

## Full Paper

# Study on Time Overrun related to Construction Projects in Sri Lanka

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### Abstract

The time overrun in construction projects is a common issue around the world and no exception in Sri Lankan construction industry. The aims are to identify the causes and their significance to the project time overrun as well as to provide suggestions for those identified causes. Totally 39 significant factors were identified as relevant to Sri Lankan construction industry through a literature survey. Then a quantitative questionnaire approach was conducted to identify the significance of factors from industry professionals (civil engineers, quantity surveyors, technical officers, supervisors & directors, and the persons with minimum qualification and experience in the construction industry) working as stakeholders such as clients, consultants, and contractors without considering the project type. The previously identified 39 factors were found to be applicable to the Sri Lankan construction industry with survey results. Through the survey, 33 responses were collected and analyzed based on the relative important index of the results. Highly weighted 15 project time overrun factors were analyzed in detail. Mainly, three factors of time overrun in construction projects were identified by ranking based on overall responses; i) contractor's improper planning, ii) mistakes during construction by contractors, and iii) delay in preparation and approval of drawings. At the same time, social and cultural factors and disputes with surroundings or neighbours got the least significance based on ranking. The relationship between the significance of factors and relevance to the construction party (contractor, consultant) is also identified in this study. From questionnaire responses, the political influence, material theft, labor attitudes and motivation, and unexpected material cost increase than the total budget was selected for the further discussion. Finally, recommendations are provided for future development projects such as the contractor's proper planning. As well as experienced and well knowledge professional to be appointed as a project manager by contracting firm.

**Keywords:** Delay factors, project completion, Sri Lankan construction projects, time overrun

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### Introduction

The construction industry captures a major portion of Sri Lankan economy. Although a large number of construction projects are taking place in Sri Lanka, most of them are not completed on time and they are often affected by delays. So the construction industry has seen a setback compared to other major industries due to delays in construction projects. Especially government or semi-government projects are significantly affected by delays in project delivery. It is identified as a common, costly and complex issue encountered in building construction projects. The success of a project reflects by the quality of the output, completion within time, and remained within the estimated budget. Therefore, mitigation of construction delays is essential for the success of a construction project.

Gajare, et al. [1] defined the construction delays as the time overruns either time exceeding from specified completion date in a contract, or past the date that the parties agreed upon for the handover of a project Assaf & Al-Hejji [2] stated that on-time project delivery is a scale of efficiency, but the process of building construction works is affected by many causes and unexpected actions. Probably these causes and actions

have an impact on construction parties' involvement, availability of resources, environmental & social conditions, and contractual relationships. Generally, it is a rare occurrence that a project is finished within the specified contract period.

Samarakoon [3] identified a few causes of delays in medium-scale construction projects in Sri Lanka. The areas were identified in order to solve the problems that clients would focus on issues such as improper design, changes during the construction, and setting reasonable time targets, while efficient project management, financial management, and materials handling would be the main aspects relevant to contractors [3]. Similar research was carried out by Jayalath [4] with a different approach and found poor planning and scheduling, delay in obtaining permits and permissions, poor site management, and seven more causes of construction delays in Sri Lanka.

This study focused on identifying the reasons for time overrun and ways to reduce the current impact on construction projects in Sri Lanka.

### Experimental Section/Materials and Methods

As a qualitative study, an online questionnaire was distributed among the clients, consultants, and contractors to receive the responses from the professionals who engaged in Sri Lankan construction industry for a reasonable time.

The questionnaire is mainly divided into two parts, Part 1 being the general information of the respondent and their experience with delays. Part 2 includes a four-point Likert scale approach which is used to find the impact of identified causes of delay. Most of the causes were identified from the literature survey [2, 5]. Sambasivan [6] also used Odeh & Battaineh's [5] factors in his research in the Malaysian context. Totally 39 significant factors were identified for Sri Lankan construction industry with some additions made by the experience of the authors.

The convenience sampling method was used for this study. Etikan, et al. [7] suggested that the inclusion of every subject is not possible when the population is very high. Therefore convenience sampling technique is used in most of the studies. Convenience sampling has easy access to select the samples or participants from the population. This method provides high availability of responses within the given time period for the study [8].

In order to analyze the collected responses, the Relative Importance Index (RII) of the factor was calculated through the relative importance index formula [8] as follows.

$$RII = \frac{\Sigma W}{A \times N}$$

Where,

W: Weighting given by respondents to each factor (from 1 to 4.)

A: Highest weight (4)

N: Total number of respondents

**Results and Discussion**

Responses are arranged group wise and number of responses for each weighing represented by using different colors as shown in Figure 1 below. The responses were analyzed based on impact to overall results as well as in order to review the clients’, consultants’ and contractors’ perspectives.

