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# Identifying the Major Factors that Affect Overtime and Cost in High-Rise Buildings

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**Abstract -** *Time and cost are two essential parameters for a successful construction project these must be effectively managed. The time and delay in economy is one of many construction buildings biggest challenge that is facing in India. The delay in building projects is a scenario where the projects cannot be accomplished in a scheduled time period. The study of this project is to explain typical causes of project delays and exceeding cost in construction project for high rise buildings. The problems were identified from empirical studies and construction sites. Data collection was carried out by means of a standardized questionnaire that was designed based on 9 categories and 50 questions. Contextual pilot research was carried out on the basis with expert opinions in the construction sector to strengthen the questionnaire by reducing the variables and recognizing any issues that might arose when the questionnaire was filled out. This questionnaire survey was conducted among clients, labors, daily wage workers, consultants and contractors from different industries. Then, the overall respondents ranked the top most variables based on relative significant index method to figure out the main reasons of time and price overruns in high elevation buildings. The conclusion provides recommendations for preventing these issues in high rise buildings and it will be useful in future projects to minimize costs and time.*

***Key Words***: Construction projects, High rise buildings, Cost overrun, Time overrun, Economy, Construction organisation.

## 1. INTRODUCTION

For a wide range of reasons, cost and time overruns can occur on various types of projects, which lead to discussion on how cost and time overruns can be minimized in high-rise buildings. Finding the causes and consequences of factors affecting cost and time overruns is important and is used to reduce such overruns. The first and most critical task is to identify and understand the reasons for overruns that are responsible.

### 1.1 Time overrun

It is a basic requirement to complete construction projects on time. Nevertheless, programs are never finished on time. That has become a problem worldwide. The problem of delays in the built environment is a global phenomenon. For most building programs, delays arise either in basic or complex terms. The uncertainty can occur as other delays at the time, and all of them will impact the completion of the project on project date. For most construction projects, the highest possible performance is unachievable with low productivity resulting for time delay and eventually project inflation costs. The effect of postponement may sync up with other delays, and all may affect the project's completion date. In delay, there were significant variations between actual progress on site work and planned work in the project.

### 1.2 Cost overruns

Cost overruns in the construction sector are very common among the original costs. Only a few projects are completed. Cost is considered one of the most significant factors over the life cycle of a project. Fortunately, most of the projects declined to complete the project with the projected cost. In addition to time overrun, cost overrunning is also a significant problem in the industry. It is a big concern for developed and developing countries alike. This same pattern is perhaps more extreme in emerging countries where the cost of the estimated project often exceeds 100 percent.

### Objective

- Identify the overrun time and cost factors for high rise buildings.
- To rank the factors according to project overruns level of importance.
- Assessing factors in projects under construction.
- Determining the overrun time and cost factors for high-rise buildings.
- Guidelines as well as findings for the prevention of problems in high-rise buildings and the improvement of future project costs and times.

This research followed a quantitative approach in determining and analyzing the major factors that cause overruns. Qualitative pilot research was carried out on the basis of expert opinions in the construction industry to improve the questionnaire by which the variables and identifying any issues that could occur when the questionnaire was completed. Consequently the questions were updated to be more transparent. In the top most is done to find out the major causes of time and cost overruns in the ranking of high rise buildings.

The analysis of this report basically focuses on three major research methods are literature review, interview and questionnaires. These three methods are related to each other to complete the report by giving a detailed data collection with a meaningful manner. The method literature review gives a clear view of understanding the role of cost and time performance as well as the factors that affects the cost overrun in a construction project.

These factors were analyzed in accordance with the cost overrun and problems of time overrun in high-rise buildings. Questionnaire survey was conducted to explain how consumers, manufacturers and contractors perceive the factors behind cost overrun. The data collected is analyzed using statistical methods to draw the conclusion in assessing the current cost and overrun challenges, conditions, and factors that contribute to this overrun.

