



Material Procurement in Construction Industry Problems and Solutions

T.Subramani^{1*}, A.Prabhu²

^{1*}Managing Director, Priyanka Associates (Civil Engineers and Valuers), Salem, TamilNadu, India.

²Project Manager, KCICI PVT.Ltd., Bommidi, Dharmapuri, TamilNadu, India.

*Corresponding author E-mail: tsmcivil2007@gmail.com

Abstract

Good project management in construction means efficient utilization of labor, material and equipment. Development of labor productivity have to be a first-rate and chronic challenge of those who are accountable for cost control of constructed facilities. Material handling, which includes procurement, inventory, shop fabrication and field servicing, requires special attention for cost reduction. The use of latest equipment and progressive strategies has made feasible wholesale adjustments in construction technology in current a long time. Groups which do no longer recognize the effect of diverse innovations and feature now not adapted to changing environments have justifiably been compelled out of the mainstream of construction activities. The frequent problems of construction industry, customers have an essential position to play. With the aid of its procurement methods, the purchaser impacts the manner a construction project is done, because the tactics affect the form of the project delivery system. What sort of procurement procedures are perceived rational, for one, depends at the underlying assumptions about the characteristic of procurement. A recognized guideline in Lean construction (LC) is that production must be conceived along with transformations (T), flow (F), and value generation (V). Alternatively, it is visible necessary to recognize and cope with the risk of value loss with an identical diligence as the other issues had been to date. Materials management plays an important role in project planning and control. Materials represent a major expense in construction, so minimizing procurement or purchase costs.

Keywords: Material, Procurement, Construction, Industry, Problems and Solution.

1. Introduction

The construction industry different from material supplying, manufacturing industry. Material demand problem sometimes occurs due to external events, such as delays in permit, inspection, material quality, availability of material, labor, weather, etc., that can affect the project completion date. Different construction phase specified requirements and project delay in any event based influence the planning phases. The construction major to the two common constrain limitations resource availability and work availability. Work availability process in construction project internal or external depended. The nature related of work dependence normally not control. If as the construction management not fulfill the resource management, the resource management enormous number of resource management and procurement studies.

1.1. Supply

Typically issues arise due to unsuitable storage materials when furnished to the website. Survey shows that purchasing and deliver management can examine company's monetary performance. Well timed call for the materials is critical for leveling the specified deliver. The cloth wished for required sports to be properly scheduled which will ensure supplier's call for. Space provided at a website for stocking of sufficient

substances dramatically lessen procurement price, wastes and different related risks.

1.2. Material Management

Material control is difficult in city regions and at sites of restrained environment. The general overall performance of creation projects in phrases triple constraints and productiveness are laid low with construction of production materials.

2. Methodology

Fig.1 shows the methodology.

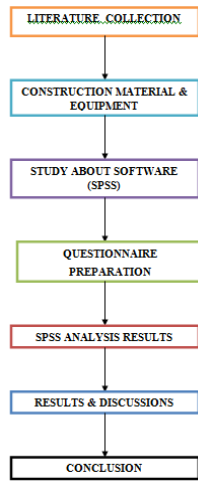


Fig.1: Methodology

3. Construction Materials and Equipment

3.1. Problems in Construction Materials and Equipment Access

The construction material classified into 2 categories its material names (cement, sand, gravel, steel, wood, brick, paint, ceramic, natural stone, and other building materials), and derivative manufacturing (air conditioning, fan, light fixture and electrical, furniture, generators, etc). Further native material and non native material. The native material manufacturing in Indonesia, as well as original trademark Indonesia (e.g. Semen Cibinong, KIA etc.), and that's underneath-licensed or franchise of overseas brands. The contrary as use the outside of non native material manufacturing , and as a consequence requiring the import process in its transport. Substances along with metal, metals, and zinc are imported, alternatively aluminum, copper, and woods are exported in Indonesia. There is strong demonstration few material , major Portland cement and metal for unknown reasons (below manufacturing or trading problems), since some materials are bring from Malaysia and China .the usage of creation equipment and material construction to achieve in Indonesia.

