

Time Delay and Cost Overrun In Construction Projects

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Abstract- The impact of cost and time overruns on construction projects is an undesirable experience both to the clients and stakeholders in the industry. This has regularly led to dispute, unfriendly working relationship, abandonment, low quality and environmental nuisances. This paper evaluated factors contributing to overruns of highway projects and their impact on projects performance at Tamil Nadu in India .Data were collected through questionnaire administration on professionals in the industry. Frequency index were employed to analyse data collected. Increase in material cost, inaccurate materials estimation and underestimating of project costs among others are the most significant cost factors while the most significant time factors include unexpected site condition, increase in project scope, lack of timely progress payment and inadequate planning.

Indexed Terms- Information, Performance, Cost and Time and Developing Economy.

I. INTRODUCTION

The Indian construction industry is an integral part of country's economy and its growth and a conduit for a substantial part of India's development investment. The industry plays a pivotal role in developing the country's infrastructure, a pre-requisite for high levels of economic growth. Most construction projects experience cost overrun and it put massive financial burden on the client or owner. Therefore this research was carried out to identify the causes leading to cost overrun in construction projects.

II. SCOPE AND OBJECTIVES

- To get opinion on these causes from major players in the construction industry namely contractors, clients and consultants.
- To test the strength of association between the rankings of the respondent groups.

- To rank the causes of cost overrun on the basis of importance.
- To assess how frequent each of these causes occur.
- To assess how severe the impact of these causes will be on the total cost of the project.

III. LIST OF CRITICAL FACTORS

- Incomplete design at the time of tender.
- Additional work at owner's request.
- A change in owner's brief.
- Lack of cost planning/monitoring during pre-and-post contract stages.
- Site/poor soil conditions.
- Adjustment of prime cost and provisional sums.
- Re measurement of provisional works.
- Logistics due to site location.
- Lack of cost reports during construction stage.

IV. LITERATURE REVIEW

Literature survey aimed to identify the time delay and cost overrun in construction projects in construction industry.

This paper present "Time delay and cost overrun in Qatari public construction projects", Ismailb 2016, the data that was collected from Qatar public work authority ASHGHAL included 122 public road, building, and drainage projects. ANOVA method was used for data analysis and inference. A regression analysis was also conducted to establish the relationships between project contract prices and cost overruns and to develop prediction models for estimating cost over runs. Two linear regression models were developed for predicting cost overruns for building and drainage public projects, respectively. Cost overruns for building projects increased with contract prices. On the other hand, cost over runs for drainage projects decreased with increasing contract prices. A significant effort was

spent in collecting data on cost over runs and delays in public construction projects. However, data confidentiality did allow the collection of enough data to ensure the robustness of the developed regression prediction models. ANOVA method was used for data analysis and inference. The analysis results showed that the cost overruns and delays were not significant at a significance level of 0.05 with respect to project type and size. They also showed that the cost overruns were not significant at a significance level of 0.05 with respect to the project duration. However, the delays were statistically significant at significance level of 0.05 with respect to the project duration.

The report “An exploration of causes for delay and cost overrun in construction projects” written by Kapur (2016) has made his study on delay and cost overruns are the key problems of any construction projects. To overcome these issues, the paper is aimed to ascertain the most impelling factors causing the project delay and cost overrun, and highlight the possible measures so that the impact on construction projects could be reduced. Each country’s quantitative data from past studies was selected to analyse and recommend the effective measures. A questionnaire survey was conducted in all three case studies adopting different data collection strategies. The main reason of selecting three case studies is to outline the comparative analysis of delay factors and to classify these factors into different priority level of influence in project delay from country to country. This paper has also analysed the average and least impact of the delay factors causing project delay and cost overrun in those countries. The paper concludes that there are diverse groups of delay factors from one country to another country that cause the project delay and cost overrun.

