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An Investigational Report on Causes, Effects and Methods for Minimizing Delays in Construction Projects

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ABSTRACT

The construction industry is particularly vulnerable to delays and uncertainties, often facing greater risks than other sectors. Delays are defined as the completion of work later than the planned schedule outlined in the contract. While delays cannot be entirely avoided, they can be minimized by identifying their underlying causes. When delays occur, they negatively impact project objectives, particularly time, cost, and quality. To mitigate these effects and ensure smooth project management, various tools and techniques are employed. Among these, the contract document is considered the most effective tool by industry professionals to manage delays. It provides a framework for contracting parties to address delays appropriately. This research examines delays in construction projects, comparing delay management clauses in contracts from developed countries with those in Indian construction contracts. The study identifies key factors contributing to project delays, including delayed progress payments, financing issues, approval delays for scope changes, material delivery issues, equipment breakdowns, low labor productivity, and adverse weather conditions. The study also highlights the significant consequences of delays, such as project time extensions and cost overruns. Based on these findings, the research recommends revisions to Indian construction contracts to enhance delay management and better align with the needs of the current Indian construction industry. It is anticipated that this study will serve as a foundation for future research on project delays and their mitigation strategies.

1. INTRODUCTION

Time is money especially on Engineering and Construction projects. The construction industry is a key sector in the development and economic growth of most countries across the world. In any case, the industry confronts various difficulties, for example, project delays. Projects or construction works that are not conveyed on time to the customer are alluded to as postponed projects. Mohamad [1] characterizes delay as a demonstration or occasion that extends an ideal opportunity to finish or perform a demonstration under the agreement. Additionally, Assaf and Al-Hejji [2], states that defer is the time invade either past culmination date determined in an agreement, or past the date that the gatherings settled upon for conveyance of a project. It is essentially a project slipping over its arranged timetable and is considered as regular issue in construction projects around the world. Assaf and Al-Hejji [2] further represents that, to the proprietor, delay implies rynloss of income through absence of creation offices and rent-capable space or a reliance on present offices.

At times, to the contractual worker, delay implies higher overhead costs on account of longer work period, higher material expenses through swelling, and because of work cost increments. Theodore [3] orders delays into two, those brought about by the customer and those created by the temporary worker. Delays brought about by the customer, for example, late accommodation of drawings and details, regular change orders, and erroneous site data produces claims from both the primary contractual workers and sub-temporary workers which ordinarily involve protracted court fights with colossal money related repercussions [3].

2. LITERATURE REVIEW

Alwi and Keith (2003) [4] surveyed for recognizing the essential reasons for postponements in building Construction

projects in Indonesia. A poll review was completed focusing on 89 respondents from substantial contractual workers and 23 respondents from little temporary workers. The respondents were solicited to evaluate the level from impact the 31 potential deferral causes on their projects. The postponement variables were gathered into five noteworthy gatherings to be specific i) project related; ii) proprietor related; iii) contractual worker related; iv) specialist related; and v) outside elements. They found out that delays can give rise to disruption of work and loss of productivity, late completion of project, increased time related costs and third party claims and abandonment or termination of contract. Delays are costly and often result in disputes and claims. Furthermore, delays effects the feasibility for project owner and retard the development in construction industry. Delays in completion of the project usually results in increased Owner, Engineer and Contractor costs, the overall time of performance is vital for the financial success of the project. Construction projects are normally labor intensive with long period of work and high financial intensity. Delays in a construction projects are avoidable by better risk allocation and management. By managing the delays in a project, a project can be made successful. Contract conditions are generally used in a project to manage these delays. Different forms of standard contract condition are used in the construction industry to manage the construction projects smoothly.

A study on time execution of various sorts of construction projects in Saudi Arabia was directed by Assaf andAl-Hejji (2005)[5]to decide the reasons for postponement and their significance as indicated by each of the project members, i.e., the engineer, expert and the temporary worker. The field study directed included 23 contractual workers, 19 experts, and 15 engineers.