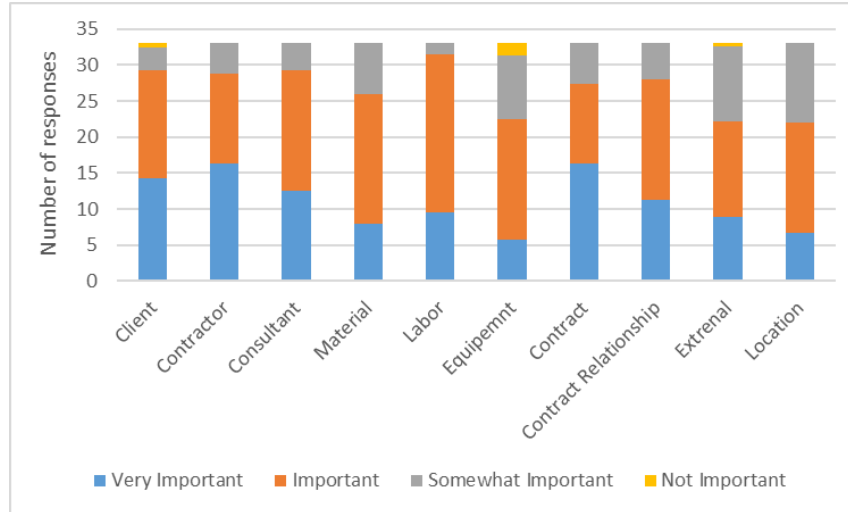


Figure 1. Overall results by groupwise

For overall analysis, each respondent’s degree of importance was used to compute the RII for each identified factors of time overrun and all the factors were ranked as table 1 in order to their RII value.

Table 1. Overall degree and rankings of factors

Group	Factors	Degree of Importance				RII	Rank
		V.I (4)	I (3)	S.I (2)	N.I (1)		
Client	Finance and payments of completed work	14	16	2	1	0.826	12
	Owner interference	18	14	1	0	0.879	7
	Slow decision-making by owners	19	11	3	0	0.871	8
	Unrealistic contract duration and requirements imposed	6	19	7	1	0.727	30
Contractor	Subcontractors	9	20	4	0	0.788	19
	Site management	20	12	1	0	0.894	5
	Construction methods	6	19	8	0	0.735	27
	Improper planning	24	8	1	0	0.924	1
	Mistakes during construction	24	7	2	0	0.917	2
	Inadequate contractor experience	15	9	9	0	0.795	15
Consultant	Contract management	7	23	3	0	0.780	21
	Preparation and approval of drawings	24	7	2	0	0.917	2

	Quality assurance control	8	16	9	0	0.742	26
	Waiting time for approval of tests and inspections	11	21	1	0	0.826	12
Material	Shortage	13	20	0	0	0.848	9
	Changes in type and Specifications	9	19	5	0	0.780	21
	Slow Delivery	6	19	8	0	0.735	27
	Damage in Storage in Site	4	14	15	0	0.667	34
Labour	Labour supply	10	23	0	0	0.826	12
	Labour productivity	9	21	3	0	0.795	15
Equipment	Equipment failure	5	19	9	0	0.720	31
	Shortage	9	7	13	4	0.659	36
	Unskilled Operator	5	25	3	0	0.765	24
	Slow and low quality delivery	4	16	10	3	0.659	36
Contract	Change owners/consultant	16	12	5	0	0.833	11
	Change orders	20	11	2	0	0.886	6
	Mistakes and discrepancies in contract documents	13	10	10	0	0.773	23
Contract Relationship	Major disputes and negotiations	11	17	5	0	0.795	15
	Inappropriate overall organizational structure linking all parties to the project	7	20	6	0	0.758	25
	Lack of communication between the parties	16	13	4	0	0.841	10
External	Weather condition	24	7	1	1	0.909	4
	Regulatory changes and building Code	7	15	11	0	0.720	31
	Social & Cultural Factors	2	14	16	1	0.629	38
	Limited working hours	4	15	14	0	0.674	33
	Obtaining permits from relevant authorities.	11	17	5	0	0.795	15
	Excessive bureaucracy in Government Offices	5	12	16	0	0.667	34
Location	Access to the site	11	16	6	0	0.788	19
	Surrounding/Neighbours	5	7	21	0	0.629	38
	Lack of area for operation/Material stocks.	4	23	6	0	0.735	27

### Discussion

The number of responses five, eight, and twenty were collected from clients, consultants, and contractors, respectively. According to that thirty-nine factors, which are causing time overrun in construction projects in Sri Lanka, were arranged according to their RII. The top 14 ranking factors which get RII of more than 0.8 are given in Table 2 below.

Table 2. List of top fifteen factors

No	Factor	Rank	Group
1	Improper planning	1	Contractor
2	Mistakes during construction	2	Contractor
3	Preparation and approval of drawings	2	Consultant
4	Weather condition	4	External
5	Site management	5	Contractor
6	Change orders	6	Contract
7	Owner interference	7	Client
8	Slow decision-making by owners	8	Client
9	Shortage	9	Material
10	Lack of communication between the parties	10	Contract Relationship
11	Change owners/consultant	11	Contract
12	Finance and payments of completed work	12	Client
13	Waiting time for approval of tests and inspections	12	Consultant
14	Labor supply	12	Labour

The contractor’s improper planning ranked first in overall results. Even, contractors ranked this factor in the first place. But this factor ranked the fourth position on ranking by consultants and clients. Mistakes by the contractor during construction and preparation & approval of drawing ranked second in overall results. Mistakes by contractors during construction ranked lower by consultants and clients. They mentioned this as the fifth most important factor causing time overrun. Preparation & Approval of drawing ranked third by all three parties. The third highest RII factor from overall results is weather conditions selected from the external group. Consultants and contractors know the seriousness of the weather in terms of project work progress. Hence both ordered weather conditions at first and fourth places respectively. According to the overall results, contractors’ responses played a huge role in the final rankings. Table 3 shows the first five selections from each group, in order to better understand.