The report “Significant factors causing cost overruns in the construction industry in Afghanistan”, Niazia (2017) has made his study on, it is generally that one criterion for judging the success of a construction project is whether it is completed within budget. Due to various factors, this is often more of a challenge in developing countries where budget problems are just one factor in often poor project performance. In Afghanistan, construction cost overruns are the most substantial problem (facing all parties to a project;

suppliers, subcontractors, main contractors and clients). This research aims to identify the significant factors that lead to construction cost overruns in Afghanistan. The finding of the research is that the key critical causes that potentially result in construction cost overruns in Afghanistan are: corruption, delay in progress payment by owner, difficulties in financing project by contractors, security, change the order by the owner during construction and market inflation.

The report “Factors affecting construction cost in the Pakistani construction Industry”, Rizwan (2012), has made his study on construction industry plays an important role in economy of a country. Construction retains its position in the economy of any country with the continuance of the growth process. Project cost is one of the most important criteria of success of project and is of high concern. The aim of this paper is to find and prioritize those factors (related to design, location and management) which can affect the construction cost during construction at project sites of

Pakistan construction industry. For this purpose a total of 82 factors are grouped under the category of location, design and management. A questionnaire was developed in which respondents were asked to rate the factors in the light of the already defined criteria. After collecting data, it was analysed by using relative importance indices. Results showed that management factors are contributing more towards affecting the construction cost followed by design factors and lastly location factors. The three most critical factors are poor project management, delay in involvement of contractor during design and third one is poor performance of work. Out of 82 factors, the following management related factors were found to be most critical. The factors in the decreasing order of criticality are 1. poor project management 2. delay in involvement of contractor during design 3. Poor performance of work.

The report “Factors affecting construction cost in Mara large construction project”, Ismail (2010), has made his study on. Project cost is one of the most important criteria of success of project and is of high concern to those who are involved in the construction industry. However, studies show that rarely projects are complete within stipulated budget. This study is

focusing on identification of significant causes affecting construction cost in MARA large projects. This paper presents the results of a questionnaire survey conducted among the personnel of Project Management Consultant (PMC). Data was analysed with statistical tools to determine the rank of factors affecting construction cost. It is concluded that cash flow and financial difficulties faced by contractors, contractor's poor site management and supervision, inadequate contractor experience, shortage of site workers, in correct planning and scheduling by contractors are most severe factors while changes in scope of project and frequent design changes are least affecting factors on construction cost. Spearman correlation analysis showed that incorrect planning and scheduling by contractor has strong positive relationship with contractor's poor site management and supervision, inadequate experience of contractors has strong positive relationship within correct planning and scheduling; and contractor's poor site management and supervision, changes in scope of project has strong positive relationship with frequent design changes; and vice versa. The comprehensive study to identify the factors affecting construction cost in MARA large projects was carried out.

The report "Preliminary study on causative factors leading to cost overrun", Hameed (2011), has made his study on cost is the fundamental component for any construction project. However, cost overrun is observed as one of the most frequently occurring issues in construction projects worldwide and need to be studied more to alleviate this issue in the future. This trend is more severe in developing countries where these overruns sometimes exceeds 100% of the anticipated cost of the project. Like other countries, construction industry in Malaysia is also facing a lot of challenges such as the delay to complete the project in time, the expenditure exceeding the budget, the building defects and over dependent of foreign workers. The ultimate effects of project delay also results in exceeding cost. This leads to serious need of addressing the critical issue of construction cost overrun. Hence, this paper is aimed to identify various factors responsible for construction cost overrun. A questionnaire survey and interviews were carried out amongst selected experienced personnel for expert opinion to identify the significant factors causing cost overrun in Malaysia. Five respondents

were selected from each of the respondents groups including client, consultant and contractor. The questionnaire responses were analysed by average index method, which resulted in identification of 59 common factors causing construction cost overrun in Malaysia. Results show that poor design & delays in Design, unrealistic contract duration & requirements imposed, lack of experience, late delivery of materials & equipment, relationship between management & labour, delay preparation & approval of drawings, inadequate planning & scheduling, poor site management & supervision and mistakes during construction were most common and significant factors causing cost overrun in Malaysian construction industry as perceived by experts.

