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MATERIAL MANAGEMENT IN HIGH RISE BUILDING

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ABSTRACT

Material management plays a critical role in the successful execution of high-rise building projects. Efficient management of materials is essential to ensure timely project completion, cost optimization, and quality control. This paper aims to provide an overview of material management practices in high-rise buildings, highlighting their importance and challenges. Through a comprehensive analysis of current practices, the abstract discusses various aspects of material management, including inventory management, procurement, logistics, quality control, waste management, and material handling. It emphasizes the significance of accurate inventory keeping, cost optimization, enhanced quality control, improved safety, and better project planning in achieving successful outcomes. The abstract also explores the challenges faced in material management, such as storage limitations, procurement issues, skilled labour shortages, transportation constraints, and material shortages. Furthermore, potential solutions and recommendations are presented to address these challenges and enhance material management practices in high-rise buildings. These abstract aims to provide valuable insights for stakeholders involved in high-rise construction, enabling them to improve material management efficiency and overall project success.

Keywords: *materials management, high rise building*

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INTRODUCTION

The goal of material management is to ensure that the materials are available at their point of use when needed. Hence, well-organized procurement of material represents a key role in the successful conclusion of the work. If the materials are not managed properly then it affects the cost of the construction and the time and effort invested in the construction site is wasted. There are many problems affecting the construction project. Materials management in high-rise building construction involves the effective coordination and control of construction materials throughout the project lifecycle. It encompasses activities such as procurement, storage, handling, transportation, and disposal of materials. Due to the scale and complexity of high-rise building projects, efficient materials management is crucial for cost optimization, timely completion, quality control, and safety. Studied the theory of material management and they concluded the doing well management of construction materials has to be based on modernized information and process utilize a well-designed construction materials management system. Lack of management of materials will affect the general presentation of building projects in situation of time, budget, worth, efficiency. The wastage of resources should also be minimized during construction to stay away from loss of revenue for the construction industry. (Kasim et al., 2017). By implementing efficient materials management practices, high-rise building projects can achieve cost savings, timely completion, and improved quality. It requires collaboration among project stakeholders, effective communication, and the utilization of technology solutions to streamline processes and enhance productivity.

LITERATURE REVIEW

Materials management is an important function for boosting productivity and efficiency in construction projects. The term refers to a combination of processes responsible for the sourcing, purchasing, moving, storing, and controlling of materials in an effective and cost-effective manner. It also to gain economy in purchasing, to satisfy demand during period of replenishment, to carry reserve stock to avoid stock out, to stabilize fluctuations in consumption and to provide a reasonable level of client services.

Materials Management Processes in High Rise Building

The planning, acquisition, processing, inventory and waste management, and logistics of materials used in building projects are all part of the materials management procedures. Proper material handling on building sites is made possible by a good environment for materials management. The procedures of planning, procurement, storage, handling, and monitoring are covered to better comprehending

materials management: planning, purchasing, logistics, handling, stock management, and waste management. (Kasim et al.,2017).

In Malaysia, like in many other countries, material management in the construction industry faces various challenges. These challenges can impact project timelines, costs, and overall efficiency.

Material Management Challenges in Malaysia

- Constraints site storage

Site logistics with regards to material handling and distribution and ordering and delivery of materials to the construction site. For example, failure to order on time may cause delays in the projects. It may interrupt the work schedule.

- Materials shortage and delay

Materials shortage and delay issues in high-rise building construction can have significant impacts on project timelines, costs, and overall productivity. High-rise buildings require large quantities of materials, including steel, concrete, glass, and specialized components. The high demand for these materials in the construction industry, particularly during periods of rapid urbanization and economic growth, can lead to shortages as the supply struggles to meet the demand. Other else major problems faced by the construction industry are late payment and non-payment. (Hashim, 2018).

- Procuring a bid

It is not uncommon for the scope of the project to change as it is coming together, which can affect the bidding and materials acquisition processes. For example, the property owner wants to substitute higher quality materials but does not want to extend the overall budget. The general contractor or project manager will need to work with on-site tradespeople like mechanical or electrical contractors to determine what, how, and where accommodation can or cannot be made. Next is ordering and receiving materials. The problem is they need to be delivered to a specific location central warehouse vs. jobsite, and they are sent to the wrong spot.

- Incorrect quantities

Problematic management of material are due to overstock materials because of improper planning, damaged materials due to logistics, handling or in application, loss of materials because of improper supervision, waiting of the materials to arrive in location can affect overall project. The fact that cannot be ignored is that factors related to construction material appeared in most of these lists of factors causing cost overrun, delay, and quality issues.

- Material transportation

Working on a high-rise with dozens of floors, knowing what elevators are available is crucial. Outside of loading docks, elevators are one of the biggest choke points for traffic flow. Unfortunately, many job sites operate with a single freight elevator. Since all the other tradespeople need to use it to transport materials too, the elevator can become busy very quickly. With worker productivity closely connected to profitability, time spent waiting for an empty elevator can be costly.