## 2. METHODOLOGY

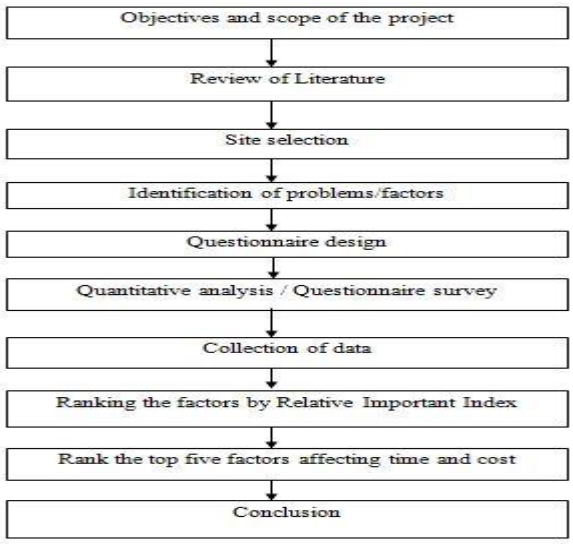


**Fig -1**: Step by Step Process

## 3. DATA COLLECTION

### Questionnaire Survey

As previously reported, questionnaires were provided to owners, consultants, and contractors for the purpose of collecting information about the perception of time and cost overrun causes. Customers, suppliers and contractors were provided with

the questionnaires for the purpose of collecting information on the time and cost overrun estimates. A set of 30 questionnaires has been circulated to representatives of clients, consultants and contracting organizations in the construction sector and 20 questionnaires have been filled in and returned. The factor ranking estimate was based on matrix Relative Value. Relative Significant Index approach is used to assess the relative value of the different factors, time and cost overruns in high-rise buildings.

The four-point scale from 1 (not essential) to 5 (extremely essential) is introduced and the following are translated into relative RII indices for each factor.

$$RII = \Sigma W / A * N$$

Where,
W = Weighting assigned by the respondents to each factor (ranging from 1 to 5)
A = Highest weight (that is, 5 in this case), and
N = Total number of respondent

### 3.1 Number of Respondent

Totally frequently (10) questionnaires were sent to the owner and about 6 completed questionnaires were received and 7 responses from 10 distributions were received from the contractor, 8 responses were received from 10 distributions to consultants. Fig. 3.1 defines the number of questionnaires submitted and the number of respondents.

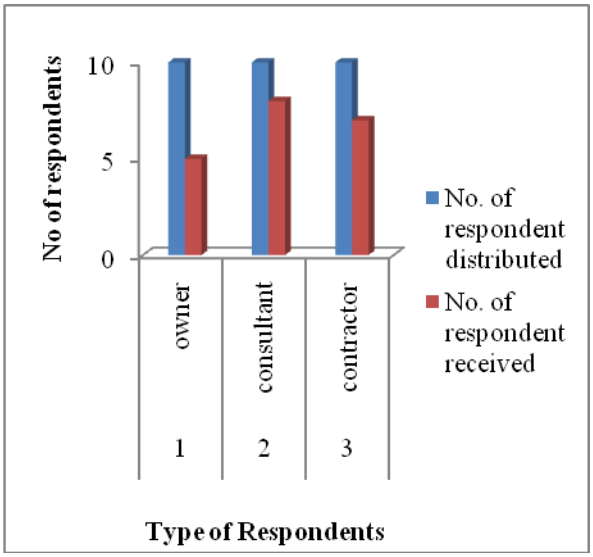


**Fig -3.1**: Number of Respondent

### 3.2 Year of Experience

On the basis of the organization's experience, four classes were defined as: more than 15 years of experience, between 10 to 15 years of experience, 5 to 10 years of experience and less than 5 years' experience. Fig. 3.2 lists the amount of the owner, contractor and consultant experience in all four categories.

