

ANALYSIS OF THE KEY ELEMENTS THAT CONTRIBUTE TO BAD MATERIAL MANAGEMENT

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ABSTRACT – The majority of a project's budget 60 to 65% is spent on materials. So, it's crucial to define project limits for material management from the planning stage to the store and inventory stage. Hence, effective material management can boost profit by up to 5 to 6% of material cost. Yet, because of poor planning and material management, it has become challenging for the company to preserve additional earnings. A major company experiences cost overruns in projects, and in order to minimize costs, quality specifications and methodical process projects are sacrificed. In order to identify the major factors affecting material management in a firm, a Likert scale survey was conducted in Satara, Maharashtra. The major factors are listed in this paper and are ranked from most dangerous to least dangerous based on the relative importance index. For each factor, solutions are offered.

INDEX TERM – Material Management, Cost, Procurement, Firm, Construction Material, Relative Important Index (RII).

1. INTRODUCTION

Material management is a process that coordinates planning, requirements assessment, sourcing, purchasing, transportation, storage, and control. In other words, material management is a system for planning and controlling all project materials at a fair cost and at the proper time and location. Secondly, because material is such a costly commodity in a project, good material management minimizes the cost of the project, resulting in extra profit.

In the construction industry, project cost variance is a significant issue that affects projects both directly and indirectly in terms of cost and performance, with an overall impact on project use and performance. To control cost variances, it is crucial to manage a project's material management; the study finds that doing so increases project efficiency by 35%. (Patel et al.) Purchasing the material too early may result in capital blockage, significant cash investment, material theft, and additional interest on the purchase of the material. If a delay occurs in purchasing the material, project activities may lag, which delays project completion therefore, proper material management is required to avoid cost increases in terms of material interest or activity delays.

2. OBJECTIVE

- I. To determine the main reasons for poor material management in construction
- II. To avoid the causes of material management issues in construction
- III. To develop a cost-effective project by managing construction materials.

3. METHODOLOGY

The investigation of the project will be carried out in accordance with the pre-planned strategy and the requirements of the study. This inquiry will aid in directing and providing direction to the article via the use of questions and answers. A research methodology is designed stage by stage in accordance with their targets conduct and functionality and role in order to ensure the work's effectiveness. The five steps are as follows: preparatory stage, reviewing literature, gathering knowledge, analysing knowledge, and forming conclusions.

Below given are step which summaries the stages of used for investigation of major contributing factor of material management they are as follow

- I. Evaluate the issues due to the poor management of material in construction.
- II. Identify the objective and scope of project.
- III. Study of objective and scope of project.
- IV. Study major causes of the poor material management
- V. Preparation of questionnaire survey question
- VI. Collection of data by questionnaires survey
- VII. Analysing the collected data
- VIII. Discussion and interpretation of result
- IX. Conclusion and recommendation

The questionnaire contains the total 24 question which divided in four stages namely A). planning stage B). Vendor selection stage C). Procurement stage D). Store and inventory. The given four stages divide the material management in four stages further these

stages are divided in question which provided the essential data for analysis of data. Then 5 point likert scale the analysis of likert scale is as shown in below table.

Table 1 – representation 5 point likert scale

Sr/no	Agreement scale in number	Representation
1	1	Strongly disagree
2	2	Disagree
3	3	Undecided
4	4	Agree
5	5	Strongly agree

The collected data is analysed by relative important index in which the according to the important index the major factor are ranked according to the values of relative important index and common ranking is also done so the impact may analysis. Total 70 questionnaires were distributed in local construction firm out of 70 only 50 responder has to survey, the responder were engineer, architecture, contractor and sub-contractor etc. at last according to relative importance index ranking are given the form for calculation of relative important index is as follow

$$RII = \frac{\sum W}{A \times N}$$

Where w is the respondent’s weighting of each factor, which can range from 1 to 5, n1 is the number of respondents for Not Important, n2 is the number of respondents for Less Important, n3 is the number of respondents for Moderately Important, n4 is the number of respondents for Important, and n5 is the number of respondents for Very Important. A state the highest weightage and N state the total sample size. The conclusion obtain from the rii are represented in tabular data, graphs and ranking are given on bases of weightage of relative important index and interpretation of each question is done to conclude each question interpretation following below table has been used.

Table 2 – interpretation criteria

Sr.no	Criteria	Interpretation
1	1.00 to 1.80	Strongly disagree
2	1.81 to 2.60	Disagree
3	2.61 to 3.40	Undecided
4	3.41 to 4.20	Agree
5	4.21 to 5.00	Strongly agree

4. RESEARCH ANALYSIS

The material management have been divided into 4 part and for each part independent questioners have developed, following are the for part as follow

- I. Planning stage
- II. Vendor selection stage
- III. Procurement stage
- IV. Store and inventory

The result of each part contain total responder, probability of event, relative importance index and ranking of major factor are stated the values with highest RII is most important and dangerous and the values with least RII is least important. The factor with highest RII is most dangerous factors.

