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Study of Correlation factors of Material management in Building construction industry

Harshal M. Patil[1], Prof. G.C. Sarode[2]
[1]*Student,Department of Civil Engineering,Dr. D.Y.Patil Institute of Engineering and Technology, Pimpri, Pune, Maharastra, India.*
[2]*Professor, Department of Civil Engineering,Dr. D.Y.Patil Institute of Engineering and Technology, Pimpri, Pune, Maharastra, India.*

Abstract: Construction industry now a days is very progressive and innovative industry as compare to another industries in the world. At every construction industry for financial profit, need of people, owner various fast track techniques are used for completion of the construction work. Because of fast track methods of construction work there are various issues occurred in material management system such as delay of supply of material and vice versa. To overcome this issues a proper material management is required at every construction sites. This paper gives the knowledge about material management and the correlation factors between total cost of project and total material management cost of that particular project as per data collection.

Keywords: Material management, Correlation Coefficient, types of Correlation Coefficient, SSPS software

I. INTRODUTION

Construction industry now a days is very progressive and innovative industry as compare to another industries in the world. At every construction industry for financial profit, need of people, owner various fast track techniques are used for completion of the construction work. Because of fast track methods of construction work there are various issues occurred in material management system such as delay of supply of material and vice versa.Every project is unique and every decision related to control on expenses is unique too. Cost of material for the project is more than 50%. So we have to focus on material management is necessary. Material management is not limited to control waste but it started from supplier's selection to quality and quantity of materials, its price, requirement as well as availability, financial strength, its transportation and storage too, etc. like lots of factors have included in it.

1.1 What is material management :

Patel and Vyas (2011) say materials management is a process for planning, executing and controlling field and office activities in construction.[1]

Madhavi et al. (2013) says materials management is defined as a management system that is required in planning and controlling the quality & quantity of the material, punctual equipment placement, good price and the right quantity as required. Material management is a management system that integrates purchasing, shipping and material control from suppliers.[2]

Patil and Pataskar (2013) say "Material management is defined as the process to provide right material at right place at right time in right quantity so as to minimize the cost of project". Material management is concerned with the planning, identification, procuring, storage, receiving and distribution of material.[3]

1.2 Objectives of studies :

1. To study factors affecting construction material management on site.
2. To study correlation coefficient of material management on site.
3. To find correlation coefficient between project cost and cost on material management by using SPSS statistical software.
4. To compare result of correlation coefficient.

II. FACTORS AFFECTING MATERIAL MANAGEMENT ON SITE

Factors related with material management can be mostly found in the following areas in local construction projects.

a. Planning and Scheduling
b. Monitoring and Controlling
c. Organization and Personnel
d. Procurement

e. Delivery
f. Storage and Storage facilities
g. Usage
h. Surplus and Waste control

a. Planning and Scheduling :-
Planning is a fundamental, important process for every project. Material planning, which is a key function of material management, is closely linked with project planning and control set-up. Scheduling the entire material program is essential to meeting the project timetable. Indeed, planning and scheduling are significant in terms of increasing productivity, profit and facilitating the timely completion of construction projects.

b. Monitoring and Controlling :-
Monitoring and Controlling of all construction activities in material management are conducted to ensure the right source of materials with the exact quality, at the right time and place suitable for minimum cost construction process. It is a process in which facilities, personnel, resources and capital are monitored and controlled to a significant impact on the operations of construction projects.

c. Organization and Personnel :-
Material management structure is organized in such a way that it allows for integral planning and coordination of the flow of materials, in order to use the resources in an optimal way and to minimize costs. The organization must be structured to provide for the timely performance of the work, with material personnel located at appropriate level of project management and influence the decision making process.

d. Procurement :-
Preliminary investigations for developing sources for procurement of materials are made by floating enquiry indents. It is processed by the material procurement responsible personnel for inviting quotations with samples of materials where applicable.