4. About software

4.1. Features of SPSS

- It is easy to learn and use.
- It includes a full range of data. Management system and editing tools.
- It provides in-depth statistical capabilities.
- It offers complete plotting, reporting and presentation features.
- Detailed labelling of variables and data values; additional documentation of data sets; storage of data and documentation in system files.

5. Analysis Results

5.1. One Sample T-Test

This take a look at is appropriate while a continuous variable is recorded on an individuals of people or items and the imply price is to be tested in opposition to some hypothesized population mean.

5.1.1. Level of Measurement

The one sample t-test requires the sample data to be numeric and non-stop, as it is based totally on the everyday distribution.

5.1.2. Independence

Independence of observations is normally not testable, but may be fairly assumed if the information series technique became random without alternative. In our example, we might want to choose laptop computer systems at random, in comparison to the usage of any systematic sample. This guarantees minimal threat of collecting a biased pattern that would yield erroneous consequences. Table 1 suggests the one sample statistics.

Table 1: One sample statistics

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Our Industry rely on few dependable suppliers	20	2.25000	1.292692	.289055
Our Industry strive to establish long term relationship with its suppliers	20	3.85000	1.53125	.34240
Our Industry helps its suppliers to improve their product quality	20	4.15000	.74516	.16662

Table 2 shows one sample T-test 1.

Table 2: One sample T-Test 1

One-Sample Test					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference
					Lower
Our Industry rely on few dependable suppliers	7.784	19	.000	2.250000	1.64500
Our Industry strive to establish long term relationship with its suppliers	11.244	19	.000	3.850000	3.1334
Our Industry helps its suppliers to improve their product quality	24.907	19	.000	4.150000	3.8013

Table 3 shows the one sample test.

Table 3: One sample T-Test 2

One-Sample Test	
	Test Value = 0
	95% Confidence Interval of the Difference
	Upper
Our Industry rely on few dependable suppliers	2.85500
Our Industry strive to establish long term relationship with its suppliers	4.5666
Our Industry helps its suppliers to improve their product quality	4.4987

5.2. Factor Analysis

Fig.2 shows the screen shot factor analysis in SPSS.

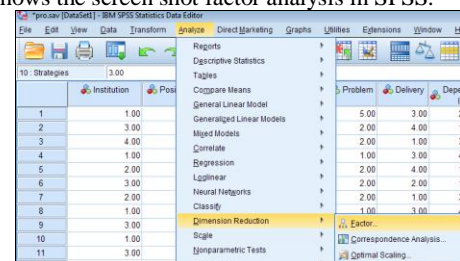


Fig.2: Screen shot factor analysis in SPSS

Table 4 shows the factor analysis – statistics.

Table 4: Factor analysis – statistics

		Statistics			
		Our Industry rely on few dependable suppliers	Our Industry strive to establish long term relationship with its suppliers	Our Industry consider quality as number one criterion in selecting suppliers	Your Industry actively involves its key suppliers in new product development processes
N	Valid	20	20	20	20
	Missing	0	0	0	0
	Mean	2.25000	3.8500	2.3500	2.1500
	Median	2.00000	4.0000	2.0000	2.0000
	Mode	1.000	5.00	1.00	2.00
	Std. Deviation	1.292692	1.53125	1.22582	.74516

Table 5 shows the initial Eigen values.

Table 5: Initial Eigen values

Component	Total Variance Explained					
	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.996	66.608	66.608	3.996	66.608	66.608
2	1.605	26.755	93.362	1.605	26.755	93.362
3	0.337	5.609	98.971			
4	0.053	0.878	99.850			
5	0.009	0.150	100.000			
6	-3.123E-16	-5.205E-15	100.000			

Table 6 shows the component matrix.