- Small Elevator

Even if they have access to an elevator, its size may be less than ideal. For instance, not all job sites have a freight elevator. While can make do with a passenger or service elevator, project manager tends to be smaller. Project manager also need to watch out for weight limits. If the elevator size is less than 10 feet, workers may have trouble fitting cable tray and other larger materials inside. Imagine how frustrating it would be if they ready to install cable tray on the 18th floor, but the material is stuck on the first.

- Lack of skilled workers

The construction industry in Malaysia faces a shortage of skilled workers, which can impact the efficient handling and installation of materials. both categories of labour demand have relationship with its determinant in short and long run period. However, the professional worker is still lacking, and this shortage is substituted by technical worker. The need for manpower is higher for the technical workers. In addition, the manpower required for 2015 and 2020 are largest for the specialized construction activities due to its larger initial stock and higher output growth (Sulaiman et al., 2021).

Solution Problem Material Management High Rise Building

- As we know the major challenges that were discovered are material management activities related to constraints site storage. It is important to establish a consistent process from the beginning. On some sites, it will make the most sense for subcontractors and tradespeople to order their own major supplies, while general contractors take care of the day-to-day and miscellaneous requirements. When it comes to on-site storage, there are a few basic things that need to be done. First is to make sure storage solution suits the job including any physical limitations, inventory schedules, and environmental factors. Second reduce how far people must go to get the materials. They do not want crews spending too much time walking back and

forth whenever they need to change their tool or grab an accessory and lastly keep storage units locked, especially when they are not in use. This will help management to control access.

- Relying on a limited number of suppliers can increase vulnerability to material shortages and delays. Building a diverse supplier network helps ensure a wider range of options and mitigates the risk of dependence on a single source. Regularly evaluating and qualifying new suppliers can enhance flexibility and resilience in the supply chain. For delay establishing open lines of communication and fostering collaboration among all project stakeholders can help address payment issues proactively. Regular meetings and progress updates allow for timely discussions on any potential payment challenges and facilitate early resolution.

- The third challenges are procuring a bid. The solution is to maintaining communication and involvement. Project manager might be able to provide advice on which materials and methods would be most suitable for the task at hand, information that can be factored into the bid.

- The next one is ordering and receiving materials, for incorrect quantities this problem the solution is needed to work with reliable suppliers. Sometimes general contractors get hung up on the price of the product, compromising on service to keep some cash in them. project pocket. Working with a partner who can provide superior service and keep your jobsite organized and stocked will help to maximize productivity and reduce labour costs.

- Solution for the elevator and material transportation is the best way to minimize elevator size issues is to plan for them. As soon as you can, measure the size of the elevator and check its weight requirements. Then, let distributor know the limitations they are working with. They will be able to help to identify any materials that will be difficult to fit inside. Distributor can package or kit materials in the most convenient size before they arrive at job site. For example, transporting conduit bundles on tilt conduit carts makes it easier to fit them into tight spaces like elevators. Other else for material transportation use Just-in-time (JIT) delivery involves scheduling material deliveries at the right time during construction. This method reduces on-site storage, congestion, and material availability, optimising logistics. Using efficient and suitable lifting and hoisting equipment also can be improved by investing in cranes, lifts, and material lifts. It reduces manual handling, reduces material damage, and speeds up heavy or bulky item movement.

- The government can provide support for the development of training programs and the adoption of technology in the construction industry to

improve skilled worker in Malaysia. This can include funding for education and training initiatives and tax incentives for organizations that invest in skills development and technology.

METHODOLOGY

This study describes the research methods that were used. A thorough planning and scheduling of the study's methodology had been organized in proper sequence to ensure a smooth running of the study programmed, beginning with the literature review, and ending with the suggestion and conclusion. The methodology ensures that the information obtained from this study is both relevant and scientifically valid. The literature review did not yield the data needed for this study's statistical analysis. As a result, primary data collection became necessary.

FINDINGS AND ANALYSIS

This study presents the findings and analysis from the literature review and questionnaires. The results and data analysis based on survey responses are covered in this chapter, with the data being analysed and interpreted in accordance with the resources available. After the data was gathered using the questionnaire, the analysis was completed. Information was gathered from individuals who are from the construction area like engineers, quantity surveyor, architect, and project manager.

Table 1: Challenges of Materials Management in High Rise Building

No	Items	Mean	Index
1.	Building having small elevator to transport the material for the high level	3.41	Moderate
2.	Problem with site storage	3.38	Moderate
3.	Issues in material transportation	3.34	Moderate
4.	Problems with procuring bid and getting incorrect quantities	3.28	Moderate
5.	Issues related to material, shortages, and delay.	3.28	Moderate
6.	Issues in lack of skilled worker	3.19	Moderate