e. Delivery :-
Delivery in terms of organizing the movement of vehicles, people and materials ensures the efficient use of workforce and production or process in construction projects. The routing of materials is one of the main causes which affect cost and time during construction.

f. Storage and Storage facilities :-
Material storage can be defined as the provision of adequate space, protection and control of building materials and components held on site during the construction process. A good and systematic storage of materials provides better management of materials in construction.

g. Usage :-
Usage of materials is the flow component that provides for their movement and placement. Material usage can be defined as the provision of proper handling techniques either manually or mechanically for the components held on site during construction process.

h. Surplus and Waste Control :-
All projects can expect a certain amount of surplus and waste of materials after construction. Surplus and waste materials arise at any stage of construction process from inception, right through design, construction and operation of the building facility. Hence, control of surplus and waste materials is important to successful material management.

III. CORRELATION COEFFICIENT

3.1 What is mean by correlation coefficient ?:
Correlation is a statistical tool that helps to measure and analyze the degree of relationship between two variables. Correlation analysis deals with the association between two or more variables.In this study correlation has been represents history of work done. This is helpful to calculate future cost which will expenses on material management.

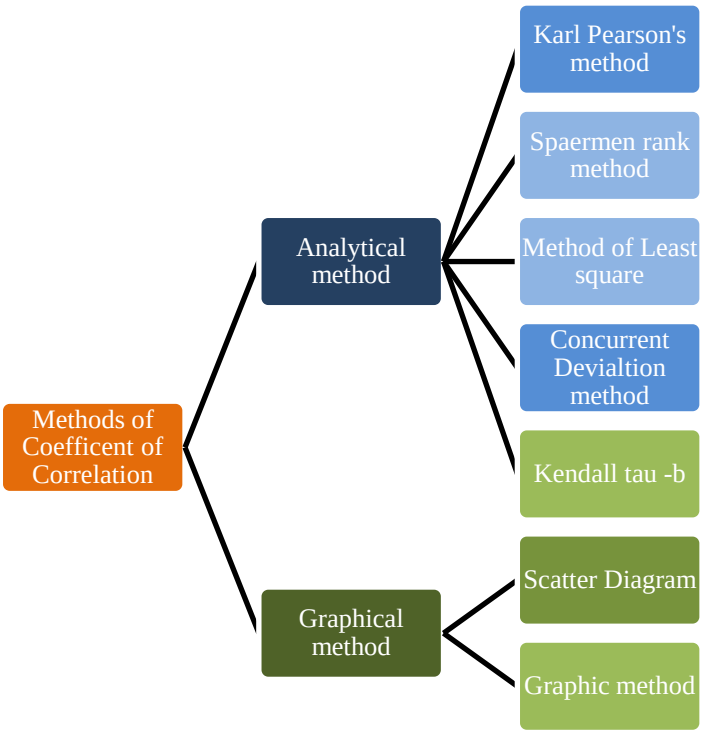
3.2 Range of correlation : The value of correlation coefficient ‘r’ ranges from -1 to +1

- If r = +1, then the correlation between the two variables is said to be perfect and positive

- If r = -1, then the correlation between the two variables is said to be perfect and negative

- If r = 0, then there exists no correlation between the variables

3.3 Methods of correlation coefficient : Various methods used in correlation coefficient are as follows



IV. DATA COLLECTION

Objective of the study is to find the correlation coefficient between cost of project and cost on material management. Cost of project means it included whole cost such as labour, material, administration cost etc. but omitted land cost. Cost on material management means cost incurred on effective material management system. Staff salary, cost of software if used that, stationary and administrative cost, if any additional land takes on hiring basis for stacking the material etc. has been included in cost on material management. Staff salary, cost for stationary, software cost has been taken on tentative basis.

