

Study of Residential Project to Find Various Difficulties Faced During Construction & Find Solutions for Cost & Time Optimization

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Abstract—Obstructions in construction projects is considered one of the most common problems causing a multitude of negative effects on the project and its participating parties. This paper aims to identify the main causes of Obstruction in construction projects in India from the point of view of contractors, consultants, and owners. A literature review was conducted to compile a list of Obstruction causes that was purged based on appropriateness to India in seven semi structured interviews. The resulting list of Obstruction causes was subjected to a questionnaire survey for quantitative confirmation and identification of the most important causes of Obstruction. The overall results indicated that the most important causes are: financing by contractor during construction, Obstructions in contractor's payment by owner, design changes by owner or his agent during construction, partial payments during construction, and no utilization of professional construction/contractual management. This paper deal with all literature related to obstruction.

Keywords-Obstruction; project; Construction industry.

I. INTRODUCTION

A number of reports indicate that most construction projects are Obstruction due to obstruction. To a project owner who counted on revenue from the project commencing from a specific date in order to comply with the schedule for repayment of the project finance, obstruction of even a week is not only an embarrassment, but also a serious risk of financial failure of the whole enterprise. As protection against this risk, project owners invariably state in their contracts with their contractors the amount that will be payable in the event of obstruction completion from a cause for which the contractor is responsible.

On the contractor's side, obstruction in completion entails increased overheads over those budgeted for (e.g., cost of supervisory personnel and site infrastructure required over the extended duration) and loss of the opportunity of taking on other profit-earning projects with the resources tied down on the obstruction project. Where the cause of the obstruction is the project owner's responsibility, the contractor would be entitled to compensation against these losses. The large sums usually involved and the multiplicity of causes of obstruction that may occur simultaneously often make the determination of each party's responsibility a matter of the greatest difficulty and this often results in disputes requiring resolution through arbitration or other forms of dispute resolution forums. The task of investigating the events that led to project obstruction for the purpose of determining the financial responsibilities of the contracting parties arising from the obstruction is referred to as obstruction analysis. Various techniques for analyzing obstruction have been developed over the years. Such a technique is referred to in this paper as an obstruction analysis methodology.

Developments in computer technology along with the availability of more advanced and user-friendly project planning software have enhanced the capabilities of these techniques over the past decade. Although these techniques have been very useful, they have wide differences as to their

capabilities and the accuracy of the results produced. The studies undertaken can be classified under four categories. The first, and most populated, consists of those studies aimed at refinements to the existing methodologies to address issues of concurrent obstructions, ownership of float, the migration of the critical path, productivity losses and resources allocation. The second group of studies analyzes causation using systems dynamics to model the impact of events. The question of causation concerns the need for a claimant to prove not only that a risk allocated to the other party occurred, but also that it caused the complained obstruction. The third category has been aimed at development of Information and Communication Technology support tools, such as knowledge-based systems. Finally, there have been surveys into aspects of some of the existing methodologies.

A review of the literature suggested a need for more empirical research to complement and extend existing knowledge, understanding and use of the most common methodologies. The research reported in this paper was undertaken as part of a wider study aimed at doing this toward the development of an appropriate framework for improving current obstruction analysis practice. The part of the research reported was designed to produce answers to the following questions:

- To what extent is industry aware of these methodologies?
- To what extent are the methodologies used in practice
- What are their success rates in terms of settlement of claims? Without disputes that require resolution by a third party?
- Which types of staff in construction organizations provide input into the production of obstruction claims?
- What are the obstacles to the use of the methodologies in practice?

It is anticipated that the answers to these questions will assist, not only the preparation of claims, but also the defense of unmeritorious claims. By far, a more important benefit is to promote common understanding between the project owner and

the contractor, thus enhancing the chances of speedy amicable settlement. A mixed method research design as described, involving the collection and analysis of qualitative and quantitative data, was adopted.