Table 6: Component Matrix

Component Matrix			Component	
			1	2
	Our Industry consider quality as number one criterion in selecting suppliers		-0.856	-0.505
	Our Industry rely on few dependable suppliers		0.926	0.188
	Total cost of distribution, including transportation and handling cost		0.842	-0.470
	Sales		-0.737	0.570
	Total cost of resources used		0.534	0.839
	On time deliveries		0.931	-0.256

5.3. Frequency Analysis

Table 7 shows the frequency analysis for dependable suppliers.

Table 7: Frequency analysis for dependable suppliers

Our Industry rely on few dependable suppliers					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	9	45.0	45.0	45.0
	Agree	2	10.0	10.0	55.0
	Strongly Disagree	4	20.0	20.0	75.0
	Disagree	5	25.0	25.0	100.0
	Total	20	100.0	100.0	

Fig.3 shows the graph dependable supplier results.

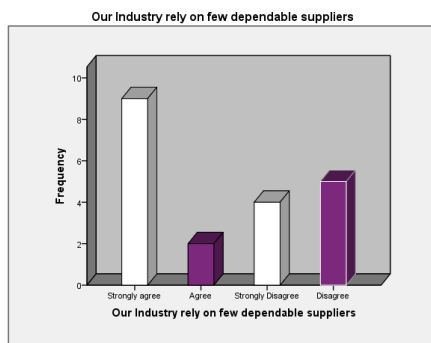


Fig.3: Graph shows the dependable suppliers Results

Table 8 shows the Frequency analysis for relationship with its suppliers.

Table 8: Frequency analysis for relationship with its suppliers

Our Industry strive to establish long term relationship with its suppliers					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	4	20.0	20.0	20.0
	Disagree	7	35.0	35.0	55.0
	5.00	9	45.0	45.0	100.0
	Total	20	100.0	100.0	

Fig.4 shows the graph relationship with its suppliers.

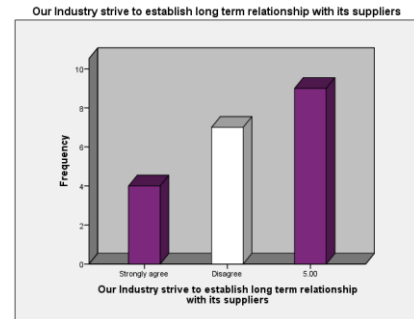


Fig 4: Graph shows the relationship with its suppliers

Table 9 shows the frequency analysis for development process.

Table 9: Frequency analysis for development processes

Your Industry actively involves its key suppliers in new product development processes					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	4	20.0	20.0	20.0
	Agree	9	45.0	45.0	65.0
	Strongly Disagree	7	35.0	35.0	100.0
	Total	20	100.0	100.0	

Fig.5 shows the graph for development process.



Fig.5: Graph for development processes

5.4. ANOVA

Table 10 shows the anova co-efficient.

Table 10: ANOVA Coefficients

Model	Coefficients					
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	2.471	0.607		4.069	0.001
	Choose the right option, where the supply chain department is facing problem in taking care of the raw material?	-0.059	0.263	-0.053	-0.224	0.825

Table 11 shows the residuals statistics.

Table 11: Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.1765	2.4118	2.3500	.06465	20
Std. Predicted Value	-2.684	0.955	0.000	1.000	20
Standard Error of Predicted Value	0.282	0.824	0.364	0.165	20
Adjusted Predicted Value	2.2661	3.0611	2.4520	0.23795	20
Residual	-1.41176	1.64706	0.00000	1.22411	20
Std. Residual	-1.123	1.310	0.000	0.973	20
Stud. Residual	-1.238	1.344	-0.035	1.039	20
Deleted Residual	-2.06107	1.73395	-0.10200	1.41382	20
Stud. Deleted Residual	-1.258	1.377	-0.033	1.055	20
Mahal. Distance	0.002	7.205	0.950	2.176	20
Cook's Distance	0.002	0.576	0.090	0.169	20
Centered Leverage Value	0.000	0.379	0.050	0.115	20

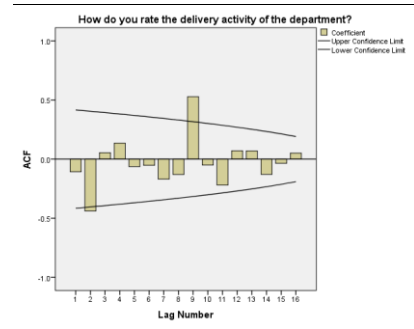


Fig.7: Graph shows the delivery activity control chart

5.5. Auto Correlations

Table 12 shows the autocorrelations between factors.

