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Factors Affecting Cost Performance due to Construction Delays in Projects at Dindigul and Madurai Districts

R. ILANGOVAN[1]
Department of Civil Engineering
University College of Engineering, Dindigul, India
K. BINITH MUTHUKRISHNAN
Department of Management Studies
Kurinji College of Engineering and Technology
Tiruchirapalli, India
M . VALAN RAJKUMAR
Department of Electrical and Electronics Engineering
United Institute of Technology, Coimbatore, India
A . VELANGANNI JOSEPH
Department of Youth Welfare Studies
Madurai Kamaraj University, Madurai, India

Abstract:

Construction delays are common problems in private and government projects in Dindigul city. This problem occurs frequently during life time leading to dispute and litigations. Therefore it is essential to study and investigate causes of construction delay. There are a number of definitions for delay: to make something happen later than expected; to cause something to be performed later than planned or to not act timely. Each of these definitions can describe a delay to an activity of work in a schedule. The construction industry is large, unpredictable and requires tremendous capital outlays. Delay of a project is a main factor and the major cause of construction claims.

[1] Corresponding author: Tel: +91-9443393649 Fax: +91-451-2554066, Email: ilango1968@gmail.com

There is an acute necessity for detailed investigations to identify the delay factors and choose correct actions to minimize the adverse effect of delay on time, within cost and for high quality. This research thesis present list of construction delays causes retrieved from literature. The feedback of construction experts was obtained through interviews. Subsequently a questionnaire survey was prepared .The questionnaire survey was distributed to owner, contractor, engineer, architect and consultant. Frequency index, importance index are calculated and according to highest value of them, the top twenty delay causes of residential construction projects in Dindigul city are find out. The number of recommendations ends the thesis. The findings of this thesis can be used as a reference by project owners, managers, and government agencies in developing their project management strategies.

Key words: Construction, Delay, Causes of Delay.

1. INTRODUCTION

Projects are envisaged and visualized with the foresight of achieving the primary objective of timely completion. Some projects are planned and executed successfully whereas others get delayed due to reasons, some of which are analyzed and evaluated in this dissertation. Delay to projects is considered to be one of the common problems in the construction industry. Delays have a negative effect on the project in terms of performance, time and cost. Thus, it is essential to identify the types of delays that normally occur in a project .The types of delays can be broadly split in two categories of delay by the client (compensable delays) and the contractor (non-excusable delays).The delays can be identified as critical or non-critical and whether the delay is concurrent or non-concurrent. The identification of the types of delays leads to the reasons of delay.

The reasons for the delays are identified so that the effect on construction projects can be reduced. The reasons for delays are client and contractor related. Unreasonable project scope and inadequate early planning are the prime delays by the client. The client interference and delay in the decision making process also major reasons for delays. The client in some cases delays the design or changes the design leading to various other changes like design related changes to drawings and their approval by the authorities. The contractor had delays related to overambitious estimates and incorrect task assessment which lead to delays and affect the project. In case of lack of task clarity, an inexperienced contractor or subcontractor may unknowingly delay the works.

The mitigation of delays can be achieved by adopting the process of knowledge management and project learning which gives insight into the various problems and their solutions. In fact the lessons leant feedback from projects is a real eye opener and helpful for others to avoid similar issues. Prevention of delays by adopting innovative and teamwork helps in planning and analyzing the requirements in detail which will allow the mapping of resources and identifying the risks. The works can then be estimated, allocated and modularized for execution. The issues that can lead to delays need to be escalated, identified and resolved on a priority to ensure that they do not become a reason for delay.

The methodology for these studies takes into account the key data for each project which included the planning methodology, resources monitoring, cost methodology and the critical decisions which are likely to delay the project. The justification for the data considered is provided and further the method of data acquisition and data analysis is detailed to substantiate the methodology. The analysis and of the data provided for the project is analyzed further for each case study for their planning, resources, cost and decisions processes. The

recommendations for each project are given as to what could have been done to mitigate the delays. The knowledge gained in some of the module is applied for recommendations which are applying the knowledge gained in a purposeful manner. Conclusions are listed based on the areas analyzed for the methodology for the case studies to allow for better knowledge management in future.

2. REVIEW OF LITERATURE

Olusegun Emmanuel Akinsiku and Akintunde Akinsulire explain the growing rate of delays is adversely affecting the timely delivery of construction projects. This study therefore assesses construction stakeholders' perception of the causes of delays and its effects on project delivery in a bid to proffer solution in minimizing the occurrences of delays. Questionnaire was used to elicit responses from construction stakeholders; a total of thirty three causes of delays, seventeen resultant effects of delays and fifteen methods of minimizing construction delays were identified for the study based on literature reviews. The results suggest that client's cash flow related problems are the main causes of delays while time and cost overruns are the major identifiable effects of delays in construction projects. However, adequate project planning and budgeting were suggested as possible.

