A Review on Causes of Delay in Construction Projects

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Abstract— Delays are the one of the major problem in the Construction Project. Construction Delays are the time overrun either beyond date specified in a contract. Delays exceed initial time and cost estimates. Delays can be minimized only when their causes are identified and analyzed. The causes of delay in construction projects are taken from the past literature review. The literature reviews are summarized and various causes related to the delays based on literature review summary.

Key words: Construction Projects, Causes of Delay

I. INTRODUCTION

Construction industry plays a very important role for the economy development. Construction Delay is a major problem facing in any developing country. A study is to review and identify the applicability of past studies on the factors causing delays in projects. In India, a study organized by the Infrastructure and Project Monitoring Division of Ministry of Statistics and Programme Implementation in 2004 reported that out of 646 central sector projects costing about 2500Cr. Approximately 40% are behind schedule, with delaying ranging from 1-252 months. The construction sector especially to give around 8% to the Gross Domestic Product (GDP) in last five years. Then it will increase from 7.67 lakh cores in 2012-2013 to 13.59 lakh cores in 2016-2017 as per Twelfth plan period. Therefore, Delays in projects gives rise to not content to all parties involved and that the projects are completed within budgeted time and cost.

II. OBJECTIVE

The main objective of this study is to identifying the major causes of delay, effect of delay and methods to minimizing delays in construction projects. The primary aim is to study the differences in perceptions of the three major parties in any construction namely owners, contractors and consultants.

III. LITERATURE REVIEW

Abdalla M. Odeh & Hussien T. Battaineh (2002), In Jordan, contractors and labor productivity was the most important delaying factor. Delays are costly and often argument and claims, damages the feasibility for the project owners and progress of the construction industry

Sadi A. Assaf, Sadiq Al-Hejji (2006), “Causes of delay in large construction”. In this paper, 73 causes of delay were identified by field survey. Three parties were participated in it. The common causes of delay arose from all parties were [1] change order by the owners during construction to avoid delay, [2] Delay in progress payment, [3] ineffective planning and scheduling, [4] shortage of labors, [5] difficulties in financing on the part of the contractor.

Frank D. K. Fugar and Adwoa B. Agyakwah-Baah (2010), In Ghana construction project, the relative importance that cause delays from that all the three parties namely owner, contractor and consultants are respondents for the questionnaire survey. From this important 32 factors are identified and analyzed based on relative importance index (RII). This study showed the top ten factors that causing delay in construction are: [1] Delay in honoring certificates, [2] Underestimation of the costs, [3] Underestimation of the complexity, [4] Difficulty in accessing bank credit, [5] Poor supervision, [6] Underestimation of time factor completion of projects by contractors, [7] Shortage of materials, [8] Poor professional management, [9] Rising cost of materials, [10] Poor site management. In this study, 32 factors are categorized in nine groups. The results shows that the financing group was the most influential factor causing delay and scheduling & controlling were considered as second most important factor and so on.

Borvorn Israngkura Na Ayudhya (2011) “Evaluation of common delay causes of construction projects in Singapore”. In this paper, delay factors identified and evaluated commonly among the three parties. The interview and questionnaire method were used in this research for identifying the factors of delay. The study showed that all the groups of agreed that out of a total 35 factors. The four categories are separated to the factors of main delay are (1) Contract Specification, (2) Environment, (3) Financial, (4) Other common. From this the highest overall severity index with 86.5%.

Towhid Pourrostam and Amiruddin Ismail (2012) “Causes and Effects of delay in Iranian Construction Projects”. They conducted a survey to identify the causes. A questionnaire with 28 causes and 6 effects for delays were taken for investigations. It highlighted the ten major factors which reduce the delays by client, consultants and contractors are revealed.

S.P.Narayanan, Chidambaram Ramanathan & Arazí B Idrus (2012) “Construction Delays causing risks on Time and Cost - a Critical Review”. In this published paper a survey conducted around the world with the delay factors and classified. They collected 113 causes of delay and they are grouped into 18 different categories. The causes are analysed and investigated through “Importance Weight, Weighted average, Mean, Standard Deviation and Variance”. The first 5 ranks in different studies are concluded from this paper.

Prakash Rao and Joseph Camron Culas (2014) “Causes of delays in Construction Projects – A case study”. In this study major causes, effects and methods of minimizing delays are identified by past literature review and conducted a survey. Based on literature review 8 causes, 6 effects and 15 methods of minimizing construction delays were identified. The top effective methods are successfully
achieved. The major effects of delays are time and cost overrun. To minimize the delays from this study includes management, communication and co-ordination.