Frimpong et. al., [6]conducted a study to recognize and assess the relative significance of huge variables adding to postpone and cost invades in Ghana groundwater construction projects. A survey with 26 elements was painstakingly outlined from preparatory examinations led in groundwater boring projects somewhere around 1970 and 1999 in Ghana. The survey was coordinated towards three gatherings in both open and private associations: proprietors of the groundwater projects, counseling workplaces, and contractual workers working in the groundwater works. The poll was dispersed to an arbitrary specimen of 55 proprietors, 40 temporary workers and 30 specialists. The consequence of the study uncovered the fundamental driver of deferral and cost invades in construction of groundwater projects: regularly scheduled installment troubles from organizations; poor contractual worker management; material acquisition; poor specialized execution; and heightening of material costs. Al-Momani[7]investigated reasons for deferral in 130 open projects in Jordan. The primary driver of deferral were identified with configuration, client changes, climate, site conditions, and late conveyances, financial conditions and increment in amount. The study proposed that extraordinary regard for elements will help industry specialists in minimizing contract question. Delays have solid association with disappointment and in powerful execution of contractual workers. Chan and Kumaraswamy[8] led an overview to assess the relative significance of 83 potential postponement elements in Hong Kong construction projects and discovered five vital elements: poor danger management and supervision, unexpected site conditions, moderate basic leadership, customer started varieties, and work varieties. They additionally found that there was a distinction in recognitions as to reasons for postponements by various gatherings of members in building and structural designing works. They proposed that inclinations of various industry gatherings may coordinate fault for postponements to different gatherings.

Ogunlana et, al., [9] considered the postponements in building projects in Thailand, as a sample of creating economies. They inferred that the issues of the construction business in creating economies could be settled in three layers: • Problem of deficiencies or insufficiencies in industry framework, mostly supply of assets. • Problems brought on by customers and advisors; and • Problems brought on by ineptitude of contractual workers.

Doloi H. et. al., (2012) [10] researched to investigate elements influencing delays in Indian construction projects. They chose set of 45 qualities. Their exploration initially recognized the key variables affecting deferral in Indian construction industry and afterward settled the relationship between the basic traits for creating forecast models for evaluating the effects of these components on postponement. A survey and individual meetings have framed the premise of their exploration. Variable investigation and relapse demonstrating were utilized to analyze the hugeness of the deferral components. From the component investigation, most basic elements of construction deferral were distinguished as absence of duty took after by wasteful site management and poor site coordination positioned third.

Megha Desaiet. al., (2013) [11] did research to analyze Critical Causes of Delay in Traditional ConstructionProjects. Total 59 causes were identified under 9major groups.

3. OBJECTIVES OF STUDY

- To understand the delays observed by the construction professionals in their contract decision making process.
- Compare the popular form of contract conditions used in India and developed countries for better delay mitigation and recommend the suitable contract condition clauses to the Indian construction industry.

4. METHODOLOGY

The research methodology for present study contains two phases. The main phase included a literature search. The literature review was conducted through conference proceedings, books, internet and international project management journal. As the outcome of this phase, causes of delays for construction projects were identified and categorized depending on their nature and mode of occurrence. The second phase includes comparing FIDIC RED Book 1999 which is the most popular form of construction contract in developed countries and MOSPI conditions of construction contract which is the most popular form of construction contract in developing country like INDIA , so that the delays in the projects are mitigated properly. This comparative study will help to improve the contract management system in India

5. RESULTS AND DISCUSSION

5.1. Delays in availability of labour , material and equipment FIDIC

If the Contractor fails to comply with Sub Clause 8.2 [Time for Completion], the Contractor shall subject to Sub-Clause 2.5[Employer‟s Claims] pay delay damages to the Employer for this default. These delay damages shall be the sum stated in the Contract Data, which shall be paid for every day which shall elapse between the relevant Time for Completion and the date stated in the Taking-Over Certificate. However, the total amount due under this Sub-Clause shall not exceed the minimum delay damages stated in the contract These delay damages shall be the only damages due to the Contractor for such default. Other than in the event of termination under Sub-Clause 15.2 [Termination by Employer] prior to Completion of the works. These damages shall not relieve the Contractor from his obligation to complete the works, or from any other duties, obligations or responsibilities which he may have under the Contract.

Early Warning Clause 32.1 says that, the contractor is to warn the employer at the earliest opportunity of specific likely futures or circumstance that may delay the execution of work. The employer shall ask the contractor to provide an estimate of the expected completion date.

Liquidated Damages

In the case of a delay in completion of the contract, according to Clause 9A of MOSPI, the contractor may need to pay the Liquidated Damages (LD) at the rate of (0.5%) of the contract price per week of delay. And the same clause says that the LD rate may be increased up to 10% of the contract price upon the decision of the employer. Clause 9A (i) say that if the owner is satisfied with the works can be completed by the contractor within a reasonable time after the specified time for completion; the owner may allow further.

Critical Analysis

a. To mitigate this cause of delay, both MOSPI and FIDIC says that the contractor is responsible to arrange labor, material and equipment to carry out the work. Under both the contract conditions the contractor is entitled to get the compensation if the employer doesn't provide something which he is to provide by the date for providing it shown on the accepted programme. Both the contract conditions allow the contractor to get compensation event, if there is any delay caused by the employer nominated subcontractors.

b. The FIDIC contract clearly mentioned that the contractor shall, subject to (Employer‟s claim) pay delay damages to the employer for every day which elapses between the relevant Times for completion. This clause makes the contractor to feel more responsible to get work done from the subcontractors rather than blaming others.