Greeshma et al have reported: any project is said to be successful when it is completed in desired time and cost. The Construction industry of India is an important indicator of the development, as it creates investment opportunities across various related sectors. Construction delays can be minimized only when the causes are identified. Time is one of the major sedations throughout project management life cycle and can be regarded as one of the most important parameters of a project and the driving force of project success. This research work attempts to identify, investigate, and rank factors perceived to

affect delays in the construction projects with respect to their relative importance so as to proffer possible ways of coping with this phenomenon. The construction industry is the tool through which a society achieves its goal of urban and rural development. It is one of the sectors that provides important ingredient for the development of an economy. It was through the analysis carried out, top 10 major causes of construction delays in construction industry are Shortage of construction materials, Effect of subsurface conditions and natural disaster, Delay in material delivery, Low productivity of labors, Rework due to errors, Late procurement of materials, Unqualified workforce, Low productivity and efficiency of equipment, Delay in quality control, Poor site management and supervision, Poor communication between parties & Lack of high technology.

Sadi A. Assaf and Sadiq Al-Hejji have stated: A survey on time performance of different types of construction projects in Saudi Arabia was conducted to determine the causes of delay and their importance according to each of the project participants, i.e., the owner, consultant and the contractor. The field survey conducted included 23 contractors, 19 consultants, and 15 owners. Seventy-three causes of delay were identified during the research. 76%of the contractors and 56% of the consultants indicated that average of time overrun is between 10% and 30% of the original duration. The most common cause of delay identified by all the three parties is “change order”. Surveys concluded that 70% of projects experienced time overrun and found that 45 out of 76 projects considered were delayed. 2005 Elsevier Ltd and IPMA.

Ming Sun and Xianhai Meng have found undesirable delays in construction projects impose excessive costs and precipitate exacerbated durations. Investigating Iran, a developing Middle Eastern country, this paper focuses on the reasons for construction project delays. We conducted several interviews with owners, contractors, consultants, industry

experts, and regulatory bodies to accurately ascertain specific delay factors. Based on the results of our industry surveys, a statistical model was developed to quantitatively determine each delay factor's importance in construction project management. This analysis revealed that some delay factors were quite significant in contributing to project cost and duration. Moreover, regression models demonstrate that a significant difference exists between the initial and final project duration and cost. Our findings can be useful in at least two ways; first, resolving the root causes of particularly important delay factors would significantly streamline project performance. Second, the regression models could assist project managers and companies with revising initial timelines and estimated costs. This study does not consider all types of construction projects in Iran; the scope is limited to certain types of private and publicly funded projects as will be described. The data for this study has been gathered through a detailed questionnaire survey.

Mohamed I. and Wahdan have found As a result of new development in most of Arab countries, there is a need for more construction projects. These projects are costs more and needs a highly experience engineering and contracting companies. Also, of the highly experience companies and the importance of the projects, high percentages of the project numbers are started and delayed or not completed on time scheduled to them. Therefore, the present study is prepared to evaluate and analysis the reasons for that matter from the project management view. The study was performed as a collective data achieved from different projects in different places as a model for the study. The percentage of the effect of each of project activities was explained. According to the present study, the most significant reasons for the project delay or not complete is presented and discussed.

Potha Raju et al have described It is widely accepted that a project is successful when it is finished on time but unfortunately, due to many reasons, in Afghanistan a large number of construction projects fail to meet their original contact time. Construction delays are the most serious problems which send bad signals to foreign investors thereby slowing down the national development. A comprehensive survey; therefore, on time performance of various construction projects was carried out to identify the critical factors that cause construction delays in Afghanistan. From in-depth literature studies, eighty three causes of delay were identified. Questionnaires were then developed and sent to 60 carefully selected construction industry stakeholders including: clients, contractors, and consultants in Afghanistan. The findings show that the main critical factors that cause construction delays in Afghanistan are: security, corruption, poor qualification of the contractor's technical staff, payment delays by clients, and poor site management and supervision by contractor. This paper also explores and provides some recommendations to reduce the impact of delays on construction projects in Afghanistan.

