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MATERIAL MANAGEMENT IN CONSTRUCION INDUSTRY

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Abstract : Materials management is an important part of the construction industry. The purpose of data management is to ensure that construction data is available at the point of use when needed Product management testing ensures that data is of the right quality and value is correctly selected, provided, delivered and completed in the right place at the right time and at the right price. The use of data management techniques effectively increases the flow of data and materials into the workspace, thereby facilitating the development of face planning, increasing productivity, program and reducing costs. Material management is important to increase the efficiency of construction It defines material management functions, including departure, supplier inspection and selection, purchasing, payment shipping, product receipt, placement, and products, sales and distribution. In project, we prepared construction management equipment construction projects for the construction industry, we also conducted business analysis and identified different types for construction materials correction management. In addition to discussing the monitoring systems and for business information management, software development for management is also discussed.

Index Terms **– Material management, project management, quality control**

I. INTRODUCTION

The construction industry is India's largest economy with expenditures. According to the Five November Plan is the second largest economy after agriculture. Document management is an important element of project management. Effective data management is essential to the success of construction. Over the years has grown and changed with the complexity of the project. Itis important to understand the origins of data management and how they differentiate from other businesses. The basic value of the construction industry is knowledge. The total cost of material scan represent 60% or more of the total cost of construction, depending on the type of project and technology level and the facility used KV (Patel et al., 2011) Such a large investment requires extensive planning and management to reduce the waste that affects the performance of the organization. Material Management is a common function responsible for planning and controlling the material flow Delays in construction One of the main problems with is poor product management. Ensuring timely information flow is an important issue in inventory management. Control of procurement is important because supply deficiencies or deficiencies can delay time and risk. This then impacts on maintaining a continuous supply of materials for production, thus affecting the entire job. Information management is simply the process by which an organization provides the goods and services it needs to purchase, store, and move. The purpose of supply management is to ensure that supplies are in the right place, in the right amount of when needed. The growth of the industry and the urbanization of the city has led to the construction of many things that lead to construction waste. Global construction of materials generates one million tons of waste per year. Waste of is a major problem in the development of business. Waste time refers to the difference if there is a difference between the estimated and actual use of individual items. Some hazardous materials may be immobilized until authorities determine that safety instructions and restrictions have been complied with. Therefore, proper waste management of the construction site is very important Waste management means eliminating as much waste as possible, reducing waste as much as possible, and reusing materials that would not normally be waste. Determining the exact amount and composition of waste generated throughout the project is difficult as it is constantly changing due to the dynamic nature of construction. Different stages of construction produce different types and types of waste. However, Waste Generation is estimated based on Building Construction and Equipment Purchase. The nature of Waste may vary at different stages of development. Therefore, waste generation during the construction phase must be identified and analysed in order to reduce waste.

1.1 Objective

- To study the present practices of material management for construction field
- To maintain sufficient stock of row material
- Buying or purchasing.
- Procuring and receiving.
- Storing and inventory control supply and distribution of materials.

- Efficient production scheduling.
- Forecasting demand and quality of materials requirement.

1.2 Purpose of Material Management

- To save funds on purchases.
- To reduce wastages.
- To provide a decent level of customer service

1.3 Advantages of Materials Management

- Reducing overall coast of materials
- Quality Control
- Labour Saving
- Better relation with suppliers
- Purchase saving
- Stock reduction
- Better cash flow management

1.4 Research Methodology

Figure 1 Plan of methodology

2. LITERATURE REVIEW

(Georgekutty, 2012)The evaluation of recent studies and publications on the management of building materials is usually the main goal of a literature review on the subject. It would probably include a wide range of topics, including waste management, inventory management, storage, and transportation in the construction sector. The literature evaluation may emphasise the main problems and difficulties in managing the materials used in construction, point out the most successful methods and approaches, and investigate how efficient management affects project time, cost, and success in general. The use of technology and digital technologies to enhance material management procedures might also be included.