II. TYPE REVIEW OF RESEARCH PAPER

Zaki M. Kraiem & James E. Diekmann [1987], This paper presents a tool to aid in analysis of delay claims. The procedure set forth will handle delays and accelerations and will help in determination of the as-adjusted schedule. This paper investigated the responsibility of the contracting parties with respect to project schedules. Apportioning the responsibility for delays retroactively after the job is completed provides an efficient way to handle the real situation reflecting the schedule sequences. The existence of more than one critical path on a project's network could create concurrent delays on different paths. These delays should be considered carefully by making an adjustment to the as-built schedule. The adjustment consists of allocating a different code to these concurrent delays that identifies the type of concurrency. The resulting as-built schedule will then be adjusted to reflect events that have occurred during contract performance.

J. K. Yates[1993], This paper discussed the delay-analysis-system (DAS) program, industrial participation in its development, why it was developed, how is it used, the benefits of implementing it on construction projects, and provided sample outputs from the program. The delay analysis system augments traditional project-control systems and assists project managers in decision-making processes. The DAS integrates traditional project-control techniques with interactive methods to produce a program that not only monitors progress toward achieving project milestones, but also highlights causes for deviations from established baselines and provides recommendations as to how further delays can be prevented.

Jonathan Jingsheng Shi, S. O. Cheung & David Arditi [2001], This paper presented a method for computing the contribution of activity variations to project delay. The method consists of a set of equations, which can be easily coded into a computer program so that the project delay information and the contributions of individual activities are easily obtainable. The method is also applicable to any intermediate construction stage for evaluating in-progress project delay. It is not unusual for parties involved in a construction claim to argue about which party is responsible for an activity delay before they agree on the contribution of the delay to the total project delay. The method presented in this paper is not based on the criticality of activities. The as-planned schedule provides a basis of comparison for evaluating the variation in the project duration, and does not need to be updated. Construction delay analysis represents a very complex task. It requires extensive project information and knowledge in determining the responsibility of a delay.

J. K. Yates & Alan Epstein[2006], Delays on construction projects, and the claims which emanate from such delays, are an integral part of the modern construction process. The overwhelming amount of time, energy, and cost devoted to delay claims does not begin when a claim is initially submitted at or near the completion of a job, rather, the construction delay claim process commences at project inception. A discussion is provided relative to how claims are generated during a

construction project, the various types of delay, contract provisions which may trigger construction delay claims, methods of solidifying a party's position, presentation, substantiation and justification of a claim, formal and informal methods to resolve claims and, most importantly, mechanisms by which to cut down on the incidence of delay claims.

Sadi A. Assaf & Sadiq Al-Hejji,[2006], 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.

M. E. Abd El-Razek, H. A. Bassioni & A. M. Mobarak[2008], Delay in construction projects is considered one of the most common problems causing a multitude of negative effects on the project and its participating parties. This paper aims to identify the main causes of delay in construction projects in Egypt from the point of view of contractors, consultants, and owners. A literature review was conducted to compile a list of delay causes that was purged based on appropriateness to Egypt in seven semi structured interviews. The resulting list of delay causes was subjected to a questionnaire survey for quantitative confirmation and identification of the most important causes of delay. The overall results indicated that the most important causes are: financing by contractor during construction, delays in contractor's payment by owner, design changes by owner or his agent during construction, partial payments during construction, and non utilization of professional construction & contractual management. Further research can be conducted, as a result of this paper. For example, similar research can be conducted in different countries identifying causes for construction project delays. A comparison between previous international literatures on the same topic can attempt to identify the reasons for differences in causes based on geographic, cultural, and socio-economic factors. Moreover, deeper research can be conducted into the results of this and similar research to identify root causes of delay using techniques such as the fishbone diagram.