Table 12: Autocorrelations between factors

Autocorrelations					
Series: Rate the working strategies of supply chain management department on the basis of the current programs?					
Lag	Autocorrelation	Std. Error ^a	Box-Ljung Statistic		
			Value	df	Sig. ^b
1	-0.618	0.208	8.835	1	0.003
2	0.363	0.202	12.053	2	0.002
3	-0.512	0.197	18.829	3	0.000
4	0.309	0.191	21.450	4	0.000
5	0.099	0.185	21.737	5	0.001
6	-0.247	0.178	23.652	6	0.001
7	0.148	0.172	24.389	7	0.001
8	-0.301	0.165	27.709	8	0.001
9	0.516	0.158	38.379	9	0.000
10	-0.316	0.151	42.764	10	0.000
11	0.181	0.143	44.373	11	0.000
12	-0.270	0.135	48.386	12	0.000
13	0.188	0.126	50.602	13	0.000
14	-0.022	0.117	50.637	14	0.000
15	-0.005	0.107	50.640	15	0.000
16	-0.034	0.095	50.766	16	0.000

5.6. Control Charts

Fig.6 shows the control chart for working strategies.

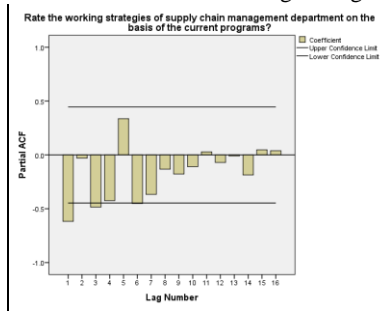


Fig.6: Control chart for working strategies

Table 13 shows the autocorrelations between the delivery activity.

Table 13: Autocorrelations between the delivery activity

Autocorrelations					
Series: How do you rate the delivery activity of the department?					
Lag	Autocorrelation	Std. Error ^a	Box-Ljung Statistic		
			Value	df	Sig.
1	-0.107	0.208	0.264	1	0.607
2	-0.440	0.202	4.991	2	0.082
3	0.054	0.197	5.067	3	0.167
4	0.135	0.191	5.567	4	0.234
5	-0.064	0.185	5.686	5	0.338
6	-0.052	0.178	5.772	6	0.449
7	-0.169	0.172	6.742	7	0.456
8	-0.130	0.165	7.358	8	0.499
9	0.527	0.158	18.483	9	0.030
10	-0.050	0.151	18.593	10	0.046
11	-0.220	0.143	20.956	11	0.034
12	0.070	0.135	21.229	12	0.047
13	0.070	0.126	21.533	13	0.063
14	-0.129	0.117	22.752	14	0.064
15	-0.036	0.107	22.867	15	0.087
16	0.051	0.095	23.148	16	0.110

Fig.7 shows the graph for delivery activity control chart.

5.7. Multilayer Perception

Table 14 shows the case processing

Table 14: Case processing

Case Processing Summary			
		N	Percent
Sample	Training	16	80.0%
	Testing	4	20.0%
Valid		20	100.0%
Excluded		0	
Total		20	

5.7.1. Classification

Table 15 shows the relationship with suppliers.