(Gulghane & Khandve, 2015) This research study offers a thorough analysis of construction waste management strategies and management practises for building materials. Due to their enormous influence on project cost, schedule, and sustainability, the authors emphasise the significance of efficient management in these areas. The study emphasises the difficulties in handling building supplies, including purchasing, storing, moving, and inventory monitoring. It examines several ways of effective material management, including supply chain management, technology, and just-in-time delivery techniques. The authors also cover another important topic for sustainable building practices—the handling of construction trash. They examine the origins and forms of construction waste as well as the effects that insufficient waste has on the environment, the economy, and society. The study paper also includes case studies or examples that show effective waste management and material management techniques in the construction sector. It assesses the advantages and difficulties of using these techniques and recommends areas for more study and development.

(Jusoh & Kasim, 2016) This study report offers a thorough analysis of how material management affects project performance. In order to successfully complete a project in terms of cost, time, quality, and overall project results, the writers emphasise the need of proper material management. The many facets of material management are examined, as well as how they affect project performance. The primary elements of material management are covered, including purchasing, inventory management, storage, transportation, and handling. The writers emphasise the difficulties and problems encountered in each of these areas and look at how they may affect the success of projects. The research also investigates the connection between project performance metrics and material management practises. To determine the connections between effective material management and enhanced project cost control, it analyses previous research and literature.

(Shet & Narwade, 2016) Examining several elements of material management, including purchasing, inventory management, storage, transportation, and handling, may be included in the case study. The writers may have used a variety of methods and tactics to enhance these procedures and raise the effectiveness of material management as a whole. The difficulties with material

management throughout the construction of the industrial building may be included in the study paper, together with how the chosen approaches handled them. It could emphasise the advantages and results attained as a result of using the selected material management approaches. Additionally, the writers may include suggestions and lessons learned for related building projects to help readers understand the case study's practical consequences. They might provide advice by talking about the suitability and efficiency of the various methods employed in the case study.

(Vatsal & Jayeshkumar Pitroda, 2017) Given the enormous influence material management has on project timelines, costs, and overall performance, the analysis begins by highlighting its vital role in building projects. To increase project efficiency and reduce delays, the authors emphasise the requirement for sound material management procedures. The writers also cover how material management affects project delivery. Effective material management procedures lead to increased project performance, decreased construction time, cost savings, and increased productivity. On the other hand, inadequate material management can lead to delays, increased costs, rework, and unhappy customers. The authors make a number of recommendations for improving material management practises in building projects based on their analysis of the literature. These include implementing cutting-edge technologies like Building Information Modelling (BIM) for the tracking and management of materials, enhancing collaboration and communication among project stakeholders, providing training for construction workers, and establishing strong strategies for procurement and supply chain management. The study uses a critical literature review technique, which entails reading and synthesising pertinent books, reports from the building sector, and research publications. The evaluation tries to pinpoint crucial elements, tactics, and difficulties related to material management and their effects on project completion. The review shows a number of important conclusions. It begins by outlining the major variables that affect material management, such as purchase tactics, inventory management, transportation, storage, and waste management. The writers go into numerous methods for enhancing these elements.

(Ashika, 2019)The deployment and advantages of an inventory management system for material management in construction projects are the main topics of the research study. An example of what such a document may include is given below in general: Most likely, the article examines the value of efficient material management in building projects and emphasises the difficulties encountered in this field. The idea of an inventory management system would subsequently be introduced as a potential remedy to simplify material management procedures. The inventory management system that is being suggested has several essential features and functions that will be included in the research paper, along with an explanation of how it can track and manage building supplies during the course of a project. Using technologies like barcode scanning, RFID (Radio Frequency Identification), or other automated systems may also be included. Case studies or examples of actual building projects where the inventory management system was used and the outcomes were evaluated may be included in the paper. Metrics including increased project schedule efficiency, less material waste, and cost savings may be included in this evaluation.
(Ramya & Viswanathan, 2019) The writers may cover a range of topics related to material management, including as purchasing, inventory management, storage, handling, and transportation. To analyse various methods for controlling building materials utilised in the industry, they may research previous literature, industry standards, and case studies. The study report could emphasise how crucial proactive material management is to enhancing project performance in areas like cost management, project planning, and quality assurance. It could go through the advantages of putting proactive strategies into practise, such just-in-time delivery, supply chain optimisation, technology utilisation, and cooperative methods with suppliers and contractors. The writers may also discuss the difficulties and obstacles encountered while putting proactive material management approaches into practise and offer suggestions for overcoming them. They could offer suggestions and useful information to help construction industry experts improve their material management techniques.