Following are the data collected from 15 sites from which coefficient of correlation is done

Sr. No.	Name and Address of Site	Project Duration	Cost of Project	Total cost on material management
1	Punevilley, Punawale	4 yrs for Phase I, 8 yrs total	1500 CR	21,888,000
2	18 Latitude, Punawale	2 years	16 CR	1,512,000
3	Eala, Punawale	3 years	78 CR	3,888,000
4	My Home, Punawale	5 years	65 CR	4,080,000
5	Not launch, Punawale	3 years	45 CR	1,548,000
6	Golden Treasure, Punawale	3 years	60CR	1,548,000

7	Not launch, Wakad	3 years	50 CR	1,548,000
8	Heritage, Wakad	3 years	17 CR	3,168,000
9	Not launch, Wakad	3.5 Years	12 CR	2,646,000
10	The Address, Wakad	2.5 Years	65 CR	3,690,000
11	KanchenEllena, wakad	3 Years	10 CR	1,548,000
12	Signature Hieghts, wakad	3 Years	4 CR	1,548,000
13	NisargVisw, Wakad	4 Years	15 CR	2,064,000
14	Royal Entrold, Wakad	6 years	90 CR	10,656,000
15	Twin Tower, Wakad	3 Years	40 CR	2,268,000

V. DATA ANALYSIS

For data analysis the correlation coefficient is find out between total project cost and total material management cost as per project site by using SPSS statistical - 19 software. By using this software coefficient of correlation of 15 sites is find out by three methods and difference is shown graphically.

- **Result of correlation by Pearson method** :

Correlations

		VAR00001	VAR00002
VAR00001	Pearson Correlation	1	.921**
	Sig. (2-tailed)		.000
	N	15	15
VAR00002	Pearson Correlation	.921**	1
	Sig. (2-tailed)	.000	
	N	15	15

**. Correlation is significant at the 0.01 level (2-tailed).

- **Result of correlation by Kendall's tau-b**

Correlations

			VAR00001	VAR00002
Kendall's tau_b	VAR00001	Correlation Coefficient	1.000	.543**
		Sig. (2-tailed)	.	.006
		N	15	15
	VAR00002	Correlation Coefficient	.543**	1.000
		Sig. (2-tailed)	.006	.
		N	15	15

**. Correlation is significant at the 0.01 level (2-tailed).

- **Result of correlation by Spearman rho :**

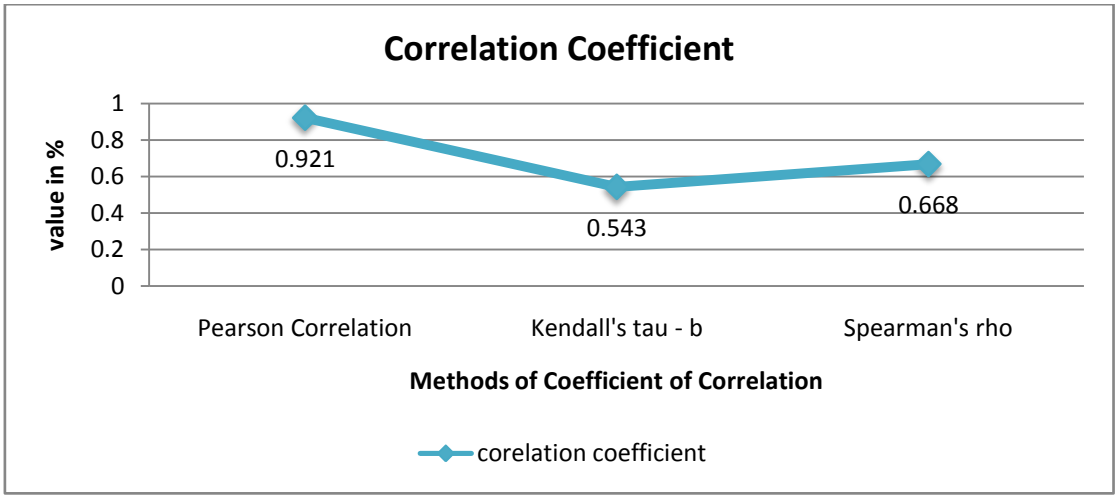
Correlations

			VAR00001	VAR00002
Spearman's rho	VAR00001	Correlation Coefficient	1.000	.688**
		Sig. (2-tailed)	.	.005
		N	15	15
	VAR00002	Correlation Coefficient	.688**	1.000