I. PLANNING STAGE

Sr.No	Major factor	RII Values	RII Rank	Interpretation
1	Procurement is Not Planned Before Starting of the Project	0.340	7	Strongly disagree
2	False Planning	0.468	6	Disagree
3	Undefined Scope	0.600	5	Undecided
4	Lack of Communication and meeting	0.752	2	Disagree
5	Incomplete Drawings & Specifications	0.772	1	Agree
6	Lack of conformance for material	0.748	3	Agree
7	Non-standard Specifications	0.700	4	Agree

Table no - 3

II. VENDOR SELECTION STAGE

Sr.No	Major Factor	RII Values	RII Rank	Interpretation
1	Uncontrollable Bid List	0.808	3	Agree
2	Incomplete Proposals & Documents	0.864	1	Strongly Agree
3	Non-Competent Vendor Selected	0.800	4	Agree
4	Vendor Satisfaction	0.792	5	Agree
5	Bid quoting	0.856	2	Strongly Agree

Table no - 4

III. PROCUREMENT STAGE

Sr.No	Major factor	RII Values	RII Rank	Interpretation
1	Delay in Fund Received	0.840	4	Agree
2	Availability of Material / Quantity	0.888	2	Strongly Agree
3	Delay Due to Long Lead	0.804	6	Agree
4	Late Deliveries	0.816	5	Agree
5	Unavailability of Temporary Material	0.724	7	Agree
6	Political Issue/ Transport Strike	0.936	1	Agree
7	Re-handling of Materials	0.864	3	Strongly Agree

Table no - 5

IV. STORE AND INVENTORY

Sr.No	Major Factor	RII Values	RII Rank	Interpretation
1	Inadequate Storage Area of Materials	0.756	4	Agree
2	Improper Track Record	0.824	3	Agree
3	Theft	0.848	2	Strongly Agree
4	Damaging /Wastage	0.888	1	Strongly Agree
5	Absence of Codification & organized According to Specification	0.680	5	Undecided

Table no - 6

5. CONCLUSION

The finding of study carried out to identify the major problem of bad material management system and major factor affecting the material management system. According to the study's relative importance index, the factor with the highest value is the most significant, and it is important to identify any potential mitigating factors. Incomplete drawings, poor communication among project participants, and improper specifications are the main planning stage issues, so appropriate remedies must be used to address them.

In order to stop the practise of fraud, special improvement in vendor selection is necessary because all factors are interconnected and one can affect the improvement of all other factors. The process of choosing a vendor may be impacted by the choice of a non-qualified vendor. The political climate, material accessibility, delays in material delivery, and erratic fund receipts are the main issues encountered during the procurement and store stages. The relative importance index of these issues is high, and the interpretations found for each factor are strongly agreed. Other factors, such as material damage from use or transportation, may result in the need for more expensive materials. Other elements such as material mis-recording and theft are major challenges with high RII. The paper clearly state that the material management should done from planning stage to the use of material thus improper handling of material may increases delay in project, increases cost and time.

6. REFERENCES

- 1) Kasim, N. (2011). Ict Implementation For Materials Management In Construction Projects: Case Studies. *Journal Of Construction Engineering And Project Management*, 1(1), 31–36. <https://doi.org/10.6106/Jcepm.2011.1.1.031>
- 2) Deepak Md. (2015). An Empirical Case Study Of Material Management In Residential Project. <https://doi.org/10.13140/Rg.2.1.1118.9368/1>
- 3) Phu, N. L., & Cho, A. M. (N.D.). Factors affecting material management in building construction projects.
- 4) Thomas, H. R., Riley, D. R., & Messner, J. I. (N.D.). Fundamental principles of site material management.
- 5) Yazdani Mehr, S., & Omran, A. (2013). Examining the challenges affect on the effectiveness of materials management in the malaysian construction industry. *international journal of academic research*, 5(2), 56–63. <https://doi.org/10.7813/2075-4124.2013/5-2/a.7>
- 6) Kasim, N. B., Anumba, C. J., & Dainty, A. R. J. (N.D.). Improving materials management practices on fast-track construction projects.
- 7) Jaśkowski, P., Sobotka, A., & Czarnigowska, A. (2018). Decision model for planning material supply channels in construction. *automation in construction*, 90, 235–242. <https://doi.org/10.1016/j.autcon.2018.02.026>
- 8) Durdyev, S., Ismail, S., & Bakar, N. A. (N.D.). Factors causing cost overruns in construction of residential projects; case study of turkey.
- 9) Asapuri, C., & Payghan, V. R. (2022). A Review on factors affecting material management on construction industry. 09(04).
- 10) Khalfan, M., McDermott, P., Oyegoke, A., Dickinson, M., Li, X., & Neilson, D. (2008). Application of kanban in the uk construction industry by public sector clients. in *proceedings of iglc16: 16th annual conference of the international group for lean construction* (pp. 347-359). university of salford.
- 11) Gulghane, A. A., & Khandve, P. V. (2015). Management for construction materials and control of construction waste in construction industry: a review. *International Journal of Engineering Research and Applications*, 5(4), 59-64.