(Saravanan & Professor, 2021) It is clear that the research paper's purpose is to conduct a meta-analysis-based literature evaluation on material management. In a meta-analysis, information from several research is thoroughly examined and synthesised in order to reach conclusive findings. The article most likely offers a summary of material management across several businesses or sectors, examining its essential ideas, guiding principles, and difficulties. Various areas of material management, including purchasing, inventory management, storage, transportation, and waste management, may be covered. The authors may have analysed and combined data from many research on material management by using a meta-analysis technique. In the available literature, they could have found recurring themes, trends, or patterns that allowed them to make inferences about the general efficacy of material management techniques.

(Pagare & Aditi R. Sonawane, 2022) The literature study may include a range of topics related to inventory and material management, such as waste management, procurement, storage, and transportation. The writers may examine various methods, plans, and equipment employed in the building sector to boost material management procedures, increase supply chain effectiveness, and optimise inventory levels. The significance of efficient inventory and material management in construction projects may be covered in the paper, with particular emphasis on how they affect project performance, cost containment, resource optimisation, and overall project results. In order to manage inventory and supplies, construction businesses frequently confront problems. The authors may identify these problems, investigate alternative solutions, and provide best practises. The study report may also discuss how technology and digital solutions, including as automation, construction management software, and RFID tracking systems, may help with inventory and material management. The writers may go through the advantages and drawbacks of using these technologies and offer viewpoints on how they may be used in the building sector. The literature review might be concluded by the authors summarising the main findings, pointing out gaps in the current research, and recommending topics for further study and advancement of inventory and material management procedures in the construction sector.

3. Data Collection

Data collection for research refers to the systematic gathering and capturing of relevant information or data to address research objectives, test hypotheses, or explore specific research questions. The purpose of data collection in research is to obtain empirical evidence that can be analysed and interpreted to draw meaningful conclusions and make informed decisions The data collected in

investigate can be subjective or quantitative, depending on the nature of the investigate consider and the investigate goals. Subjective information collection strategies center on capturing non-numerical information, such as interviews, perceptions, and record investigation, to investigate and get it complex marvels in-depth. Quantitative information collection strategies, on the other hand, point to get numerical information that can be analysed factually, such as studies, tests, and sensor-based information collection.