The data provided presents a comprehensive assessment of various aspects within the construction or a related industry. The mean values and index ratings offer valuable insights into the severity or importance of each item. All the listed items received a "Moderate" rating, indicating that while there are concerns and room for improvement, the issues are not overly critical. Among the factors evaluated, three areas emerge as more pressing concerns. Firstly, there is a notable concern surrounding the building having a small elevator for transporting materials to higher levels, as indicated by the mean score of 3.41. This suggests that addressing this issue could enhance efficiency and productivity on construction sites. The problem with site storage closely follows with a mean score of 3.38. Adequate storage is crucial for ensuring smooth operations and preventing delays, making this aspect another key area for improvement. Additionally, issues in material transportation, which obtained a mean score of 3.34, are also of significance. Efficient material transportation is vital for timely project completion and cost-effectiveness. Another area that warrants attention is the difficulty in procuring bids and dealing with incorrect quantities, scoring an average of 3.28. Clear and accurate procurement processes can help avoid potential complications and financial setbacks. Further emphasizing the importance of seamless material management, issues related to material shortages and delays also achieved a mean score of 3.28. Lastly, the lack of skilled workers, with a mean score of 3.19, is a concern that should not be overlooked. Addressing skill shortages and investing in workforce development could contribute to higher quality outputs and smoother project execution. Overall, the "Moderate" ratings imply that while there are challenges within the industry, they are not insurmountable. This analysis highlights several areas where focused efforts can lead to notable improvements in construction operations and outcomes. To gain a deeper understanding of these results, additional context, such as the survey's scope, respondent demographics, and specific project contexts, would be beneficial for crafting targeted solutions and strategies to address the identified issues.

Table 2: Solution of Material Management in High Rise Buildings

No	Items	Mean	Index
1.	Stay up to date market trends for materials	3.69	Moderate
2.	Avoid overspending on materials	3.56	Moderate
3.	Relying on a limited number of suppliers for avoid material shortage and delay	3.53	Moderate
4.	Develop strong relationships with suppliers	3.47	Moderate
5.	Develop strong relationships with suppliers for procurement process	3.41	Moderate
6.	Maintaining communication and involvement for procuring a bid	3.34	Moderate
7.	Utilizing just-in-time delivery methods	3.09	Moderate

The data provided indicates that the surveyed participants recognize the importance of various procurement and material management strategies within a business or industry setting. The fact that all items received a "Moderate" rating suggests that while these strategies are acknowledged as valuable, none of them are perceived as highly urgent or critical by the respondents. Among the strategies, "Staying up to date with market trends for materials" obtained the highest mean score of 3.69, indicating that the participants consider staying informed about market trends crucial for effective material procurement and cost management. This insight underscores the significance of monitoring market dynamics to make informed decisions and maintain a competitive edge. Closely following is the strategy of "Avoiding overspending on materials" with a mean score of 3.56. This finding highlights the participants' emphasis on cost control and optimizing material expenses, likely to improve overall financial performance and project profitability. Another vital aspect is "Relying on a limited number of suppliers to avoid material shortage and delay," scoring a mean of 3.53. The participants recognize the importance of supplier diversification to mitigate risks associated with material shortages and delays, indicating a prudent approach to procurement. The significance of "Developing strong relationships with suppliers" is evident from its mean score of 3.47. Building and nurturing cooperative relationships with suppliers are seen as beneficial for maintaining a reliable supply chain and ensuring smooth operations. Similarly, "Developing strong relationships with suppliers for the procurement process" scored 3.41, indicating that participants value positive interactions with suppliers during the procurement phase to streamline the process and achieve favourable outcomes. Effective communication during the bid procurement process is highlighted by the strategy "Maintaining communication

and involvement for procuring a bid," which achieved a mean score of 3.34. This result suggests that transparent and active communication with stakeholders during the bidding process contributes to successful project execution. Lastly, "Utilizing just-in-time delivery methods" received a mean score of 3.09. Although still rated as "Moderate," the slightly lower average score may indicate that the participants perceive this strategy as somewhat less critical compared to other approaches. Overall, the analysis reveals that the survey participants value a balanced and comprehensive approach to procurement and material management. While these strategies are considered important, their specific importance might vary based on the context and objectives of the industry or business surveyed. Further context, such as the survey's specific goals, participant demographics, and industry type, would be valuable to gain a more in-depth understanding of the data. Additionally, conducting further analysis and comparing this data with other relevant metrics would provide deeper insights into the effectiveness and impact of these strategies on overall business operations and success.

CONCLUSION

The study successfully identified high-rise building materials management practises and their issues. Data analysis revealed several key findings. Data analysis revealed several key findings. Data analysis It also showed significant dissatisfaction with current material management practises, suggesting improvement. Most respondents said high-rise building projects need material management. Logistics, storage, procurement, and transportation were discussed. Material management includes inventory, procurement, logistics, quality control, waste, and handling. These management methods fixed inventory shortages, delays, quality issues, waste, and logistics. In high-rise construction, material management improves cost optimisation, quality control, safety, and project planning. Project success required these functions. Material management challenges included site storage constraints, procurement and quantity accuracy issues, transportation issues, skill shortages, limited lift capacity, and material shortages and delays. The study advised developing strong supplier relationships, using a small number of trusted suppliers, maintaining open communication and involvement throughout the procurement process, avoiding excessive material spending, staying current on market trends, and implementing just-in-time delivery. These solutions improved material management and project results. The study illuminates high-rise material management. It emphasises material management efficiency, challenges, and improvement. These tips can help high-rise building stakeholders.

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