ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25jul191

A Detailed Study into Cost & Time Benefit Analysis in Construction Industry

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Publication Date: 2025/07/12

Abstract: This study examines cost versus time benefit analysis in a residential housing project in Kerala. It evaluates how schedule acceleration techniques—such as overlapping activities and resource intensification—affect overall project costs. By comparing conventional and fast-tracked timelines, the research highlights the trade-offs between increased direct costs and potential savings in indirect costs and early occupancy. Findings show that, with proper planning, time-cost optimization can enhance project efficiency while managing associated risks. The study offers practical insights for improving cost-effectiveness in residential construction projects.

How to Cite: Jinitha C K; (2025) A Detailed Study into Cost & Time Benefit Analysis in Construction Industry. *International Journal of Innovative Science and Research Technology*, 10(7), 521-522. https://doi.org/10.38124/ijisrt/25jul191

I. INTRODUCTION

Time and cost are two critical parameters that determine the success of construction projects. In residential construction, especially in regions like Kerala where climatic and logistical challenges exist, achieving an optimal balance between project duration and cost is essential. Project managers often face the dilemma of whether to expedite project timelines at the risk of increased expenditure or to follow conventional timelines with controlled budgets. A cost vs. time benefit analysis helps identify the most economically viable approach without compromising project quality.

II. METHODOLOGY

The methodology adopted in this study is a case-based quantitative analysis:

- Time-Cost Analysis
- Graphical Representation
- Analysis Criteria

III. METHEDOLOGY & ANALYSIS

- *Data Collection*

Project data were obtained from planning documents, cost estimates, and execution reports of a real-time housing project comprising [insert number] residential units. Key cost components considered include:

- Direct costs (labor, materials, equipment)
- Indirect costs (site overheads, supervision, utilities)

- *Time-Cost Analysis*

Two construction schedules were developed for comparison:

- Normal Schedule (baseline project duration)
- Accelerated Schedule (using overlapping activities and resource loading)

A time-cost trade-off analysis was conducted by adjusting project duration and recording corresponding cost impacts. The technique follows principles of Critical Path Method (CPM), where non-critical activities were compressed, and cost variations were calculated for each scenario.

- *Graphical Representation*

The collected data were used to prepare:

- A Time-Cost Trade-off Curve showing variations in total cost with different durations
- A Bar Chart comparing cost components under normal vs. accelerated conditions.

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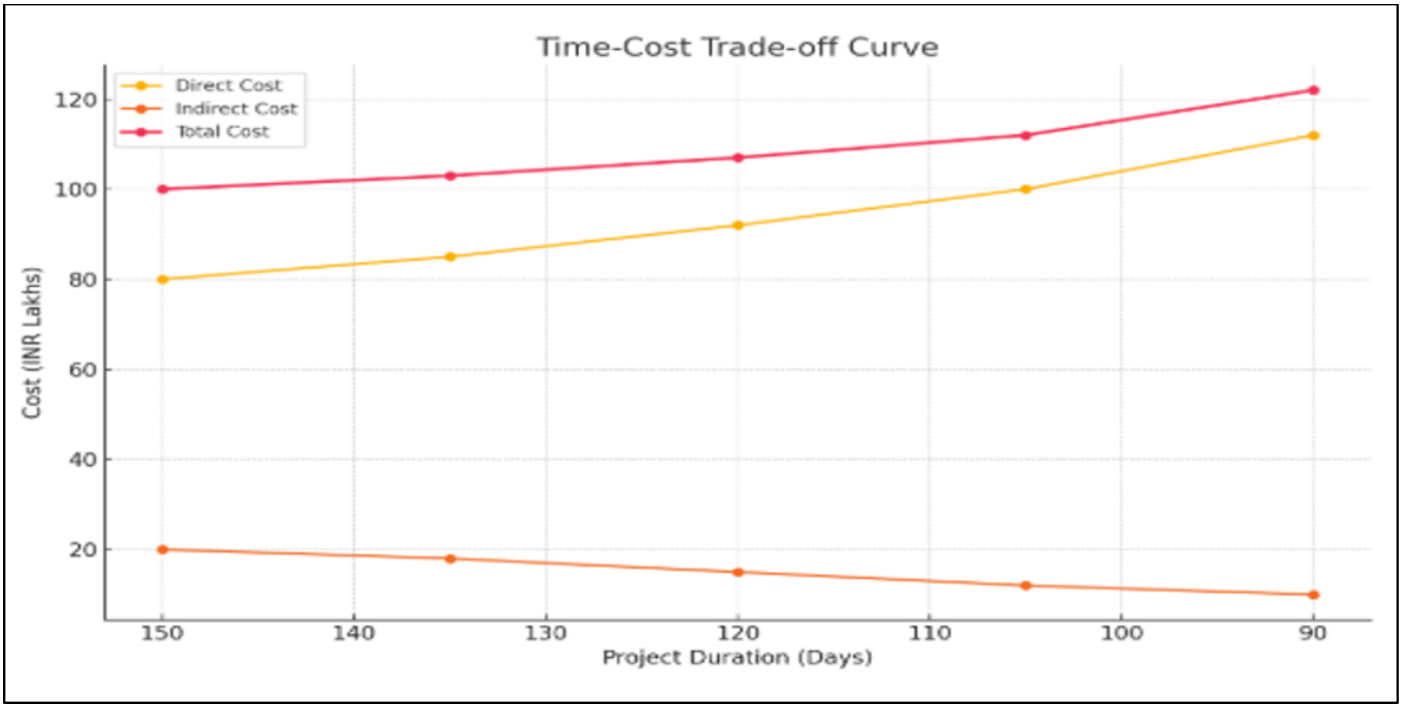

Fig 1 Time-Cost Trade-off Curve

➢ *Analysis Criteria*

Cost impacts were evaluated under the following conditions:

- Direct and indirect cost variation
- Overall project cost change
- Practical feasibility of acceleration techniques

The goal was to identify the point of optimal balance where any further compression leads to disproportionately higher costs, thus reducing project value.

IV. CONCLUSION

This study demonstrates that time and cost are intricately linked in construction project management, particularly in the context of residential housing projects in Kerala. The analysis shows that while reducing project duration can lead to early completion benefits such as faster occupancy and reduced overhead costs, it also significantly increases direct costs due to resource intensification and accelerated schedules. Through time-cost trade-off evaluation and comparative cost component analysis, the research highlights the importance of identifying an optimal project duration that balances both economic efficiency and execution feasibility. The findings underscore the need for strategic planning and informed decision-making during the scheduling phase of construction projects to maximize overall value without compromising quality or stakeholder objectives.

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