



e-ISSN: 2319-8753 | p-ISSN: 2320-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 9, Issue 9, September 2020

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.512

9940 572 462

6381 907 438

ijirset@gmail.com

www.ijirset.com

Evaluation of the Factors Influencing Time and Cost Overrun in Construction Projects

M.B.Shivakrishnan¹, Y.Shantharam²

PG Scholar, Department of Civil Engineering, Mahendra Engineering College, Tamilnadu, India¹

Assistant Professor, Department of Civil Engineering, Mahendra Engineering College, Tamilnadu, India²

ABSTRACT: Construction industry is considered as one of the most important and second largest industries in India after agriculture. It is well known that most construction projects in India, especially in Tamil Nadu are exposed to time and cost overrun or both. Time cost schedule is a crucial task in construction project management. This phenomenon may affect the progress of construction industry in Kerala as well as may expose many institutions of construction to be destroyed. For instance, it can materially help to identify the expected financial requirements. It is also an important tool for the time control process. Construction project time schedule is greatly affected by many uncertain but predictable factors. This research lists the main factors affecting time and cost overrun and discusses their influence on schedule performance. The main factors are analyzed using Statistical Package for the Social Science (SPSS 16.0). From the analysis, planning and scheduling deficiencies, financial unavailability, quality of materials, rain / inclement weather effect, inaccurate time estimates, design changes by owner found to be most critical factors.

KEYWORDS: Electronic components Supply Chain, Evolutionary Algorithm, Travelling Salesman Problem, Fuel Truck Dispatch System.

I. INTRODUCTION

This thesis aims to identify the various factors influencing duration in construction based on type of projects. Normally the main goals of any successful construction project management system are to complete the project on time, within the planned budget, and with the required quality limits. The three goals are inter-related where each of them is affecting, and being affected by, the others. In order to meet the time deadline of a project, an accurate scheduling should be done. Due to the unique nature of construction projects, time contingency and project uncertainty are essential for accurate scheduling, which should be flexible enough to accommodate changes without negatively affecting the overall duration of the project. It is essential to allocate a contingency value to both cost and time. Yet, there are situations where there could be delays in activities that result in a delay in the overall project duration. These delays will consequently have a negative impact on the quality and budget of the project.

Therefore, estimating time contingency is seen as a major factor for achieving success in construction projects. Although several industrial sectors developed and used software for estimating time and cost contingencies in order to minimize delays and over budget, yet limited efforts are reported in the literature in the area of predicting time contingency in the construction sector.

PROJECT SUCCESS AND FAILURE

A successful project must be on time, on budget, and deliver quality (features and functions) as promised. Anything less will be either a failed project or a challenged project. The disturbing conclusion from this Standish report is that only 16.2% of projects were successful by all measures, and that of the 70% of projects that were not successful, Over 52 percent were partial failures and 31% were complete failures.

The top 5 factors found in successful projects are:

1. User Involvement.
2. Executive Management Support.
3. Clear Statement of Requirements.
4. Proper Planning.
5. Realistic Expectations.

These were the elements that were most often pointed to as major contributors to project success. These elements alone could not guarantee a success project. But if these are done well, a project will have a much higher probability of success. The time cost overrun is the main effect of a failure project.

OBJECTIVE OF THE STUDY

The objective of this paper is to identify the main factors affecting time contingency based on a comprehensive survey among a collected samples of construction experts in Indian construction experts. In addition, a neural networks model was developed in order to help project planner to have a more reliable prediction for the amount of time contingency that should be added to the scheduled completion time.

The main objective of this research is to ,

1. To find out the factors affecting construction duration activity.
2. Analyzing the most probable factor from the collected data Using SPSS.
3. Combining the contingency value to the base estimate.
4. To find out the overrun in construction projects.

II. RELATED WORK

One of the most important problems in the construction industry is time and cost overruns. Time and cost overruns occur in every construction project and the magnitude of these delays and cost overruns varies considerably from project to project. So it is essential to define the actual causes of time and cost overruns in order to minimize and avoid the delays and increasing cost in any construction project. This chapter reviews literature concerning the major issues of time and cost overruns in order to recognize the related information regard those issues.