Issaka Ndekugri, Nuhu Braimah & Rod Gameson[2008], This paper reports on an empirical study into the current practice in the use of these methodologies in the United Kingdom, as part of a wider study aimed at developing a framework for improving delay claims analysis. The part of the study reported here was based on a questionnaire survey of key informants. The issues investigated include the categories of staff within contracting organizations who contribute to delay claims analyses, the awareness, use and reliability of existing delay analysis methods and the obstacles to their use in practice. The main findings of the study are that: (1) the preparation of delay claims often requires input from commercial managers (quantity surveyors), schedulers, site managers, external claim consultants and estimators; (2) commercial managers have the greatest involvement; (3) claims analyzed using the as-built versus as-planned and the impacted as-planned techniques are often successful although

there is considerable literature on the shortcomings of these techniques; and (4) the main obstacles to the use of the methods relates to deficiencies in project records and scheduling practice. The next stage of the research entails semi structured interviews to investigate these issues in more depth.

N. Hamzah, M.A. Khoiry, et.al.[2011], Delay can be defined as time overrun or extension of time to complete the project. Construction delay is something that cannot avoided especially in government agencies in Malaysia. Therefore delay is a situation when the actual progress of a construction project is slower than the planned schedule or late completion of the projects. The causes of delay are taken from the pass literature review. There are two main type of delay: excusable delay and non excusable delay. The literature reviews are summarized and the delay framework is constructed based on the literature review summary in context of public higher learning institution.

M. Haseeb, Xinhai-Lu, et.al.[2011], The problem of project delays is a fact that occurs mostly in construction industry of Pakistan. Delays are always measured as expensive to all parties concerned in the projects and very often it will result in clash, claims, total desertion and much difficult for the feasibility and it slows the growth of construction sector. For analyzing the causes of delay, an appraisal on construction project's time performance was conducted. The main objective of this study is the identification of factors of delay and their effects on the success and completion of project. The most common factor of delay are natural disaster in Pakistan like flood and earthquake and some others like financial and payment problems, improper planning, poor site management, insufficient experience, shortage of materials and equipment etc. This paper covers the delay factors and causes of delay and some suggestion for reducing these delays in large construction projects in Pakistan. Delay also occurs due to external factor like change in government, regulation and location etc. Client must be mentally and financially strong for starting a new project due to which we can reduce delay in projects.

Ibrahim Mahamid, Amund Bruland & Nabil Mmaidj[2012], The construction industry is one of the main sectors that provides important ingredients for the development of an economy. However, many projects experience extensive delays and thereby exceed initial time and cost estimates. Construction delay is considered to be one of the most recurring problems in the construction industry and it has an adverse effect on project success in terms of time, cost, quality, and safety. This study is conducted to investigate the time performance of road construction projects in the West Bank in Palestine to identify the causes of delay and their severity according to contractors and consultants through a questionnaire survey. The statistical analyses of the data show the following: (1) No participant response specifies any cause with no influence on the delay of road construction projects; (2) there are no causes with a severity index less than 30%; and (3) the groups, index is between 45 and 61%. These all indicate that the identified causes are highly relevant to the problem of delay in road construction projects in the West Bank.

Pablo González, Vicente González, et.al.[2014], The literature suggests that the construction industry is in need of additional research to systematically relate the causes of delays to their impacts. To overcome this limitation, this paper analyzes delay causes in activities that were not completed as scheduled. The paper contributes to a methodology to examine the qualitative (delay causes) and quantitative (time performance) dimensions of the delay issue. The paper proposes two indicators, as follows: (1) reason for

noncompliance (RNC) as an indicator that characterizes scheduling failures, and (2) delay index (DI) as a time-performance indicator that describes the impacts of delay on critical and noncritical activities. The paper presents two building projects as case studies, with planning and subcontractors as the primary RNCs that have the greatest impact on time performance. Planning was the most harmful delay cause on time performance. The methodology proposed in this paper can help identify relationships between RNCs and their impacts on projects that will allow management to direct construction projects more quickly and effectively. Further research should focus on how to improve the methodology and evaluate assumptions related to estimating delays for more dynamic planning processes.