5.2. Time overrun by the contractor

FIDIC

According to the Clause 8.7 if the Contractor fails to comply with Sub-Clause 8.2 [Time for Completion], the Contractor shall subject to Sub-Clause 2.5 [Employer‟s Claims] pay delay damages to the Employer for this default. These delay damages shall be the sum stated in the Contract Data, which shall be paid for every day which shall elapse between the relevant Time for Completion and the date stated in the Taking-Over Certificate. However, the total amount due under this Sub-Clause shall not exceed the maximum amount of delay damages (if any) stated in the Contract Data. These delay damages shall be the only damages due from the Contractor for such default, other than in the event of termination under Sub-Clause 15.2 [Termination by Employer] prior to completion of the Works. These damages shall not relieve the Contractor from his obligation to complete the Works, or from any other duties, obligations or responsibilities which he may have under the Contract.

Employers Claim: Sub-Clause 2.5

If the Employer considers himself to be entitled to any payment under any Clause of these Conditions or otherwise in connection with the Contract, and/or to any extension of the Defects Notification Period, the Employer or the Engineer shall give notice and particulars to the Contractor The notice shall be given as soon as practicable after the Employer became aware, or should have become aware, of the event or circumstances giving rise to the claim. A notice relating to any extension of the Defects Notification Period shall be given before the expiry of such period. The particulars shall specify the Clause or other basis of the claim, and shall include substantiation of the amount and/or extension to which the Employer considers himself to be entitled in connection with the Contract. The Engineer shall then proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) the amount (if any) which the Employer is entitled to be paid by the Contractor; and/or (ii) the extension (if any) of the Defects Notification Period. This amount may be included as a deduction in the Contract Price and Payment Certificates. The Employer shall only be entitled to set off against or make any deduction from an amount certified in a Payment Certificate, or to otherwise claim against the Contractor in accordance with this Sub-Clause.

MOSPI

Early Warning

Clause 32.1 says that, the contractor is to warn the employer at the earliest opportunity of specific likely futures or circumstance that may delay the execution of work. The employer shall ask the contractor to provide an estimate of the expected completion date.

Liquidated Damages

In the case of a delay in completion of the contract, according to clause 9A of MOPSI, the contractor may need to pay the LD at the rate of (0.5%) of the contract price per week of delay. And the same clause says that the LD rate may be increased up to 10% of the contract price upon the decision of the employer. Clause 9A (i) say that if the owner is satisfied with the works can be completed by the contractor within a reasonable time after the specified time for completion; the owner may allow further extension of time at its discretion with or without the levy of liquidated damages. Clause 9A (ii) says that the owner if not satisfied that the works can be completed by the contractor, and in the event of failure on the part of the contractor to complete work within further extension of time allowed as aforesaid, shall be entitled, without prejudice to any other right, or remedy available in that behalf, to withdraw the contract. Clause 9A (iii) says that the owner, if not satisfied with the progress of the contract and in the event of failure of the contractor to recoup the delays in the mutually agreed time frame, shall be entitled to terminate the contract. Incentives: Clause 50.9.B (Option Clause) Clause 50-9(B) articulates that, for early completion of the contract before the stipulated date of completion, the contractor may get an incentive amount at the rate of half per cent (0.5%) of the contract price per week

of early completion or it may be subject to maximum of five percent (5%) of the contract price.

6. CONCLUSION

The successful completion of a project depends on many factors of which proper delay mitigation is one of the most important. This research undertaken to perform a comparative study of the delay mitigation clauses from the popular form of contract conditions adopted from India and Developed Country's construction industry. Such a comparative study has helped to make the critical analysis of the delay mitigation capability of the developing contract management system in India with the developed contract management system. To make the comparative study more effective, this research has identified the popular form of contract condition and procurement method adopted from Developed Countries and India, i.e., FIDIC contract in Developed Countries and MOSPI contract in India. The significant risks associated with the traditional methods were identified from the literature review and the top 10 delays were prioritized through a comprehensive assessment of their impact severity, likelihood of occurrence established through the research survey. The contractual delay mitigation mechanism for the top 10 delay factors was identified through the data analysis process. The key findings obtained from this comparative study of FIDIC (Developed Countries) with MOSPI (India) for mitigating the delays associated with the traditional contract methods shall help to improve the condition of Indian Construction Industry. This comparative study helps to get to know about the delay mitigation capacity of the Indian construction projects. However the recommendations made by this research project is not conclusive, but to provide a comparative list of delay mitigation techniques adopted by both the contractual and industry perspective. Hence the reader of this research shall consider these recommendations as a guide note to mitigate delay rather consider as conclusive solution to mitigate delays

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