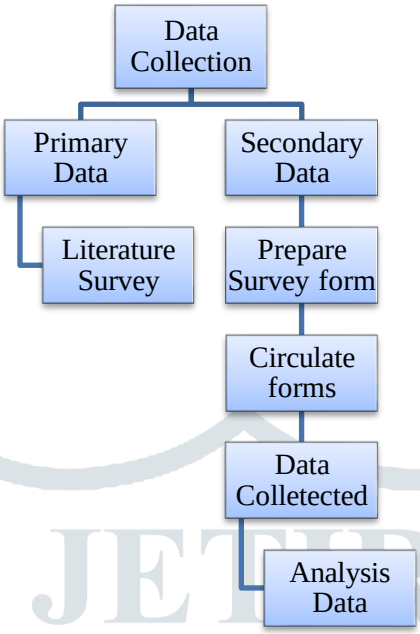

Figure 2 Data collection process

3.1 Questioner design

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
5	4	3	2	1

Table 1 Measure Scale

4. DATA ANALYSIS

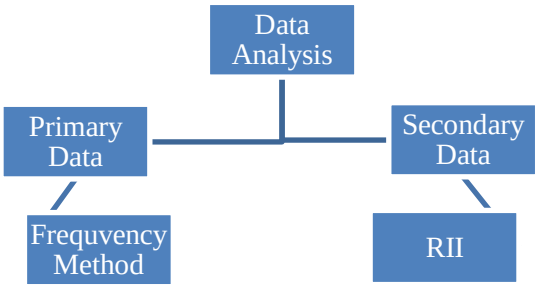

Figure 3 Process of Data analysis

4.1 Data Analysis by RII

After collecting all responses and data, it is classified into the related types of projects. Then the find out the major causes and how much parentage it will affect the projects in delay, cost overrun. And what are the solution for same.

$$RII = \Sigma w / A \times N$$

Equation 1 RII Analysis

Where W is the weighting as assigned by each respondent

$$RII = \frac{5\,n5+4\,n4+3\,n3+2\,n2+1\,n1}{AxN}$$

Equation 2 Relative Importance Index Method

n5 = Number of Respondent for Strongly Agree
n4 = Number of Respondent for Agree
n3 = Number of Respondent for Neutral
n2 = Number of Respondent for Strongly Disagree
n1 = Number of Respondent for Disagree

4.1.1 Factors and Responses

NO.	Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	On Site job layout follow	18	31	07	12	04
2	Material over stroke on site	18	27	13	14	00
3	On site dispute due to un plane material management	22	30	09	09	02
4	Material test & quality checking on site	26	21	10	12	03
5	Space availability on site for storage	17	25	13	13	04
6	Whether the existing material handling system is effective or not?	23	24	13	09	03
7	Do you fix vendor for same material	15	33	10	10	04
8	Material wastages on site	23	27	05	17	00

Table 2 Data collected from questioner

4.1.2 Factor RII Rank

NO.	Questions	RII	Rank
1	On Site job layout follow	0.7304	6
2	Material over stroke on site	0.7361	5
3	On site dispute due to un plane material management	0.7694	1
4	Material test & quality checking on site	0.7527	4
5	Space availability on site for storage	0.7055	8
6	Whether the existing material handling system is effective or not?	0.7577	3
7	Do you fix vendor for same material	0.725	7
8	Material wastages on site	0.7555	2

Table 3 Result of RII method

4.2 Correlation Method Statistics

Correlation method is used for corelate different factors with other. In research factors are questioner factors are used to compare with each other and used to find the correlation between all of it. Which are the main factors which affect the delay in construction project in residential projects in western region

No	Question	Mean	Std. Deviation	N
1	On Site Job Layout Follow	3.65	1.189	72
2	Material Over Strock On Site	3.68	1.059	72
3	On Site Dispute due to un plane material management	3.85	1.083	72
4	Material Test & Quality Checking On site	3.76	1.228	72
5	Space Availability on site for storage	3.53	1.198	72

6	Whether the existing material handling system is effective or not?	3.76	1.157	72
7	Do You Fix Vendor For same Material	3.63	1.131	72
8	Material Wastages on Site	3.78	1.141	72

Table 4 Statics from SPSS software

5. Conclusion

All data collected and analysis we found different factors affecting material management in construction industry we identify the factor were put in questionary form and response was from stakeholders at small and medium scaled residential projects in Gujarat Based on the response from the questionary from, the following conclusion made.

1) In material management, defined roles and responsibilities was considered to be the major problem by storage of materials and poor store layout.

2) In vendor analysis stage for material management, poor coordination and among contractor and material supplier was considered to be the major problem.

3) In material wastage analysis stage many materials wastes on site.

4) Use of in correct material on site without test & quality checking use material

5) Other factor is don't follow the job layout on site.

We are use two methods in this project relative importance index method and correlation method that after we are find the result wash most affected factor from questionary was on site dispute to un plane material management this is the most effective for material management.

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