Msafiri Atibu Seboru has investigated the majority of road construction projects in Kenya do not get completed within the initially set targets of time. Project delays frustrate the process of development, have an immeasurable cost implication to the society, and also lead to loss of reputation of the parties involved in the projects' execution. The purpose of this study was to investigate the factors causing delays in road construction projects in Kenya. Project delays are a common problem internationally in the construction industry in modern times. Investigating the reasons for delay has become an important contribution to improved construction industry performance. Over seventy percent of projects initiated in Kenya are likely to escalate in time with a magnitude of over fifty percent. The study used purposive sampling technique and

survey design. Data was collected using questionnaires which were distributed to consultants and contractors. The data was analyzed using the Relative Importance Index and Spearman's rank correlation. The top five causes of project delays were observed to be payment by client, slow decision making and bureaucracy in client organization, inadequate planning and scheduling, and rain. It is recommended that clients should improve their financial management systems so that they are able to pay contractors in a timely manner. Bureaucracy and red tape should be reduced in client organizations in order to speed up the slow decision making process. Efficient management of the construction process will also lead to a reduction in incidences of claims. Contractors should prepare adequate plans and schedules which can also be used to minimize the effects of rain.

Qais Kadhim Jahanger has described this study aimed to identify causes of delay in construction projects in Baghdad city, and specify the most important causes of delay in the construction project through a field survey of a questionnaire contained 58 causes of delay identified for this research, categorized in 10 groups of delay causes. The Field survey conducted included 78 engineers represent the project three participants (owner, contractor and consultant). The results show that 60 engineers responded agree together that the most important cause of delay is (Mistakes and discrepancies in design documents) by relative importance index (RII) of 83.05%, followed by (Ineffective planning and scheduling of project by contractor). While design group of delay causes was ranked the highest instead of environmental group that was ranked the lowest group of delay causes.

Desai Madhura has investigated the project is said to be a successful when it is completed in desired time and cost. Construction delays are common problems in private residential projects in Nashik city. This problem occurs

frequently during life time leading to dispute and litigations. Therefore it is essential to study and analyze causes of construction delay. There are a number of definitions for delay: to make something happen later than expected; to cause something to be performed later than planned; or to not act timely. Each of these definitions can describe a delay to an activity of work in a schedule. The construction industry is large, volatile and requires tremendous capital outlays. Delay of a project is a main factor and the major cause of construction claims. There is an acute necessity for detailed investigations to identify the delay factors and choose correct actions to minimize the adverse effect of delay on time, within cost and for high quality. This research paper present list of construction delays causes retrieved from literature. The feedback of construction experts was obtained through interviews. Subsequently a questionnaire survey was prepared. The questionnaire survey was distributed to owner, contractor, engineer, architect and consultant. Frequency index, importance index are calculated and according to highest value of them, the top twenty delay causes of residential construction projects in Nashik city are find out. The number of recommendations ends the paper. The findings of this paper can be used as a reference by project owners, managers, and agencies in developing their project management strategies.

Mastura Jaafar and Behnam Khalatbari have described the construction industry in Iran is known for its late project delivery. The increasing percentage of incomplete projects calls for comprehensive study. Various factors that include knowledge and technical skills have been hypothesized to influence the time performance of power plant construction projects. This paper aims to examine the knowledge and technical skills of project managers as well as their correlation with the time performance of power plant construction projects in Iran. Thirty technical managers who work in power plant

construction sites were surveyed. The descriptive analysis of data indicates that the respondents have minimal knowledge on project time, risk, procurement and scope management. To effectively manage the power plant time performance, project managers need to enhance their knowledge on project structure and risks and opportunity. This study contributes significant findings for the improvement of the power plant industry in Iran.

Owolabi James et al have explained delay is one of the biggest problems often experienced on construction project sites. Delays can instigate negative effects such as increased costs, loss of productivity and revenue many lawsuits between owners and contractors and contract termination. The aim of this project is to investigate the causes and effects of delay on building construction project delivery time. Random sampling technique was used in this study. Population sample of 150 was used in this work. A total sample of ninety three (93) was deployed. A structured questionnaire in Likert scale was used in data collection. There are many factors that induce delay on construction projects, however in some of identified factors includes: lack of funds to finance the project to completion, changes in drawings, lack of effective communication among the parties involved , lack of adequate information from consultants, slow decision making and contractor's insolvency, variations among others. Also, there are project management problem, mistake and discrepancies in contract document, equipment availability and failure, mistakes during construction, bad weather, fluctuation in prices of building materials, inappropriate overall organizational structure linking to the project and labour. The factors above could be observed and could be a clue to preventing delay on construction sites.