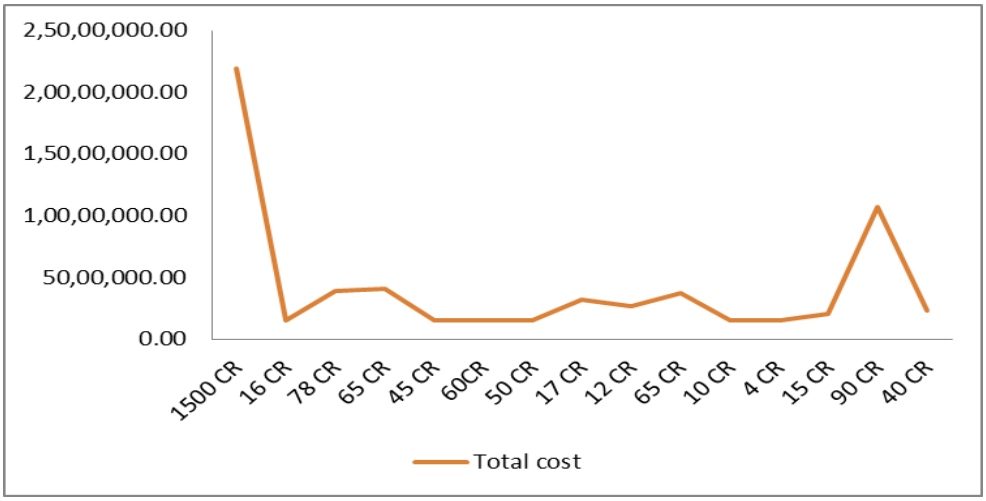
	Sig. (2-tailed)	.005	.
	N	15	15

**. Correlation is significant at the 0.01 level (2-tailed)

- **Graph showing difference between results of correlation :**



- **Graph of cost of project versus total cost on material management :**



VI. CONCLUSION

Correlation coefficient between cost of project and cost on material management of 15 building sites by using following methods of correlation with results on SPSS statistical software,

- Pearson correlation – 0.921

+1 > 0.921 > 0 - the correlation between the two variables is said to be perfect and positive

- Kendall tau – b – 0.543

+1 >0.543> 0 - the correlation between the two variables is said to be perfect and positive

- Spearman rho – 0.688

+1 >0.688> 0 - the correlation between the two variables is said to be perfect and positive

Hence data analysis of total cost of project and the material management cost on project is perfect and gives positive results of correlation also data is useful for future survey work.

REFERENCES

[1]. Khyomesh V. Patel and Prof. Chetna M. Vyas. "Construction Materials Management on Project Sites".National Conference on Recent Trends in Engineering and Technology. 13-14 May 2011.

[2]. T. PhaniMadhavi, Steve Varghese Mathew and Roy Sasidharan."Material Management in Construction – A Case Study".International Journal of Research in Engineering and Technology.Nov.2013. Page no. 400-403.

[3]. Ashwini R. Patil and Smita V. Patskar."Analysing Material Management Techniques on Construction Project".International Journal of Engineering and Innovative Technology. Volume 3, Issue 4. Oct. 2013. Page no. 96-100.

[4]. S.Sindhu, Dr.K.Nirmalkumar, V.Krishnamoorthy, "Performance Analysis of Inventory Management System in Construction Industries in India" (IJIRST) Vol. 3, Issue 4, April 2014

[5]. VivBewick, Liz Cheek and Jonathan Ball, Statistics review 7: Correlation and regression, Critical Care 2003, **7**:451-459 (DOI 10.1186/cc2401)