHODOLOGY:

The concept of the research study is Identification of problems and to give remedial measures on building maintenance in existed building. The main importance is given to reducing the maintenance cost of the building the technique we have used to problem identification is value management techniques. In that technique we have chosen one of the best sub technique named as electronic brainstorming technique to identify the problems and reduce the maintenance cost of the apartment.

3.1. Data collection:

Data collection for the project should be done in two ways .Firstly we collected previous published journals on maintenance issues and what are the remedies to decrease the maintenance issues in building/apartment.

The questioner was prepared to identify the various defects and problems in existing buildings. And those questions were prepared in Google forms and sent to various people like maintenance managers, local people, masons, students, project managers etc.

From the collected responses we can identify the various problems occurred in the form of maintenance problems to various buildings. After the problems identification few brainstorming sessions were conducted for various people. The main ideas generated from brainstorming should be implemented in project to rectify faulty design mistakes and maintenance problems

3.1.1. Questioner Survey on Maintenance Problems:

S.NO	QUESTIONS
1	What are the major maintenance problems in your apartment/building?
2	What are the main reasons for maintenance problems?
3	In which stage of construction we can decrease the maintenance cost of the building?
4	What are the main reasons for increase in maintenance cost?
5	In which area you are spending more budget on your building for maintenance?
6	What is the annual budget for the maintenance works you spend on your building/apartment?
7	In which way do you perform maintenance of building?
8	Does your society having system on maintenance management system?
9	What types of maintenance does your organization follows?
10	At which season you are getting more maintenance issues?
11	Which method in brainstorming is best and suitable to identify the problems and to decrease the

	maintenance of a building?
12	Give suggestions to effective maintenance of apartment?
13	What do you suggest about the maintenance work for building from your own point of view?
14	Who are the people involved in maintenance management system of your building/apartment?
15	What do you suggest about the maintenance works for building from your own point of view?
16	What type of maintenance does your organization follows?
17	At which time you are getting more maintenance issues?
18	Which method in brainstorming is best &suitable to identify the positive problem to decrease the maintenance cost?
19	As per your knowledge does the brainstorming techniques helps to reduce the premature construction maintenance?
20	What are the minor problems you absorbed as a maintenance problems in your building?
21	Does your system has automatic maintenance problem identification system?
22	Give suggestions to effective maintenance of the building or project?

As per the above questioner survey the following factors in percentage% has been calculated. The factors are electrical problems 15%, plumbing works 28%, cracks 26%, painting works10%, floor works 5%, and lift maintenance 16%.

After that, the above data has been interrupted by using a value management technique named as electronic brainstorming technique.

3.1.2. Questioner on maintenance using electronic brainstorming:

1	In which stage of construction we can decrease the maintenance cost of the building?
2	What are the major issues of maintenance problems you identified during the construction?
3	In which stage of construction does your organization using brainstorming?
4	What is the best thing to do to decrease the maintenance cost?
5	By taking precautions at what stage of construction we can decrease the maintenance cost?
6	In general whom you prefer to solve the maintenance problems?
7	What is your opinion on your apartment/community maintenance team to solve your maintenance problems?
8	What is the first thing you do if you get any problem regarding the maintenance?
9	What is the response of your neighbors on maintenance budget for every month?
10	What do you thing that the budget allocated for maintenance is properly using or not?
11	What are the main reasons for increasing of maintenance problems in an apartment?
12	What will be the output if the maintenance management is not involved during the designing time?
13	If u encountered a problem regarding to maintenance after 6 months of construction completion, who will be main reason for that problem?
14	At which stage of construction mainly you absorbed major maintenance problems in building?
15	Does your company/organization following the value management techniques, if following what type of techniques are those?
16	What is the main reason for increasing of maintenance problems in a building?
17	What are the minor maintenance problems you encountered in your organization?
18	Improper communication between an architect and maintenance management will raises what type of problems?
19	If u have a maintenance management, what type of maintenance does your organization follows?
20	What is the role of your municipal officials regarding the maintenance issues?