3. METHODOLOGY

The main focus of this study will be on questionnaire survey that was distributed among the Engineers that are working in construction industry in Dindigul and Madurai District. Furthermore, statistical package for the social sciences program would be used to analyze collected data. The whole methodology is divided into main following sections that will briefly be described as follows,

3.1 Questionnaire Design

In most of the studies, the questionnaire would be designed according to the objective of the research. In this research, as it was mentioned before, the main aim is causes of delays in construction industry at Dindigul and Madurai District. In addition to that aim, the research has followed some specific objectives about the project delivery methods (PDM) and the ways to reduce selected delays based on choosing the best PDM. However, it would be impossible to eliminate all delays but when the reliable data was collected and the related party causing the delay was determined, it would be easier to control the delays of projects. This questionnaire survey was developed to get the opinion of large number of construction companies about the construction delay and relevance between this problem and PDM. Also selected companies help to classification the causes of delay based construction industry. The questionnaires were prepared in 7 different subcategories. These are (i) Part A: Respondent Characteristics, (ii) Part B: contractor related delay, (iii) Part C: owner related delay, (iv) Part D: consultant related factors, (v) Part F: material related factors, (vi) Part G: lab our and equipment related factor and (vii) Part H: External and other related factor.

4. DATA ANALYSIS AND DISCUSSION

In this the questionnaire survey, the data will be analyze and discussed. The collected data were analyzed by using SPSS tool method. The main aim of conducting the analysis for second part of questionnaire is establishing all of one hundred and thirty factors under the identified groups of Engineers in dindigul and Madurai district. The ranking method was designed according to importance degree of each parameter. To achieve a better result, all factors were divided into different groups and each group was analyzed separately. With this method, the most influential factor of each group could be revealed easily.

5. CONCLUSIONS & RECOMMENDATIONS

Project delays have been a topic of concern in the construction industry. Delays have become a universal phenomenon and are almost always accompanied by cost and time overruns.

Construction project delays have a debilitating effect on parties (owner, contractor, consultant) to a contract in terms of a growth in adversarial relationships, distrust, litigation, arbitration, cash-flow problems, and a general feeling of apprehension towards each other.

Delays can be minimized only when their causes are identified. Knowing the cause of any particular delay in a construction project would help avoiding the same. This project was therefore, aimed at identifying the major causes of delays in construction projects in the Construction Industry in dindigul and Madurai district through a survey, and quantifies the perceptions of different parties relating to causes, responsible party and types of delay. This research project was limited to building projects in the dindigul and Madurai region only.

Based on the results of the questionnaire survey and information gathered from the literature review, the following conclusions were drawn. Generally, whether a delay is determined to be excusable or non-excusable, a contractor is not entitled to an extension of time or to an upward adjustment in costs without understanding the full context of the contract.
Code-Related Delay is ranked as the most critical category followed by Design-Related Delays, Construction-Related Delays, and so on, as shown below. In general, the ten (10) most critical causes (across the six sub-headings given above) of delays are:

Sl.No.	Description	--------
1	Building Permits Approval	3.83
2	Change order	3.81
3	Changes in Drawings	3.76
4	Incomplete Documents	3.63
5	Inspections	3.40
6	Changes in Specifications	3.37
7	Decision during Development Stage	3.35
8	Shop Drawings Approval	3.23
9	Material delivery	3.15
10	Severe weather conditions on job site	3.00

Based on the overall results, we can conclude that the following is the ranking of responsibilities of the contractual from the most responsible (1) to the least (5):

1	Contractor	46%
2	Owner	23%
3	Government	16%
4	Consultant	12%
5	others	3%

In most of the cases, it is found that when the contractor has the responsibility, the type of delay respectively is Non-Excusable when the responsibility is the owner's or the consultant's it is an Excusable Compensable Delay; and when the government is responsible, the delay is considered an Excusable Compensable.

The consultants play a very important role in Design-Related Delays because as they are in charge of the design process in conjunction with the owner of the project. On the other hand, the government plays the most important role. The contractor has the major responsibility for delays in Construction-Related Delays. Delays due to Financial/Economical Causes as well as Management/Administrative Causes share an intermediate position of importance, just presenting one Key Delay – Delayed Payments. These categories do not have the same negative impact on project completion times as other factors considered in this study such as code, design and construction related issues.

Based on the findings of this study, the authors would like to recommend that the Buildings Permit Approval Process be streamlined as much as possible and changes in Laws and Regulations be made keeping in mind the negative impact it causes in terms of construction project cost and time. Design related issues such as changes in drawings, incomplete and faulty specifications and change orders have a very damaging effect on project completion times and invariably lead to cost escalations as well. These are issues that can be controlled with proper design process management and timely decision- making. It is a well-known fact that decisions made early in the life of a project have the most profound effect on the project's objectives of delivering a safe, quality project within the time and budget allocated.

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