This literature survey is based on factors affecting construction duration and construction duration estimation models. In the first section, the factors affecting construction durations are discussed. Then the types of models for estimating construction durations are defined. In the last part, the examples of modelling type and their comparisons are presented. There are many definitions of construction duration, but the most apt one has been given by,

Divya.R1et al., (2015), The construction industry is one of the main sectors that provide important ingredients for the development of an economy. The construction is the tool through which a society achieves its goals of urban and rural development .However it is becoming more complex because of the sophistication of the construction process itself and the large number of parties involved in the construction process, i.e., clients, users, designers, regulators, contractors, suppliers, subcontractors, and consultants. Modern construction projects are characterized by new standards, advanced technologies, multiparty participation, and frequent owner-desired changes. Coupled with this state are inherent uncertainties and complexities in the physical, financial, and economic environment in which most projects are performed. Such conditions have made completing projects on schedule and on budget a difficult task to accomplish, often leading to claims on cost compensations and time extensions. This eventually leads to delay in the completion of the project. Delay could be defined as the time over run either beyond completion date specified in a contract or beyond the date that parties agree upon for delivery of a project. It is slipping over its planned schedule and is considered as common problem in construction projects. The objective of this study is to identify the major causes of construction delays, its effects, and minimizing delays in construction projects. This study is carried out based on literature reviews and questionnaire survey.

Muhammed Mufazzal Hossen et al., (2015), In this study, Nuclear Power Plant (NPP) construction schedule delay risk assessment methodology is developed and the construction delay risk is assessed for turnkey international NPP projects. Three levels of delay factors were selected through literature review and discussions with nuclear industry experts. A questionnaire survey was conducted on the basis of an analytic hierarchy process (AHP) and Relative Importance Index (RII) methods and the schedule delay risk is assessed qualitatively and quantitatively by severity and frequency of occurrence of delay factors. This study assigns four main delay factors to the first level: main contractor, utility, regulatory authority, and financial and country factor. The second and the third levels are designed with 12 sub-factors and 32 sub-sub-factors, respectively. This study finds the top five most important sub-sub-factors, which are as follows: policy changes, political instability and public intervention; uncompromising regulatory criteria and licensing documents conflicting with existing regulations; robust design document review procedures; redesign due to errors in design and design changes; and worldwide shortage of qualified and experienced nuclear specific equipment manufacturers. The proposed combined AHP-RII methodology is capable of assessing delay risk effectively and efficiently. Decision makers can apply risk informed decision making to avoid unexpected construction delays of NPPs.

Pranit Sathe(2015), Not all the projects finish on time any within given budget. Delays and changes occur during construction that impact the schedule, consequently impacting the project in its completion. Delay of a construction project is defined as late completion of the project as compared to theplanned schedule. Delays in construction projects are quite expensive; sometimes they may result in severe damages to the involved parties. The time and cost for performance of a project are usually important to the employer and contractor. Time overruns always contributed as expensive to all parties. Delays are unique one in every of the largest issues construction companies are facing today. Delays will result in several negative effects like lawsuits between house owners and contractors, exaggerated prices, loss of productivity and revenue, and contract termination. Thus, comprehensive study on delays in construction projects is important. The aim of this study is to discuss the most common existing delay analysis techniques as well as review the issue that are often missed in the analysis and required improvement need. The scope of this study involves investigating the techniques application thoroughly with the view to developing appropriate frame work for improving their proper uses, in order to help reduce frequent delay claims resolution difficulties.

Mr. Salim S. Mullaet al., (2015), The Construction industry is one of the key economic industry in India and is the main motivating force in Indian national economy. But, it suffers from a number of problems that affect time, cost and quality performances. Successful management of construction projects is based on three major factors i.e. time, cost and quality. The successful completion of construction projects within the specified time has become the most valuable and challenging task for the Managers, Architects, Engineers and Contractors. How to achieve this task is a problem, which should be solved. The overall objective of this study is to identify the factors responsible for overruns in time and cost of the construction project and suggest the suitable remedial solutions. Poor planning, implementation and management are the main reasons for time and cost overruns in construction projects in India. Since most of the reasons are well known and can be controlled if a proper arrangement is made.