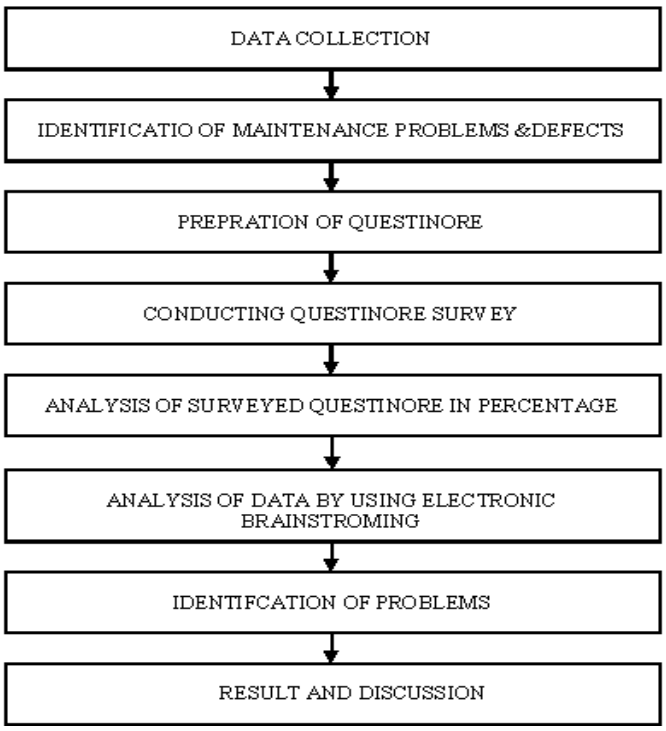

Figure 1 step by step process of methodology

4. RESULT AND DISCUSSION:

4.1. Problems Identified By the Questioner Survey:

The below pie chart shows that major maintenance problems in building /apartment the responses are sorted based on the survey we conducted. Nearly 30% of responses show that plumbing works are main reason for maintenance problem in a apartment.15% for electrical works, 26% for cracks in building, 5%floor maintenance, 15% for lift maintenance. Mainly leakages are the major problems in buildings improper fixing and using non-conforming material leads to leakages and dampness in walls. It will decrease the life span of building and need of regular repairs. In this process the maintenance of the building will increases so there chance of increasing building maintenance and cost of the maintenance will increases.

Identified Maintenance problems in apartment

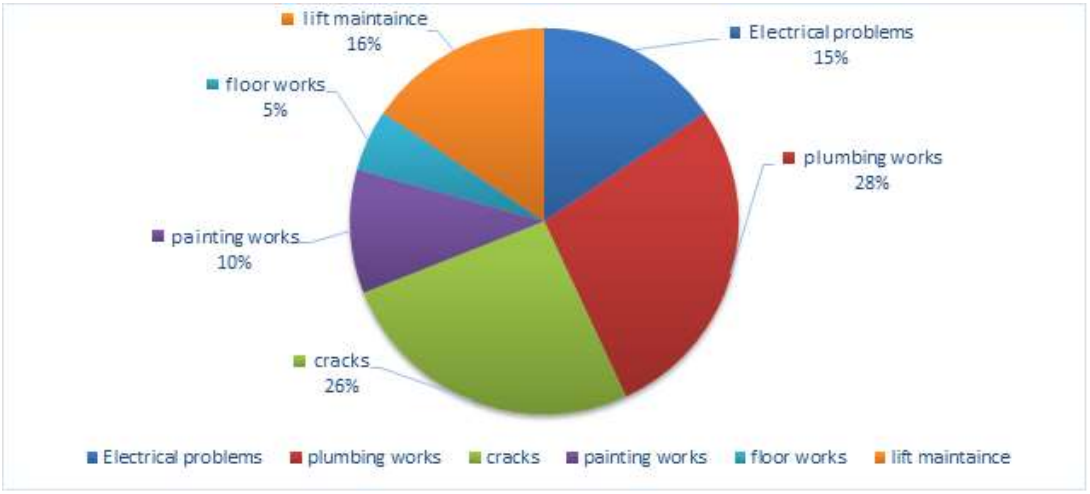

Figure 2 Percentage of each problem identified by the questionnaire

The following factors are identified as major maintenance problems electrical problems 15%, plumbing works 28%, cracks 26%, painting works10%, floor works 5%, and lift maintenance 16%.

4.2. Analysis of data by using brainstorming

The below pie chart represented the various stages of construction and their contribution to decrease the maintenance cost of the project after conducting electronic brainstorming the respondents responses are during design stage 35% responses, during construction stage 17%,after construction 10% during estimation 21% responses, during analysis 17% responses had been generated Based on the generated responses high percentage should be taken as the major problems for decreasing maintenance cost. Research states that to decrease the maintenance cost the main parameter is to consider is design of the project.