Table 15: Relationship with suppliers

Our Industry strive to establish long term relationship with its suppliers					
Sample	Observed	Predicted			
		Strongly agree	Disagree	5.00	Percent Correct
Training	Strongly agree	4	0	0	100.0%
	Disagree	0	6	0	100.0%
	Overall Percent	25.0%	37.5%	37.5%	100.0%
Testing	Strongly agree	0	0	0	0.0%
	Disagree	0	1	0	100.0%
	Overall Percent	0.0%	25.0%	75.0%	100.0%

Table 16 shows the Product development processes

Table 16: Product development processes

Your Industry actively involves its key suppliers in new product development processes					
Sample	Observed	Predicted			
		Strongly agree	Agree	Strongly Disagree	Percent Correct
Training	Strongly agree	4	0	0	100.0%
	Agree	0	6	0	100.0%
	Strongly Disagree	0	0	6	100.0%
	Overall Percent	25.0%	37.5%	37.5%	100.0%
Testing	Strongly agree	0	0	0	0.0%
	Agree	0	3	0	100.0%
	Strongly Disagree	0	0	1	100.0%
	Overall Percent	0.0%	75.0%	25.0%	100.0%

Fig.8 shows the multilayer perception flow diagram

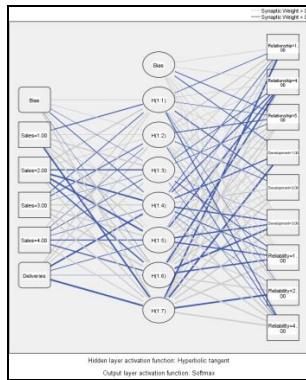


Fig.8: Multilayer perception flow diagram

7. Solution

7.1. Presentation of Case Studies

For the purposes of this paper, four case researches have been decided on to focus on in detail the requirement control strategies, related issues and counseled upgrades. The information of the tasks worried in the case studies, which suggests the sector of customer and type of undertaking. Precise of the findings on necessities management procedures based on those projects and descriptions the overall techniques adopted, those worried inside the RSM techniques, the records series process and some superb observations about the requirements control for each task. It has to be stated that those case research had been now not intended to be consultant of necessities control practices usually, but instead served to offer a few indicative insights into the requirements management method within a specific undertaking. Most detailed information was collected for the case study A and it is selected for a more detailed investigation and description.

7.2. Miscommunication of Clients Needs

From the outcomes of the semi-structured interviews, misunderstanding and Misinterpretation of purchaser desires and requirements changed into the most large problem of RSM. Most of the respondents agreed that misunderstandings should jeopardize the final mission success and client's pleasure. Information the consumer necessities are consequently the initial and essential step within the mission improvement process. If this step is not done effectively, it's miles hard for the all the subsequent steps to be at the proper music, not to mention any fulfillment of the all final outcome of the project. This displays the all findings of many preceding research that requirements are important to every mission and are very critical to the a success shipping of any project such as inside the domain names of machine in addition to the construction industry.

8. Conclusion

Material management plays an inevitable function in any creation undertaking. The current research identified and ranked the maximum giant factors associated with fabric procurement, deliver and control of building initiatives in India. Numerous factors from previous literature have been identified and filtered through experience specialists having sensible enjoy of greater than twenty years. In their seek questionnaire 28 factors were presented. Survey was restrained to the building initiatives of India. Data was gathered from contractors and sub-contractors working in various building projects. From the analysis results priority factors are manage materials due to insufficient storage, due to improper storage of materials.

