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A STUDY OF MATERIALS MANAGEMENT IN EXISTING CONSTRUCTIONS AT COIMBATORE

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ABSTRACT

Construction materials constitute a large portion i.e., up to 60-70% of the total cost in construction projects. Therefore effective material management can increase the productivity, cost efficiency of a project and also helps to complete the project within the time specified as per the plan. This research helps to found out which materials management's tasks and its priority, problems and frequency of occurrence in materials management, wastages occurred in execution stage as well as transportation/receiving stage at the construction sites in Coimbatore and suggestions will be given for managing the materials better in future.

Keywords: Materials management, problems in materials management, wastages in different stages.

I. INTRODUCTION

Materials management is nothing but the management of planning, executing as well as controlling the field and office activities in construction. The main aim of the materials management is that to ensure the construction materials are available at the right time in right quantity and quality when needed in the project. Good and effective materials management should ensure that the materials of right quality and also right quantity are selected, procured, delivered and also handled at the site in the right time at reasonable rates. So, the materials management is an important criteria in the project management. Poor materials management will results in the early purchase of the materials which may lead to the damage of materials while stored in the inventory. The early purchase may held up the capital costs. Materials management is an important element in project planning and controlling of materials. Materials management is not only required for the monitoring stage but also management decisions are required at the time of planning and scheduling stages for make it effective. Materials ordering problems are reduced now a days by the usage of automated materials management systems. In those systems, master production schedules, inventory records and order lists are combined to determine when the materials are ordered and how much ordered in each time period.

Stages in materials management:

- Materials planning
- Procurement / Purchasing
- Materials Handling
- Transportation
- Receiving

II. METHODOLOGY

In this method both quantitative as well as qualitative approach are used. Likert scale is used for the respondent's attitude measurements. For analysing quantitative data M.S.Excel and Medical statistics software are used.

Research objective

First objectives of the research was found out for carrying out the further research. Based on the objectives appropriate methodology and questionnaire was developed to get results.

Literature review

Many journals and research paper were studied to select the correct methodology, scale of measurement and data analysis method.

Questionnaire design

Questionnaire consists of the following 5 sections

- Section 1 : Company's Profile
- Section 2 : Problems and its frequency of occurrence
- Section 3 : Materials Management tasks and its priorities
- Section 4 : Materials and its wastages in execution and transportation stages
- Section 5 : Technologies Needed to manage materials better

Section 1 consists of 8 questions about the company, section 2 consists of 9 questions, section 3 consists of 5 questions, section 4 consists of 20 questions, and section 5 consists of 2 questions.

Pilot study and questionnaire distribution

Pilot study is the process of validating the questionnaire’s questions, it is the trial method for the questionnaire. Pilot study was done with 5 different respondents and then questionnaire was redesigned to make its performance better. After pilot study questionnaire was distributed to 80 construction sites in Coimbatore which have a valid registration.

Data coding

Computer software i.e., as Microsoft office excel and Medcal is used in this research for data coding which helps in data analysis by descriptive statistics.

Data analysis

Relative important index (RII)

$$RII = 5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1 / 5N$$

Where, N= total no. of respondents

n_1, n_2, n_3, n_4, n_5 = likert scale degree

Chronbach’s alpha : (α)

$$\alpha = (k/k-1) * (1 - \Sigma var/var)$$

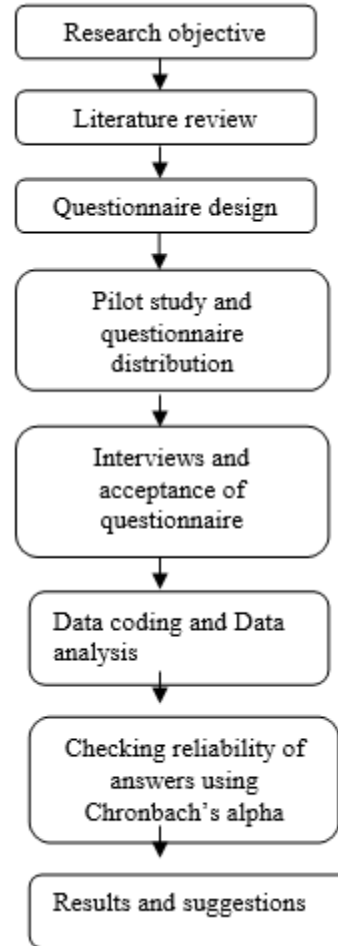
where, k= total no. of respondents

Σvar = summation of variances

Var = variance

Chronbach’s alpha shall be used to check the reliability of answers only for responses recorded in likert scale. Chronbach’s alpha less than 0.5 is not acceptable.

Quantitative data are analyzed with the help of descriptive statistics (Relative important index method) in which mean, median, mode are calculated to find out the central tendency and also chronbach’s alpha is determined to find out the reliability of the answers. And the final answers are represented by tabulations.



3.6 Methodology flowchart

III. RESULTS

The followings were the results which were found out at end of the survey, Rankings are given in the tabulation form based on the respondent’s total score and RII.

Table of Material management and its priorities

Material management tasks	RII	α	Rank
Materials planning	0.995	0.67	1
Materials Handling	0.944	0.64	2
Procurement/ purchasing	0.818	0.63	3
Materials transportation	0.758	0.66	4
Materials receiving	0.698	0.69	5

Table for Material management problem and its frequency of occurrence

Materials Management Problems	RII	α	Rank
Surplus of, or missing, materials	0.595	0.77	1
Lack of storage space for materials on site.	0.581	0.75	2
Materials whose specifications do not match the ones in the purchase order	0.423	0.79	3
Lack of complete and up-to-date information regarding arrival of materials to the site And, or, regarding on site stocks.	0.413	0.77	4
Materials arriving to the site at the wrong time, or in the wrong quantity	0.400	0.78	5
Burglary, theft and vandalism	0.372	0.79	6
Unavailability of information regarding the status of the orders	0.293	0.78	7
Waste of man-hours searching for materials and tracking them	0.279	0.76	8
Forgetting to order the materials	0.296	0.80	9

Materials wastages in percentage in execution stage:

Materials	Average wastages in %	Rank
Reinforcement steel	2.62	1
Sand	2.59	2
Coarse aggregates	2.55	3
Cement	2.40	4
Timber	2.16	5
Tiles	1.73	6
Electrical materials	1.58	7
Sanitary materials	1.55	8

Material's wastages in transportation/receiving stage:

Materials	Average wastages in %	Rank
Sand	0.83	1
Sanitary materials	0.79	2
Tiles	0.77	3
Electrical materials	0.69	4
Cement	0.67	5
Coarse aggregates	0.66	6
Timber	0.62	7
Reinforcement steel	0.52	8

IV. CONCLUSIONS & SUGGESTIONS

From the result we confirm that construction personnel will be giving more priority to planning stage which could be more effective in reducing the wastages.

And the frequently occurred problem is surplus or missing of the materials. To avoid this, inventory should be managed with care.

The material which was wasted more in execution stage is reinforcement steel while overlapping with adjacent bars, it is unavoidable but the wastages can be used for making manholes.

The material which was wasted more in transportation/receiving stage was sand. For reducing the wastage sand hooks should be used effectively and place should be made favored for sand storage without any trenches nearer to the storage area.

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