Table 3. Top 5 ranked factors of each group

Clients	Consultant	Contractor
Site management	Weather condition	Improper planning
Change orders	Change orders	Mistakes during construction
Preparation and approval of drawings	Preparation and approval of drawings	Preparation and approval of drawings
Improper planning	Improper planning	Weather condition
Mistakes during construction	Mistakes during construction	Slow decision-making by owners

The respondents were asked to suggest the factors causing delays in construction projects. From their responses, political influence, material robbery, labours’ faith, and cost exceeding than the total budget was selected for the further discussion.

To mitigate the construction delay, an experienced and well-knowledge professional must be appointed as a project manager by the contracting firm. Because the success of the project depends on the contractor’s

proper planning. Then the work process could be done without major mistakes during the construction as well. At the same time, consultants and clients should select the contracting firm based on past project records and capabilities of the contractor, not put more concern into low biddings. The weather condition must be considered at the beginning stage. According to the past weather records related to the site, the location is analyzed earlier and then it must be planned for dry seasons. Some of the works can be done during rainy seasons like internal works and some can't. Therefore, the project schedule must be planned considering those processes. Above mentioned recommendations are appropriate to Sri Lankan construction industry.

## Conclusions

Project time overrun in construction has a negative impact on Sri Lankan construction industrial development as well as Sri Lanka's economy. It is observed that there are three key factors such as contractor's improper planning, mistakes during construction by the contractor, preparation, and approval of drawings, and weather conditions, getting RII above 0.9 and selected by various stakeholders as significant. The contractor's improper planning is considered as the most significant factor causing time overrun in Sri Lanka. According to Sambasivan's [6] research, they find out contractors' improper planning is the most significant cause of delay in the Malaysian construction industry as well. Therefore, monitoring the contractor's work program with respect to their past experiences and proposed project conditions should be carried out without negligence and good record-keeping. Apart from these four factors, the other 10 causes from the top fifteen have more significance with above 0.8 RII. All the responded parties agreed that disputes by surrounding, or neighbours and social & cultural factors are the least significant factors.

## Conflicts of Interest

The authors declare no conflict of interest.

## References

- [1] Y. Gajare, P. Attarde, D. K. Parbat, "Assessment Of Significant Causes And Effects Of Delays On The Projects Completion Period," *International Journal of Modern Trends in Engineering*, **2015**.
- [2] S. A. Assaf, S. Al-Hejji, "Causes of delay in large construction projects," *International Journal of Project Management* 24, **2006**, pp. 349-357.
- [3] S. M. S. Samarakoon, "*Causes and effects of delays in medium scale building construction projects in Sri Lanka*," University Of Moratuwa, Electronic Theses & Dissertations, Moratuwa, **2009**.
- [4] D. S. K. U. Jayalath, "*The most significant causes of delay in construction in Sri Lanka*," University Of Moratuwa, Electronic Theses & Dissertations., **2010**.
- [5] A. M. Odeh, H. T. Battaineh, "Causes of Construction delays : Traditional Contracts," *International Journal of Project Management*, **2002**, pp. 67-73.
- [6] M. Sambasivan, Y. W. Soon, "Causes and effects of delays in Malaysian construction industry," *International Journal of Project Management*, **2007**, pp. 517-526.
- [7] I. Etikan, S. A. Musa, R. S. Alkassim, "Comparison of Convenience Sampling and Purposive Sampling," *American Journal of Theoretical and Applied Statistics*, **2016**, pp. 1-4.
- [8] B. Abbasnejad, H. I. Moud, "Construction Delays in Iranian Civil Engineering Projects: An Approach to the Financial Security of Construction Business," *Life Science Journal*, **2013**, pp. 2632-2637.
- [9] D. Dolage, T. Pathmarajah, "Mitigation of Delays Attributable to the Contractors in the Construction Industry of Sri Lanka - Consultants' Perspective," *ENGINEER - Vol XLVIII, No.01*, **2015**, pp. 21-30.
- [10] H. Doloi, A. Sawhney, K. Iyer, S. Rentalala, "Analysing factors affecting delays in Indian construction projects," *International Journal of Project Management*, **2012**, pp. 479-489.

- [11] A. Aibinu, G. Jagboro, "The effects of construction delays on project delivery in Nigerian construction industry," *International Journal of Project Management*, **2002**, pp. 593-599.
- [12] Y. L. Pathiramage, R. U. Halwatura, "Factors Influencing the Duration of Road Construction Projects in Sri Lanka," *The Institution of Engineers, Sri Lanka*, **2010**, pp. 17-30.