Stages of construction to decrease the maintenance

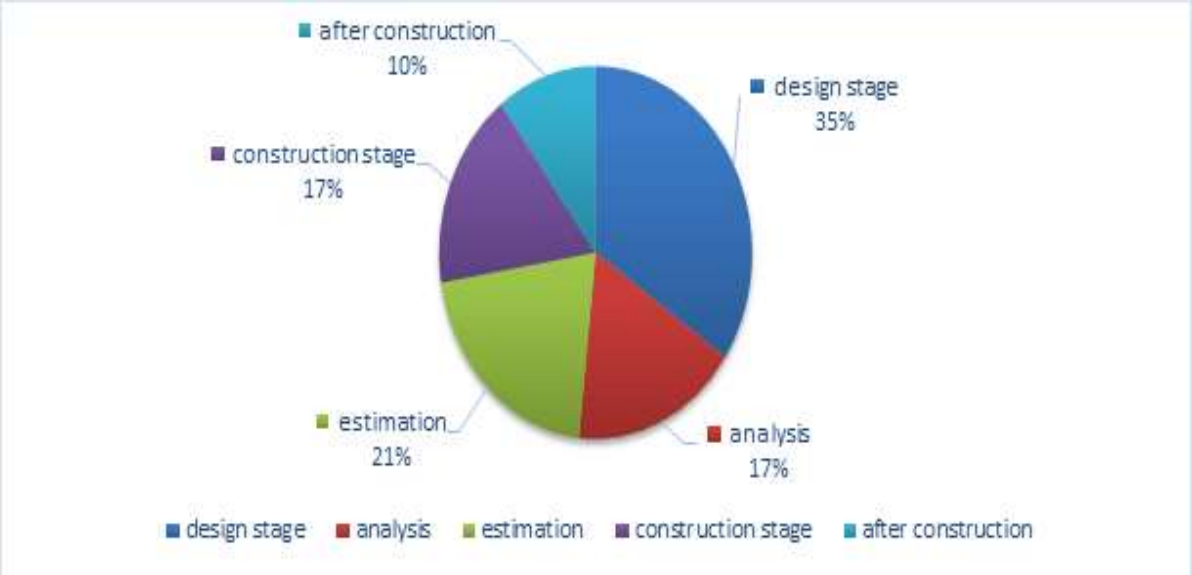

Figure 3 shows the stages of construction to decrease the maintenance cost

4.3. Identified Problems In Apartment:

Figure 4 Pictorial representation of maintenance problems in the study

The above figure states because of sanitary pipe lines lot of water is leaking and it causes the dampness of the floor to decrease the dampness at the time of construction we should go for procuring conformed material and fixing the joints of sanitary pipes must be well checked .The drainage pipeline was not placed in the corner of the slab it is placed near to slab. But the slope keeping on the edge side of the slab because of this reason the water logging in the slab causes the dampness of the building walls.

According to the above studies we observed many problems and solutions to rectify the maintenance problems. Some of the responds mention that lack of communication between maintenance managers and architect or design engineers will leads to improper output. From past studies and our studies the main maintenance issues are plumbing problems, sanitary problems, water leakages and lift stopping's, dampness and electrical problems are identified. By conducting brainstorming in small group companies there is increase in the productivity. Efficient generation of ideas during the brainstorming should be implemented during the design stage or initial stage of construction, so there is chance of decreasing the maintenance problems of building from the design stage .If the maintenance problems are reduced, automatically the maintenance cost of the building will also reduce.

4.3. Recommendation:

- To decrease the maintenance cost of the building we need to take precautions from the designing stage
- Implementation of value management techniques in small scale construction to reduce premature maintenance problems or defects.
- We should use only quality materials to minimize the maintenance cost
- If we are implementing the new technology we should give proper training to the users for the effective utilization.
- Care should be taken while construction work going on to decrease the cost
- For special type of works like POP works, flooring works and interior works we should procure skilled labor and we should supply the quality material.
- Effective maintenance management team should be implemented to control over all maintenance issues during the design and initial stage of construction.
- While special techniques are going on must and should use efficient and skilled labor.

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