Jose Ramon San Cristoba (2014),The construction sector represents one of the most dynamic and complex industrial environments where conflicts among builders and owners are very common particularly in a bidding or claiming situation where owners, builders and contractors pursue their own interests at the expense of the others, leading to conflict or cooperation. The time required to complete the project is usually greater than the time specified in the contract and, because of the overriding importance of time for both the owner and the contractor, delays are the source of frequent disputes and claims among owners, clients and consultants, leading to lawsuits. There is a general consent between theorists that Game theory provides, by its very nature, the appropriate tools for the analysis and eventual solution of conflicts of any kind. The course of a conflict as well as its resolution depends on the decisions made by the various factors involved. Each party, when considering is decisions, should take into account the decisions made by all the other parties. Game theory is a natural tool that can be used in such interactive situations where the results of the interaction depend on all the players' decisions. Despite the extensive literature devoted to the delay is acknowledged as one of the most common, costly, and risky problems, and the source of frequent disputes and claims among owners, clients and consultants leading to lawsuits. Such situations usually involve questioning the facts, causal factors, contract interpretations and quantum of the claims. Since the ability to make a claim is very much based on what the contract says about delays, contractual documentation needs to reflect the particular nature of each project in order to prevent disputes and claims. This paper proposes a method based on game theory and applies it to a road building project, in order to identify the activities that are responsible for the delay of the project and divide the costs among them. Using the model presented in this paper, a wide variety of project situations can be modelled and placed as contractual obligations. The number of variables, equations, and inequalities needed to model these real-life situations will depend on the complexity of the problem.

Dr. Peter Smitha (2014),This paper examines the global issues and challenges facing the project cost management profession. This relates to professionals in the fields of quantity surveying, cost engineering, project controls and project managers providing cost management services. As a profession that is not widely recognized in societycompared to professional disciplines such as engineers and architects, the project cost management profession faces many challenges in creating greater awareness of the value that they provide for projects. The global construction industry is littered with many examples of high profile projects that have experienced significant time and cost overruns and this is merely a reflection of similar problems at all project levels. However, these high profile projects attract considerable attention in the wider community and highlight the need for more effective cost management and project controls. The paper is based on a literature review of global project cost management issues and research undertaken through professional cost management associations that include the International Cost Engineering Council, the Pacific Association of Quantity Surveyors, the African Association of Quantity Surveyors, the International Project Management Association, the Association for the Advancement of Cost Engineering, the China Engineering Cost Association and the Royal Institution of Chartered Surveyors. The research identifies the need for global recognition of

the profession and the development of global professional standards and certification programs. The paper culminates with a series of recommendations and strategies for the profession that includes formal recognition through global organisations such as the United Nations, the World Bank, the World Trade Organisation and the International Management Fund, the development of ISO cost management standards, formal recognition under the global Central Product Classification (CPC) scheme, development of a project cost management certification program for the European region and raising of global professional standards particularly in developing countries and countries where the profession is not traditionally recognized.

III. METHODOLOGIES

By conducting case studies of delayed project, the factors which are responsible for the time cost overrun in construction projects are identified.

Data collection

In order to collect the data a questionnaire survey is conducted. The factors should be identified the time cost overrun in the construction projects.

Questionnaire Design

It has been assembled around of factors which affect the time and cost overruns in engineering projects in various places around India and at intervals of time, but not all of these factors are consistent. The selected factors commensurate with questionnaire content, the nature of construction projects and problem.

Questionnaire Content

The questionnaire includes the related factors of time and cost overruns at construction projects. Factors influencing time overruns and factors influencing cost overruns are included.

Analysis and evaluation of data

In order to be able to select the appropriate method of analysis, the level of measurement must be understood. In this research, ordinal scales were used. Ordinal scale is a ranking or a rating data that normally uses integers in ascending or descending order. The numbers assigned to the agreement to the degree of influence (0, 2, 3, 4) do not indicate that the interval between scales are equal, nor do they indicate absolute quantities.

Implementation

Analysis of questionnaire data and data entry to statistical packages for social sciences were done in this step.

Developing mathematical model

A mathematical model was going to develop using beta distribution equation.

Results and discussions

The factors influencing time cost overrun is analyzed and evaluated.

IV. PROBLEM DEFINITION

Project finishing on time and absence of cost overruns are considered the most important factors of successful projects, which help to decrease problems for all parties and give new chances to construct other related projects. It also helps to increase the profits and development of construction industry in Tamil Nadu. Most construction projects in Tamil Nadu are exposed to delay to the extent that it may extend to double the period of time specified for that project, causing loss of project's profit, increasing cost and leading to technical and managerial problems among project's parties. Cost overruns are also considered as another big problem, which hinders project's progress, since it decreases the contractor profit leading to huge losses leaving the project in a big trouble.