T.Subramani, P S Sruthi & M.Kavitha[2014], 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. Desk study along with questionnaire survey was used to identify the causes of cost overrun. A total of 30 filled questionnaires were collected from clients, consultants and contractors. The respondents were asked to rate the listed causes on the basis of probability of occurrence and severity of impact. The main objectives of this thesis are to identify and analyse the causes of cost overrun in construction. To achieve the objectives, the thesis research used desk study and questionnaire survey as research instruments. Clients, consultants and contractors were asked to identify and rate the causes of cost overrun. The respondents were asked about the probability of occurrence and severity of impact of the listed causes in the questionnaire. The data collected using the questionnaires was analysed using mean score method. Spearman's rank correlation coefficients were found out to reveal agreements between opinion of clients and consultants, between consultants and contractors, and between contractors and clients.

Nihal Ananda Perera, Monty Sutrisna & Tak Wing Yiu[2016], In construction, delay claims resolution is at the center of apportioning liabilities between the claiming party and the defending party. This process generally consists of two phases of causation: (1) establishing each party's potential liability for the claimed occurrence; and (2) determining the quantum of the effect flowing from that liability. However, a lack of consensus among the practitioners of disputing parties as a result of the existence of various theories, concepts, and methodologies for apportioning liabilities has been acknowledged as an obstructing factor in delay claims resolution. This paper discusses the development and anatomy of the DMM that was specifically designed to enable the practitioners to choose the optimum MDA on a more objective and tenable basis for delay analysis. It is an outcome of a recently completed doctoral research project. this research paper contributes to the body of knowledge of construction engineering, and particularly the claims management community, by providing a reliable, accurate, and objective tool that can be used in minimizing the potential for conflict and disputes arising from apportioning liabilities in construction delays. Nevertheless, because the main mathematical basis for the function of the DMM is largely

determined by psychological constructs of the individuals (respondents), further research is recommended for ensuring continuous refinement and expansion of the DMM in its database of experts by incorporating them into the DMM's database.

Kim Schneider, Ola Lædre & Jardar Lohne[2016], This paper examines the handover process in Norwegian construction industry, focusing on commercial buildings. Improving handover processes reduces the number of conflicts, increases user value, improves indoor climate along with securing overall building performance, both in closing construction phases as well as throughout the building lifetime. As little research is found on the subject, a collective project was initiated by the municipality of Trondheim. This case study is limited to a single, environmentally certified, office building in Norway. The paper aims to determine main delay and defect causes. Finally, some countermeasures are identified. A literature review along with a document study was performed. Seven semi-structured, case specific interviews were conducted in addition to a pilot study consisting of three interviews on the same topic. Further studies on the subject, using the research results found will help confirm or disprove findings and countermeasures. These should be ranked in order to determine cause and countermeasure importance. Researching multiple case projects will give a clearer problem scope as well as give a basis for developing and implementing countermeasures. This can in turn improve performance and profitability in commercial buildings in Norway.

III. CONCLUSION

Obstruction in construction projects is considered one of the most common problems causing a multitude of negative effects on the project and its participating parties. This paper aims to identify the main causes of obstruction in construction projects in India from the point of view of contractors, consultants, and owners. A literature review was conducted to compile a list of obstruction causes that was purged based on appropriateness in seven semi structured interviews. The resulting list of obstruction causes was subjected to a questionnaire survey for quantitative confirmation and identification of the most important causes of obstruction. The overall results indicated that the most important causes are: financing by contractor during construction, obstructions in contractor's payment by owner, design changes by owner or his agent during construction, partial payments during construction, and non utilization of professional construction & contractual management. The contractor and owner were found to have opposing views, mostly blaming one another for obstructions, while the consultant was seen as having a more intermediate view. Results analyses suggest that in order to significantly reduce obstruction a joint effort based on teamwork is required. Furthermore, causes of project obstruction were discussed based on the type and size of the project.

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