References

- [1]. T.Subramani., "Cost Estimation and Identification of Transport Infrastructure facility Projects in Salem", International Journal of Engineering and Technology, Vol.2, No.5, Pp 859 – 867,2012.
- [2]. T.Subramani., P.Anitha., S.Sekar., "Health-Care Waste Management System", International Journal of Engineering Research and Applications, Vol. 4, Issue 6(Version 2), pp.255-258, 2014.
- [3]. T.Subramani., N.Kanthasamy., "High End Solution For Advanced Civil Engineering Projects", International Journal of Modern Engineering Research, Volume. 4, Issue. 6 (Version 3), pp 49-53, 2014.
- [4]. T.Subramani.,D.S.StephanJabasingh,J.Jayalakshmi. "Analysis Of Cost Controlling In Construction Industries By Earned Value Method Using Primavera", International Journal of Engineering Research and Applications, Volume. 4, Issue. 6 (Version 5), pp 145 -153, 2014.
- [5]. T.Subramani.T, P.T. Lishitha., M.Kavitha., "Time Overrun And Cost Effectiveness In The Construction Industry", International Journal of Engineering Research and Applications, Volume. 4, Issue. 6 (Version 5), pp 111- 116, 2014.
- [6]. T.Subramani. ,R.Lordsonmillar., "Safety Management Analysis In Construction Industry", International Journal of Engineering Research and Applications, Volume. 4, Issue. 6 (Version 5), pp 117- 120, 2014.
- [7]. T.Subramani., A.Sarkunam.A, J.Jayalakshmi. "Planning And Scheduling Of High Rise Building Using Primavera" , International Journal of Engineering Research and Applications, Volume. 4, Issue. 6 (Version 5), pp 134 - 144, 2014.
- [8]. T.Subramani.,P.S.Sruthi., M.Kavitha. "Causes Of Cost Overrun In Construction", IOSR Journal of Engineering, Volume. 4, Issue. 6 (Version 3), pp 1 - 7, 2014
- [9]. T.Subramani, M.Sekar , " Preplanning And Scheduling Of Road Construction By Using PPM" , International Journal of Application or Innovation in Engineering & Management (IJAEM) , Volume 4, Issue 5, pp. 234-244 , 2015
- [10]. T.Subramani, V.Jayaraman , " Analysis Of Construction Workers Migrate From Industries" , International Journal of Application or Innovation in Engineering & Management (IJAEM) , Volume 4, Issue 5, pp. 274-283 , 2015
- [11]. T.Subramani, S.Tamizhanban , " Supply Chain Management In Construction Site By Using SPSS Software" , International Journal of Emerging Trends & Technology in Computer Science (IJETTCS) , Volume 5, Issue 3, pp. 182-193 , 2016.
- [12]. T.Subramani, S.R.Rajiv , " Improving Construction Efficiency And Productivity Of Industry Using SPSS" , International Journal of Application or Innovation in Engineering & Management (IJAEM) , Volume 5, Issue 5, pp. 239-250 , 2016 .
- [13]. T.Subramani, K.Chinnadurai , " Construction Management And Scheduling Of Residential Building Using Primavera" International Journal of Application or Innovation in Engineering & Management (IJAEM) , Volume 4, Issue 5, pp. 188-198 , 2015
- [14]. T.Subramani, Kurian Jacob , " Analysis Of Risk, Threshold And Issues And Monitoring Schedule Of Building Construction Using PPM Software" , International Journal of Emerging Trends & Technology in Computer Science (IJETTCS) , Volume 5, Issue 3, pp. 171-181 , 2016.
- [15]. T.Subramani, M. Muhammed Ansar, S.Priyanka , " Impact Of Prefabricated Technology And Equipment On The Profitability Using Primavera " , International Journal of Emerging Trends & Technology in Computer Science (IJETTCS), Volume 6, Issue 3, May - June 2017 , pp. 176-185 , ISSN 2278-6856.
- [16]. T.Subramani, V.Annamalai , S.Priyanka , " Management Information And Communication Technology In Construction Engineering Of Structures Using Primavera " , International Journal of Emerging Trends & Technology in Computer Science (IJETTCS), Volume 6, Issue 3, May - June 2017 , pp. 186-197 , ISSN 2278-6856.
- [17]. T.Subramani, V.Bhaskaran Nair, A.David, B.Mohamed Ghouse, N.Siva Kumar , " A Study Of Inventory Management System In Construction Industry " , International Journal of Application or Innovation in Engineering & Management (IJAEM), Volume 6, Issue 5, May 2017 , pp. 304-311 , ISSN 2319 - 4847.