The report "Factors influencing the construction cost of industrialized building system (IBS) projects" Azmi (2012), has made his study on, this paper presents the results of a survey of factors influencing the construction costs of Industrialized Building System (IBS) projects in Malaysia. The aim of the study was to evaluate and rank a range of factors that Malaysian IBS stakeholders regard as important, with the key identified factors being those associated with the main project characteristics, contract procedures and procurement methods, contractors' and consultants' attributes and design parameters besides external market conditions. Remarkably, factors grouped under the consultants and design parameters, external factors and government/authority requirements indicate low RII index while project/IBS characteristics, contractor attributes, external market conditions denote high RII index. Some testing results of EPS foam under dynamic compressive loading have also been reported in the literature. Increasing trends of elastic modulus with the increment of strain rate. The EPS has linear elastic, plateau and densification region, the linear elastic region terminates when the plateau stress is reached. This paper is among the first in Malaysia to suggest that it is the responsibility of entrepreneurs, contractors and estimators to take into account Project/IBS characteristics'-related factors such as repeatability and standardization, repeat use of design, and Economics and market conditions", related factors such as the price and supply stability of materials when making costing and strategic decisions at the initial project phase.

Besides providing valuable insight into the factors influencing construction costs, specifically from the Malaysian contractors' perspectives, it seeks to develop a robust cost control mechanism for the construction industry.

The report "Using structural equation modelling to assess effects of construction resource related factors on cost overrun", Ismail (2013), has made his study on cost performance is the basic criteria for measuring success of any project. Since construction projects are highly dependable on resources, construction cost is significantly affected by various resource related factors. Compared to traditional methods of data analysis, Structural graphical equivalent of a mathematical representation to study relationship between dependent variable to explanatory variable. SEM is regarded as extension of standardized regression modeling and is important tool to estimate the causal relationship between factors. SEM functionality is better than other multi variety techniques including multiple regression, path analysis and factor analysis in analyzing the cause-effect relations between latent constructs. Since no study has estimated causal relations among resource factors and cost performance yet, hence this study adopted structural equation modeling to assess the effects of the resource related factors on project cost in the southern part of peninsular Malaysia. With 20 resource-related factor identified from literature, a theoretical model demonstrated how construction resources affect cost overrun. The model is tested using structural equation modeling technique with Partial Least Square (PLS) approach to SEM as PLS is dominant approach to establish rigor in complex models. Money (finance) related factors were found as most dominant factors causing cost overrun. The authors conclude that effective financial management can significantly improve the project's success and help in reducing the cost overrun.

The report "Web-based risk assessment technique for time and cost overrun (WRATTCO) – A Framework", Hameed (2014), has made his study on Controlling time and cost overrun of construction projects is very crucial in achieving successful completion of any projects. Unfortunately, construction industry today is facing a major risk in estimated time and cost. This risk is caused by various factors. Aiming to treat this problem, this

study presents a framework for web-based expert and decision support system in order to assess the risk level of causative factors of time and cost overrun on project success throughout the lifecycle of construction process. It will be integrated with project schedule to estimate the consequences of these factors and forecast the loss of time and cost if the risk factors are not controlled. This will be achieving by implanting the technique of neural network. The program will also be able to suggest the corrective actions in order to control the identified risk factors. Finally, various reports can be generated in presenting the associated problems of the factors and their relative impact of project performance. This paper presented a problem solving method in controlling the chronic problem of time and cost overrun faced by construction industry. As identified, time and cost overrun are global concerns and associated to almost every project. These overruns are resulted from various factors which are threat to project success and considered as major risk. WRATTCO approach will enable practitioners in assessing relative risk of various factors in affecting project time and control. Based on identified factor, the system will suggest suitable corrective action in controlling the risk factors and improve time and cost performance.