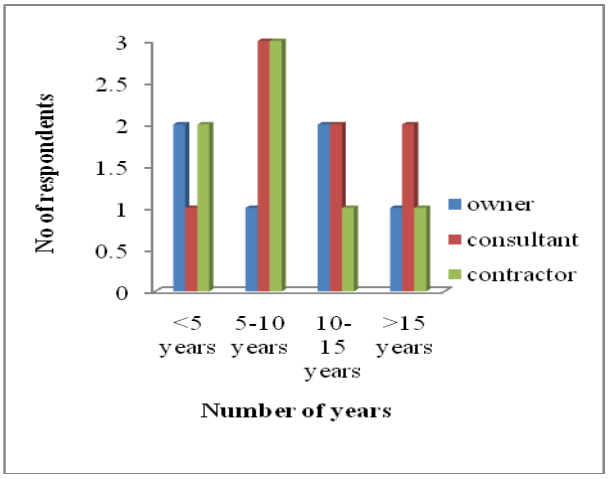


**Fig -3.2**: Year of Experience

### 3.3 Number of Project Executed

Questionnaire survey includes number of executed projects within the organization. This survey is divided into three categories, more than 50 projects done, between 20 to 50 projects done and fewer than 20 projects done. Fig. 3.3 indicates the number of projects performed in all three sections including owner, contractor and consultant.

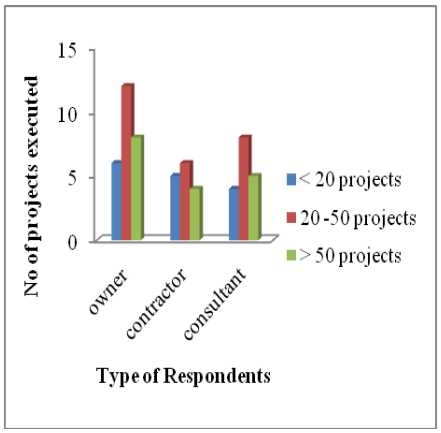


**Fig -3.3**: Number of Project Executed

## 4. DATA ANALYSIS AND DISCUSSION

Ranking is done in high-rise buildings of 20 out of 30 questionnaires issued by the total respondents on factors impacting time and cost overruns. RII results and general respondents ranking as shown in table 4.1

**Table -4.1**: RII and Ranking of Factors by Overall Respondents

| SL .No | FACTORS AFFECTING THE TIME AND COST OVERRUNS | RII | RANK |
|---|---|---|---|
| 1. | Contract length original is too short. | 0.82 | 8 |
| 2. | Legal litigations between different parties. | 0.81 | 11 |
| 3. | Low contractor management and supervision of sites. | 0.83 | 6 |
| 4. | Poor professional for the Contractor. | 0.8 | 15 |
| 5. | Poor communication & coordination with other parties by | 0.79 | 20 |
| 6. | Discrepancies between contract Document | 0.76 | 31 |