Methodology of Working

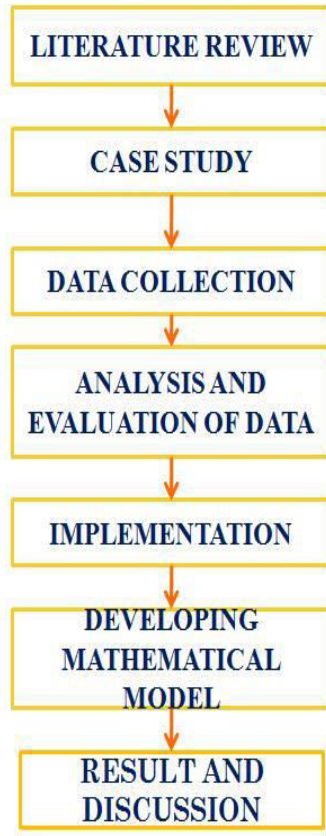


Fig 1 Methodology of Working

V. RESULTS AND DISCUSSION

This chapter describes the result and discussion of questionnaire survey concerning contingency assessment from contractors, consultants and owner viewpoint in India. This chapter focuses on describing the respondent’s characteristics in addition to the discussion of the factors that influences time cost overrun.

ANALYSIS AND PREDICTION OF COST AND TIME OVERRUN

The characteristics of the project were obtained and used to tabulate the estimated project duration, final project duration, estimated project cost and final project cost of the projects. The Statistical Package for Social Scientists (SPSS) 19.0 version was used to analyse the variables using Paired t-test .The paired t-test method of analysis compares two samples and determines the likelihood of the observed different between the samples occurring by change. The change is reported as the p-value. A p-value close to 1 means, it is likely that the hypothesized and sample means are the same, since it is very likely that such would happen by change, if the null hypotheses of no difference exist.

The choice of this model is informed by the fact that once the relationship has been determined, it can be used to mark any number of forecasts simply by inserting the value of x for which a forecast is necessary. Where change may have taken place, it is necessary to collect new set of data and recomputed the value of “a” and “b”

The following equation were also used in the analysis

Time overrun = actual project duration - estimated project duration

Cost overrun = actual project cost - estimated project cost

%cost overrun = cost overrun x100
estimated project cost

%time overrun = time overrun x100

estimated project duration.

Factors to Improve:

- Improve the effectiveness of site management and supervision.
- Follow up efficient and simple construction process.
- Clearly defined roles and responsibilities of each project participants.
- Increase the coordination of design and construction teams.
- Ensure continuous work flow is going on the site
- It is the duty of the contractor to validate the drawings given by client at the time of bidding the tender.
- The contractor must also analyze all the factors which may lead to delays from government bodies, changes in rules and regulations.
- The contractor should also be financially stable to digest the cost overrun leading to delays.

VI. CONCLUSION

The project on the topic Time and Cost Overrun of Construction, various aspects of the time and cost overrun were studied and listed. The questionnaires to conduct survey in different projects and case studies were prepared. The main factors of time and cost overrun are listed as contractor's factors, client factors and owner related factors. The rest of the project is the questionnaire surveying, Case studies and ranking the findings as per importance index method. The questionnaire survey is executed in and analysis is done by using the SPSS software. Then the solutions from my point of view for these problems identified are listing and recommendations are enlighten.

The following reasons were observed during this thesis work, which can be held responsible for time cost overrun in construction projects are ;

- Financial unavailability
- Planning and scheduling deficiencies
- Quality of materials
- Rain / inclement weather effect
- Inaccurate time estimates ,design changes by owner.

So it is cleared that the top means of minimization of construction delays are effective strategic planning, frequent progress meeting, accurate initial cost estimates, proper project planning and scheduling, site management and supervision.