The report "Causes of delay and cost overruns in construction of groundwater projects in a developing countries", Frimpong et al (2003), has made his study on Delay and cost overruns are common in construction projects and groundwater construction projects in Ghana are not an exception. The paper presents the results of a questionnaire survey conducted to identify and evaluate the relative importance of the significant factors contributing to delay and cost overruns in Ghana groundwater construction projects. Respondents of this survey included personnel from owners, consultants and contractors involved in groundwater projects in Ghana. The results of the study the main causes of delay and cost overruns in construction of groundwater projects included: monthly payment difficulties from agencies; poor contractor management; material procurement; poor technical performances; and escalation of material prices. Hence, effective project planning, controlling and monitoring should be established to enhance project

performance in order to minimize or avoid delay and cost problems in groundwater construction projects.

The report “The effects of construction delays on project delivery in Nigerian construction industry”, Aibinu et al (2002), has made his study on Construction delay has become endemic in Nigeria. It is imperative to create awareness of the extent to which delays can adversely affect project delivery. This paper identifies, by questionnaire evaluates and through empirical method assesses the effects of construction delays. The findings showed that time and cost overruns were frequent effects of delay. Delay had significant effect on completion cost and time of 61 building projects studied. Client- related delay is significant in Nigeria. Acceleration of site activities coupled with improved clients’ project management procedure and inclusion of appropriate contingency allowance in pre contract estimate should assuage the adverse effect of construction delays.

The report “Effect of organizational culture on delay in construction”, Arditi et al (2017), has made his study on Delay is one of the most common problems in the construction industry. This study aims to explore the relationship between a construction company's organizational culture and delay. A questionnaire survey was administered to construction companies located in the U.S. and India in order to collect data on their organizational culture and the amount of delay that they experienced in their projects. The results of this study show that construction organizations in the U.S. are dominated by “clan” culture whereas those in India are dominated by “market” culture. The study also shows that the percentage of delay relative to project duration is lower in the U.S. compared to India. Despite the fact that delays are caused by a multitude of reasons often mentioned in the literature, statistical analysis indicates that there is also a significant relationship between organizational culture and the magnitude of delays. This relationship could be useful for a construction company in cultivating an organizational culture that is expected to reduce project delay.

The report “Cost overruns in transportation infrastructure projects: Sowing the seeds for a

probabilistic theory of causation”, Peter et al (2016), has made his study on, Understanding the cause of cost overruns in transportation infrastructure projects has been a topic that has received considerable attention from academics and the popular press. Despite studies providing the essential building blocks and frameworks for cost overrun mitigation and containment, the problem still remains a pervasive issue for Governments worldwide. The interdependency that exists between „causes“ that lead to cost overruns materialising have largely been ignored when considering the likelihood and impact of their occurrence. The vast majority of the cost overrun literature has tended to adopt a deterministic approach in examining the occurrence of the phenomenon; in this paper a shift towards the adoption of pluralistic probabilistic approach to cost overrun causation is proposed. The establishment of probabilistic theory incorporates the ability to consider the interdependencies of causes so to provide Governments with a holistic understanding of the uncertainties and risks that may derail the delivery and increase the cost of transportation infrastructure projects. This will further assist in the design of effective mitigation and containment strategies that will ensure future transportation infrastructure projects meet their expected costs as well as the need of taxpayers.

V. CONCLUSION

Most construction projects in India are influenced by delay and overrun in cost. Many documents and final reports for several projects were analyzed. The Terrain conditions, weather conditions, variation of order, and availability of labor are most affecting factors as result shows. In order to validate these findings, further research is recommended with projects from different geographical locations or states and different owners. Finally, the authors recommend that in the planning stage of any construction project, more efforts should be exerted on the planning preparation, scheduling and cost evaluation to reduce the risk of delay and cost overrun of the project implementation. Successful management of construction projects may need to adopt procedures to avoid problems and to adopt contingency plans to reduce the effects of problems when they occurred on site.

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