| | | | |
|---|---|---|---|
| 7. | Incompetent subcontractors and poor communication between contractors | 0.7 | 41 |
| 8. | Poor contract management | 0.82 | 8 |
| 9. | Inadequate Construction Planning by contractor | 0.74 | 38 |
| 10 | Distasteful methods of Building by contractor. | 0.82 | 8 |
| 11. | Delay in project payments | 0.83 | 6 |
| 12. | Insufficient Fund | 0.75 | 36 |
| 13. | Delays in Decision making | 0.89 | 1 |
| 14. | Suspension of work by owner | 0.77 | 28 |
| 15. | Unqualified / unskilled labour | 0.76 | 31 |
| 16. | Shortage of labour | 0.75 | 36 |
| 17. | Labour disputes and strike | 0.67 | 46 |
| 18. | Relationship between management and labour | 0.76 | 31 |
| 19. | Absenteeism of labour | 0.57 | 49 |
| 20. | Small staff efficiency | 0.7 | 41 |
| 21. | Scaling up of commodity costs | 0.8 | 15 |
| 22. | Poor quality of materials and unreliable suppliers | 0.8 | 15 |
| 23. | Delay of material Delivery to site | 0.8 | 15 |
| 24. | Lack of materials in markets | 0.76 | 31 |
| 25. | Inaccurate quantity take off | 0.81 | 11 |
| 26. | Changes in material specification & type | 0.78 | 25 |
| 27. | Quality Assurance/control | 0.79 | 20 |
| 28. | Miserable coordination with others & cooperation. | 0.81 | 11 |
| 29. | Conflicts between Consultant & design Engineer | 0.78 | 25 |
| 30. | Delay in performing inspection and testing | 0.79 | 20 |
| 31. | Change in the scope of the project by consultant | 0.85 | 3 |
| 32. | Delay in inspection & approval of completed works | 0.79 | 20 |
| 33. | High cost of machineries | 0.76 | 31 |
| 34. | High transportation cost | 0.79 | 20 |
| 35. | Equipment breakdowns | 0.7 | 41 |
| 36. | Shortage & slow mobilization of Equipment | 0.77 | 28 |
| 37. | Low level of equipment operators skill | 0.74 | 38 |
| 38. | Design and Document Issues | 0.85 | 3 |
| 39. | Incomplete drawings & design | 0.88 | 2 |
| 40. | Inaccurate Site investigation or survey before design | 0.81 | 11 |
| 41. | Errors in design documents | 0.84 | 5 |
| 42. | Slow permits by government agencies | 0.7 | 41 |
| 43. | Unforeseen ground Conditions | 0.69 | 45 |
| 44. | Wastage on site | 0.63 | 47 |
| 45. | Problem with nearby construction area | 0.57 | 49 |
| 46. | Accidents during construction | 0.8 | 15 |
| 47. | Natural Disaster (flood, rainfall, earthquake) | 0.77 | 28 |
| 48. | Flawed conditions on the subsurface (soil, water table high) | 0.74 | 38 |
| 49. | Delay in obtaining local permits | 0.78 | 25 |
| 50. | Effect of cultural factors | 0.62 | 48 |

The top most factors are found by using RII to collect the answers and list the top factors according to the Relative Importance Index of the Related Factor. All these data are shown in the Fig. 4.2

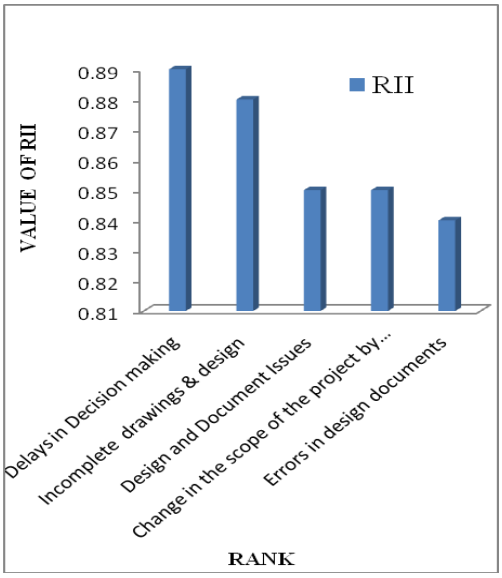


**Fig - 4.2**: Effect of Top Most Variables Impacting Time and Cost Overruns

The ranking is based on the importance of the RII as shown in the figure and indicated as follows:

1. Decision time delays
2. Incomplete drawings and design
3. Issues regarding design and documentation
4. Increase in project spectrum per contractor
5. Errors in design documents

## 5. CONCLUSION

Factors influencing the time and cost overruns in high-rise buildings rate the total questionnaires provided by the respondents. RII, and several other key factors ranking by the overall respondents are as shown in the table 5.1

**Table -5.1:** Top Most Factors Affecting Time and Cost Overruns

| SL. NO. | TOP MOST FACTORS AFFECTING TIME AND COST OVERRUNS | RII | RANK |
|---|---|---|---|
| 1. | Delays in Decision making | 0.89 | 1 |
| 2. | Incomplete drawings & design | 0.88 | 2 |
| 3. | Design and Document Issues | 0.85 | 3 |
| 4. | Change in the scope of the project by consultant | 0.85 | 3 |
| 5. | Errors in design documents | 0.84 | 5 |

Therefore, the top most time and cost influencing factors are identified and rated by the overall respondents based on the Relative Important Index system.