Owolabi James D, Olusanya etc., (2014) “Causes and Effect of delay on project construction delivery time”. In this project, causes and effects of delay on delivery time was investigated. Random sampling method was used in this study. Sample taken for this project are population sample is 150 and total sample 93 was deployed. A questionnaire structured in linkert scale was used in data analysis. From this investigation, client having the highest value 51.1%, contractors having 35.5% then the consultants having 13.3% of causes of delay in construction project. The 15 factors are identified and ranked according to the mean index score. A factor includes lack of funds, adequate information from consultants, slow decision making and insolvency of contractors.

IV. CLASSIFICATION OF DELAYS
The classifications of delays are categorized into four basic ways:
1) Critical or Noncritical delays
2) Excusable or Non-excusable delays
3) Compensable or Non-compensable delays
4) Concurrent or Non-concurrent delays

Delays that affect the duration or completion of project are critical delays. The delays do not affect duration or completions of project are noncritical delays.

The delays which are not predicted under any activity which is apart from the control of contractor are excusable delays. In this type, no one is responsible by law for penalty. In Non-excusable delays, the delays are beyond the control of contractor and these delays are deal with contractor and client may be claim to something for the compensation.

A compensable delay is a delay where the contractor is designated to prolong the time and to add the compensation. Excusable delays are able to compensate. In Non-compensable delays, the contractor is not able to claim for the compensation from the excusable delays.

A concurrent delay is the concept of presenting an analysis for common construction delays. The argument of concurrency is not to determine the critical delays point of view but from an attitude responsible for damages connected with the delay to the critical path.

V. CAUSES AND EFFECTS OF DELAYS
From this review, the causes of delay can be categorized into different groups to make a questionnaire survey with the contractors, owners, consultants, and other participants and effects also observed.

A. Causes of Delays
- According to owners contribution
- Contribution of contractors
- Based on consultant factors
- Materials contribution to the work
- Labors contribution
- Equipment
- Other external factor

B. Effects of Delays
- Time over-run
- Profit reduction for the contractors
- Non productivity loss
- Distrust within the parties
- Delay in work progress payment
- Arbitration
- Disputes between the owners and contractors

VI. METHODOLOGY
The project methodology from this review was made to find out the factors that causing delay in the construction project. The following process is carried out to identify the causes of delays.
- Collection of literature
- Literature review
- Identify the factors
- Collection of data
- Data analysis

Project methodology is a process based upon the phases of the project (i.e.) literature review of the delays.

VII. DATA ANALYSIS
The data analysis can be analyzed through two techniques are:
1) Relative Importance Index technique
2) Importance Index technique

A. Relative Importance Index (RII) technique
For analyzing the data, various researchers used RII (Relative Importance Index) to determine the various cause of delay observed from the questionnaire survey and interview. In this case Likert scale adopted for determining the relative importance of the causes using the formula.

Relative Importance Index (RII) = ∑W,A−N

Where, W- Weightage given to respective factor by the respondents which ranges from 1 to 4, A- highest weight, N-total number of respondents.

B. Importance Index Technique
In this importance index technique, frequency of occurrence and degree of severity are considered to find the cause on project delay. Severity and frequency are categorized under four point scale. Three formulas are used to determine the relative importance of causes of delay in importance index. They are:
1) Frequency Index

This formula is used to find the causes based on frequency

Frequency Index (F.I.) (%) = ∑a (n/N)*100/4

Where, a is a constant for expressing the weightage given to each response (range from 1 to 4), n is the frequency and N is the total number of response.

Severity Index
Based on severity, the causes of delays can be determined by using this formula.

Severity Index (S.I.) (%) = ∑a (n/N)*100/4

Where, a is a constant for expressing the weightage given to each response (range from 1 to 4), n is the frequency and N is the total number of response.
2) Importance Index
The Importance index can be calculated using both the frequency and severity indices, as follows:

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\text{Importance Index (IMP.I.)} \% = \left[ \frac{F.I.(\% \times S.I.(\%)}{100}\right]
\]

VIII. CONCLUSIONS
This study is to identify the major cause for delaying construction project. The causes in the projects are clearly identified; delays can be avoided or minimized. From the past literature, some of the most common factors causing delays is identified, they are lack of experience in the work, poor supervision, changes in design during construction by the owner, delay in delivery, co-ordination, project management problem, weather conditions, soil condition, slow mobilization.

IX. RECOMMENDATIONS
The aim of this paper is shown that in order to reduce the project delays. According to various researchers, the following recommendations can be made to minimize the delays.

- Prepare effective planning and scheduling.
- Proper site management and supervision.
- Using up-to-date technology.
- Procurement of material.
- Co-ordination between the parties involved in the project.
- Use adequate construction methods.
- Estimate the initial cost for the projects.
- Owners should make decisions quickly.
- Progress payment should be made on time.
- Manage the financial resources.

Finally, similar studies are performed for the specific type of construction. Detailed study should be carried out to estimating the delays in the construction projects by utilizing of this paper.

REFERENCES