REFERENCES

1. AftabHameedMemona, Ismail Abdul Rahmanb, Noor YasminZainunc, Ahmad TarmiziAbdKarimd Web-based Risk Assessment Technique for Time and Cost Overrun (WRATTCO) – A Framework(Social and Behavioral Sciences 129 (2014) volume 2 issue 3 .
2. Augustine Purnus ,ConstantaNicoletaBodea – Correlation between time and cost in a qualitative risk analysis of construction projects Procedia Engineering 85 Volume 4, Issue 1, January 2014 .
3. Daniel .W.M .Chan , Mohan . M .Kumaraswamy (Alexandria Engineering Journa l (2013) - Compressing construction durations:lessons learned from hongkong building projects.
4. Desai Megha , Dr Bhatt Rajiv.A - Methodology for Ranking of Causes of Delay for Residential Construction Projects in Indian Context (ISSN 2250-2459, ISO 9001:2008).
5. Dhanashree S Tejale, Dr.Khandekar.S.D, Dr.Patil. J.R - Analysis of the Construction Project Cost Overrun by Statistical Method (Volume 3, Issue 5, May 2015).
6. Divya .R , S. Ramya -Causes, Effects and Minimization of the Delays in Construction Projects (2013) volume 2 issue 3.
7. Dr. Peter Smitha Project - Cost Management Global Issues and Challenges (Social and Behavioral Sciences119 (2014) Volume 4, Issue 1, January 2014.
8. GulPolat, Ferzen Okay, EkinEray - Factors affecting cost overruns in micro-scaled construction companies. Procedia Engineering 85 (2014).
9. Hamzaha .N, Khoirya.M.A, Arshada.I, Tawilb.N.M and CheAnib .A.I Cause of Construction Delay in the projects - TheoreticalFramework(Procedia Engineering 20 (2011) .
10. Haseeb.m ,Xinhai Lu , Aneesabibi , Maloofuddyyian - Causes and effects of delays in large construction projects of Pakistan.

11. Haseeb.M ,Xinhai Lu, AneesaBibi ,Maloof-ud-dyian - Problems of projects and effects of delays in the construction industry of Pakistan Vol.1 No.5 [41-50] | September-2011.
12. Jose Ramon San Cristoba- Cost allocation between activities that have caused delays in a project using game theory: Procedia Technology 16 Volume 4, Issue 1, January 2014.
13. Ketki S. Kamble, A. R. Kambekar -Analysis of factors contributing delays and claims in construction projects (eISSN: 2319-1163 pISSN: 2321).
14. MeghaDesai , Rajiv Bhatt - Critical Causes of Delay in the Residential Construction Projects: Case Study of Central Gujarat Region of India .
15. Mohamed .M .Marzouk ,Tarek .I .El Rasaa - Analyzing delay causes in egyptian construction project .
16. MuhammedMufazzalHossen, Sunkoo Kang, Jonghyun Kim Construction schedule delay risk assessment by using combined AHP -RII methodology for an international npp project Volume 4, Issue 1, January 2014 .
17. Ramanathan Chidambaram and NarayanaSambu potty – Qualitative analysis of time delay and cost overrun in multiple design and build projects.
18. Ravisankar.K.L ,Dr.Ananda Kumar .S ,M.E., Ph.D., Krishna Moorthy . V - Study on the Quantification of Delay Factors in Construction Industry ((ISSN 2250-2459, ISO 9001:2008).
19. RemonFayek Aziz-.Ranking of delay factors in construction project afteregyptianrevolution .
20. Shanmugapriya.s ,Dr.Subramanian.k-Investigationof significance factorsinfluencing time and cost overruns in Indian construction projectsProcedia Engineering 2014.
21. Shujaa Safdar Gardezia .S, Irfan Anjum Manarvia, Jamal SafdarGardezib .S -Time Extension Factors in Construction industry of Pakistan (Procedia Engineering 77 (2014) .
22. TowhidPourroostam and Amiruddin Ismail - Causes and Effects of Delay in Iranian Construction Projects .
23. Trefor .P. Williams , Jie Gong -Predicting construction cost overruns using text mining , numerical data and ensamble classifiers (Automation in Construction 43 (2014) .
24. UbaniE.C ,Okorochoa K.A , EmeribeA.C -Analysis of factors influencing time and cost overruns in construction projects in south eastern Nigeria.
25. Ying-Mei Cheng - An exploration into cost influencing factors on construction projects (International Journal of Project Management .



INNO  **SPACE**
SJIF Scientific Journal Impact Factor

Impact Factor:
7.512

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 **9940 572 462**  **6381 907 438**  **ijirset@gmail.com**



www.ijirset.com

Scan to save the contact details