In recent years high-rise buildings have been a great success in the civil industry. Time and cost overrun are the biggest challenges faced when building these types of apartment buildings.

The technique proposed in this study aims to understand the major factors that affect time and cost overruns on high-rise buildings. It was performed on the basis of the site issues and the data obtained in the literature questionnaire survey.

## REFERENCES

[1] D. Aditi (2014), "Evaluate of Construction Cost and Time Attributes," Association of Researches in Construction Management, Vol.2, pp.473-480.
[2] D. Aditi (2015), "Effective Techniques in Cost Optimization Of construction project: An Review," International Journal of Research in Engineering and Technology, Vol.4, No.07, pp.551-557.
[3] H. M. Aftab, A. R. Ismail, Ade Asmi Abdul Azis (2012), 'Time and Cost Performance in Construction Projects in Southern and Central Regions of Peninsular Malaysia," International Journal of Advances in Applied Sciences, Vol.1, No.1, pp.45-52.
[4] H. M. Aftab, A. R. Ismail, Ade Asmi Abdul Azis (2011), "Preliminary Study on Causative Factors Leading to Construction Cost Overrun," International Journal of Sustainable construction Engineering and Technology, Vol.2, issue -1.
[5] Ali, Kamaruzzaman (2010), "Cost performance for building construction projects in Klang valley," Journal of building performance, Vol.1, issue -1.
[6] S. Ashwini Arun, Rahul S. Patil (2014), "Effect of Construction Delays on Project Time Overrun: Indian Scenario," International Journal of Research in Engineering and Technology, Vol.3, issue -1.
[7] D. Megha, Dr B. Rajiv (2013), "A Methodology for Ranking of Causes of Delay for Residential Construction Projects in Indian Contex," International Journal of Emerging Technology and Advanced Engineering Vol.3, issue -3.
[8] M. Hannah, Dr. G. Srinivasan (2014), "A Study on the Resource Factors Influencing the Scheduling Performance in Construction Industries," International Journal of Engineering Research &Technology, Vol.3, issue -4.
[9] V. Meena, Ar. K. Suresh Babu (2015), "Study on Time Delay Analysis for Construction Project Delay Analysis," International Journal of Engineering Research &Technology, Vol.4, issue 03.
[10] K. Phaniraj, K. S. Sreekumar (2014), "Practical Factors Affecting Delay in High Rise Construction – A Case Study in a Construction Organization," International Journal of engineering Research & technology. Vol.3, issue -5.
[11] C. Ramanathan and S. Narayanan (2014), "Qualitative analysis of Time delay and Cost overrun in Multiple Design and Build Projects," International Conference Data Mining , Civil and Mechanical Engineering.
[12] Salim S. Mulla, Prof. Ashish P. Waghmare (2015), " A Study of Factors Caused for Time & Cost Overruns in Construction Project & their Remedial Measures, " Internal Journal of Engineering Research and Applications. Vol.5, issue -1.
[13] S. Shanmugapriya, Dr. K. Subramanian (2015), "Investigation of significant factors influencing time and cost overruns in Indian construction projects," International Journal of Emerging Technology and Advanced Engineering, Vol.3, issue -10.
[14] A. Shreenaath, S. Arunmozhi, Sivagamasundari (2015), "Prediction of construction cost overrun in Tamil Nadu- A Statistical Fuzzy Approach," International Journal of Engineering and technology Research, Vol.3, issue -3.
[15] S. Sivakumar, Shree Naath. A, R. Sivagamasundari (2015), "Statistical Study on Critical Factors Influencing Time Overruns in Tamil Nadu Construction Projects," International Journal of Engineering and Technical Research,Vol.3, issue -1.

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