Cost Reduction of Highway Construction Project Using Material Procurement Methods

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Abstract- *The profitability of construction projects can vary greatly, sometimes resulting in contractors losing money rather than making a profit. Project control in the construction industry is crucial to ensure projects are completed on time, within budget, and meeting all project requirements. Cost reduction techniques play a significant role in managing time and expenses effectively. The construction industry constantly strives to reduce costs, often by implementing innovative technologies and methodologies to enhance productivity. This paper discusses how proper material and inventory management techniques can lead to substantial cost savings, ultimately increasing project profitability. Various challenges such as poor planning, material shortages, delays, and communication issues can lead to cost and time overruns in construction projects. It is essential to analyze project costs and implement cost reduction strategies to carry out projects efficiently. By managing project costs effectively through cost reduction techniques, contractors can avoid financial losses and ensure the success of their projects.*

Keywords- Cost Reduction, Management, Construction Technology.

I. INTRODUCTION

The purpose of the introduction chapter is to orient the reader to the project presented in the body of thesis. The introduction chapter includes all information necessary to prepare the reader, to put the reader in the picture in terms of the specific scope of cost reduction in highway construction project using various material procurement methods. This thesis focus on the material procurement methodologies which deals with the reduction of the cost of construction materials without compromising the quality of materials. The methodologies adopted are Economic Order Quantity, North West Corner Method, Market Price Trend Analysis, Request for Proposal and Negotiation, Bulk Buying. Construction project management is a professional service that uses specialized, project management techniques to oversee the planning, designing and construction of a project from its inception to its end. The purpose of construction project management is to efficiently plan, schedule and execute the project by overcoming various challenges faced during its runtime. Success of any construction project strongly depends on the effective utilization of cash flow, material management to complete project in scheduled timeframe with required quality norms in optimized cost. Considering the importance of material management this project includes the importance of material management to improve construction costs with theoretical details and practical description of material management systems.

II. IDENTIFY,RESEARCH AND COLLECT IDEA

The basic aim of construction work is to build a unique facility, product or service within the specified size, quality, time and cost. Some road construction projects face losses due to poor construction management and cost efficiency by contractors. Some road construction projects face losses due to poor construction management and cost efficiency by contractors. It is necessary to probe in to previous studies that have focused upon supply chain management and process modeling. Though material requirement planning studies in road construction projects were not purely found, some key points like major road construction materials and sections relevant to study are referred from some papers The following are only a few of the numerous variables that have an impact on the building cost estimate and ultimately the project cost:

1) Similar Construction Projects: The finest source of information for the construction estimate will be comparable construction projects. The final costs of those comparable projects can serve as a model for estimating the costs of new construction projects. It is necessary to weigh in the completed cost of previous projects with the current construction cost indices.

2) Construction Material Costs: These include the cost of the materials, shipping fees, and any necessary taxes. So, it is important consider all these variations while calculating construction material cost as construction material may account to more than 50% cost of the whole project. Factors Contributing to Trends in Building Material Prices: Here now we have gathered the price action chart of cement, steel, plastic /PVC, paint over a decade and then compared against

actual economic indicators that may affect future 19 building material prices. The correlation coefficients computed for the economic indices and accordingly the factors are ranked.

i) Demand and Supply: Demand and Supply is a deciding factor for the price of material/commodity. Here Demand means the requirement /buying orders of the given material. And Supply means the capacity of supplier/seller to provide the material within a stipulated time. If the demand is less and supply is more it will increase the price of given material vice versa is also true. Therefore, we need to take this factor while finding out the changes in price trend.

ii) Market condition: Market condition is a broad term; it can be seen as an index indicating the price of various different categories of stocks. It also indicates the growth potential of the country. If the market is in a bullish trend indicates that commodities are not overvalued.

iii) Transportation Cost: Most of the time increased material cost is primarily due to increased transport charges.

iv) Raw Material and Input Cost: Rising raw materials costs along with other factors such as oil, gas and energy are the key causes of increases in the prices of building materials such as cement, roofing membranes and water proofing and vice versa.

v) Energy Cost: Increase in energy cost have a knock-on effect on the production processes of most construction materials in order to compensate for this and maintain their profit margin, manufacturers have to increase building material prices.

III. WRITEDOWNYOURSTUDIESAND FINDINGS

The project provides information on the basics of materials management, the role of inventory management in inventory management with inventory terminology and classification, business strategy, inventory management systems, key performance indicators of product management systems, inventory models and product optimization with physical importance. text. you plan to keep inventory in time. Further to it project provide importance of material management for finance & cost control for construction project with relation to inventory costs. Also, further project applies all this theoretical terminologies & process to a practical case study of a typical construction site.

Implementing sustainable material procurement methods can significantly contribute to cost reduction in highway construction projects while promoting environmental stewardship. By adopting practices such as sourcing recycled and locally available materials, construction firms can lower transportation costs and minimize the carbon footprint associated with material delivery. Additionally, bulk purchasing agreements and long-term supplier relationships can offer economies of scale, further reducing material costs. Advanced procurement techniques, such as just-in-time delivery, can help reduce storage needs and associated costs. Furthermore, leveraging technologies like Building Information Modeling (BIM) can optimize material usage and reduce waste. These approaches not only streamline procurement processes but also enhance overall project efficiency, leading to substantial cost savings and sustainable construction practices.

IV. CONCLUSION

Large-scale scientific resource projects often have lots of senate grinds unit. To work out the plan and repeated calculation only by personal experience will often spend a lot of time and usually isn't easy to achieve objectives. Use the project management technology can do comprehensive management when managing a project. And it has characteristics of timely, raid, accurate and convenient etc. Whatever manual work only can't match it all. For this reason, depending on its significant role in project management, and its characteristics of simple operation, easy to tracking and adjust. Project must will be widely used. We have used Microsoft Excel for procurement of material, which gives us the optimize cost of different construction materials using different procurement management techniques. We can optimize the cost of construction material without compromising the quality of material.

The conclusion of the project regarding the optimization by different procurement method is as follows:

1. Actual budget of project ₹16,89,70,82,744.14
2. After optimization by different procurement methods, budget of project ₹12,62,51,67,601.80
3. The % optimization 4.19%

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