CAUSES OF DELAY IN CONSTRUCTION PROJECTS

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ABSTRACT

Delay in Building Construction Project is one of the most common problems. Delay can be defined as time overrun or extension of time to complete the project. Delay is the situation when the actual progress of a construction project is slower than the planned schedule. Delay is also causes when the project completion is late. The causes of delay in Building Construction Projects are taken from the pass literature review. The literature reviews are summarized and the delay framework is constructed based on literature review summary.

Delay is one of the biggest problems often experienced on construction project sites. Delays can triggered the negative effects on the following factors such as loss of productivity, revenue laws between owners and contractors and contract termination, and increased costs. To find the causes and effects of delay on building construction project delivery on time was the main aim of this project. A structured questionnaire in Likert scale was used in data collection. I had visited the 17 construction sites in which 8 was responded. There are many factors that delay on construction projects, and some of them identified factors are: lack of adequate information from consultants, slow decision making, lack of effective communication among the parties involved, bad weather contractor's insolvency, lack of funds to finance the project to completion, changes in drawings, inappropriate overall organizational structure linking to the project, variations among others, project management problem, mistake and discrepancies in contract document, equipment availability and failure, mistakes during construction, fluctuation in prices of building materials, and labor. The above reasons could be preventing the causes of delays in construction project.

KEY WORDS:-*Delay, Construction, Delivery, Construction, Effects* **.**

1. INTRODUCTION

1.1 GENERAL INTRODUCTION

The construction industry is one of the main sector that play important role in the growth of an economy of a country. The construction industry is the tool through which a society achieve its aim of urban and rural area development. It is becoming more complex because of the deification of the construction process itself and the large number of parties involved in the construction process. People that involved in constructions are clients, users, designers, regulators, contractors, suppliers, subcontractors, and consultants.

Innovative construction projects are characterization by new standard advanced technologies multiparty participation, and frequent owner- demand changes. Coupled with this state are inherent and complexities in the physical, financial, and economic environment in which most projects are performed. These conditions made them to completing the projects on time and budgeted is a difficult work must leading to claims on cost compensations and time extensions.

Delays is defined as the time overrun beyond the completion date of the project specified in agree upon for the delivery beyond the date that the parties of a project. It is planned schedule. It is slipping operand is considered as common problem in construction projects. Construction project is considered one of the most common use problems causing a multitude negative effect on the project and its participating partied. It is essential to identify the actual cause of delay in order to minimization and avoid the delays and their corresponding expenses. Late completion, lost productivity acceleration, contract termination and increased costs are number of changes can causes when delays in construction occur.

1.2 Review Of Past Research Effects In Causes And Effects Of Delay In Construction Project Deliveries

A few selected related articles were presented in this section on causes and effects of delay on construction works. Dates

(2003) studied construction delays, the study developed a decision support system for construction delay analysis called (DAS). The main categories of delays in DAS on the basis of study is labor, management, equipment engineering, delays of external, weather, owner, material, subcontractors, and contractors. In Nigeria, delay and cost overrun causes in construction projects. Factors that causes delay in construction projects showed by the results are: poor contract management, storage of material, financing and payment for work, changes in site conditions and improper planning.

1.3 Delay Can Be Minimised By

- Site investigations in detail.
- Regular meetings and careful monitoring.
- Effective site management.
- Collaborative working and effective coordination.
- Careful scheduling.

2.1 Aim And Objectives of the Study

The scope of the research was mainly focus on a questionnaire survey and literature review. Projects investigated in this research included office and administration building, medical centre, communication facilities and civil engineering projects. The survey was conducted in Aceh, India.

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1.4 OBJECTIVE

- To achieve the aim the following objective have been identified:
- To identify the major causes of delay in construction project.
- To identify the effects of delays in construction project.
- To identify the methods of minimizing construction delays.
- These study developed a decision support system for construction delay analysis called (DAS). DAS have some main categories which includes material, labor, weather, external delays, management, engineering, equipment, owner, and subcontractors.s, management, engineering, equipment, owner, and subcontractors

2. LITRATURE REVIEW

General Reviews

There are so many factors that cause delay on the projects of construction. Lack of effective communication among all the parties, changes in drawings, slow decision making by contractor, contractor's insolvency, variations, lack of funds to finance the project to completion, lack of improper information from consultants project management problem, 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 strike these all are the factors that cause construction delay. On the effects of delay on the project work was also analysed. Delays in construction project among parties these factors were ranked highest are time overrun, trying down of client capital due to non-completion of the project.

Baldwin and Manthei (1971) – In United States the causes of delay in building projects were studied. Engineers, contractors, and architects, were surveyed and found that in concerning the causes of delay there was an important agreement among the three groups. They also noticed that weather, labour supply, and subcontractors were the major causes of delay.

Chalabi and Camp (1984) - Discussed causes of building project delays in delays in developing countries during the pre-planning and the construction stages. Their study dealt with developing counties where workers are relatively skilled. The proper planning at the very early stages of the project is important for cost overruns and minimizing delay in most projects in developing countries.

Al-Momani (2000) - In 130 public projects in Jordan the causes of delay was investigated. The main causes were related to user changes, design, weather, late deliveries, site conditions, increases in quantity, and economic conditions. For

minimizing contract delays the special attention on factors will help the practitioners in construction. Delays have strong relationship with failure and in effective performance of contractors.

Chan and Kumaraswamy (1997) – In Hong Kong the relatively importance of 83 potential delay factors was conducted to evacuated construction project and found five principle factors: slow decision making, poor risk management and supervision, work variation, unforeseen site condition, and client-initiated variations. They suggested that bases of different industry groups might direct blame for delays to other groups.

Mezher and Tawil (1998) – In the construction industry the survey was conducted on the causes of delays from the point of view of contractors, owners, and architectural/engineering firms. The owner had most concern in contractor's contractual relationship, and financial issues also, while consultants most concern with the project management issues.

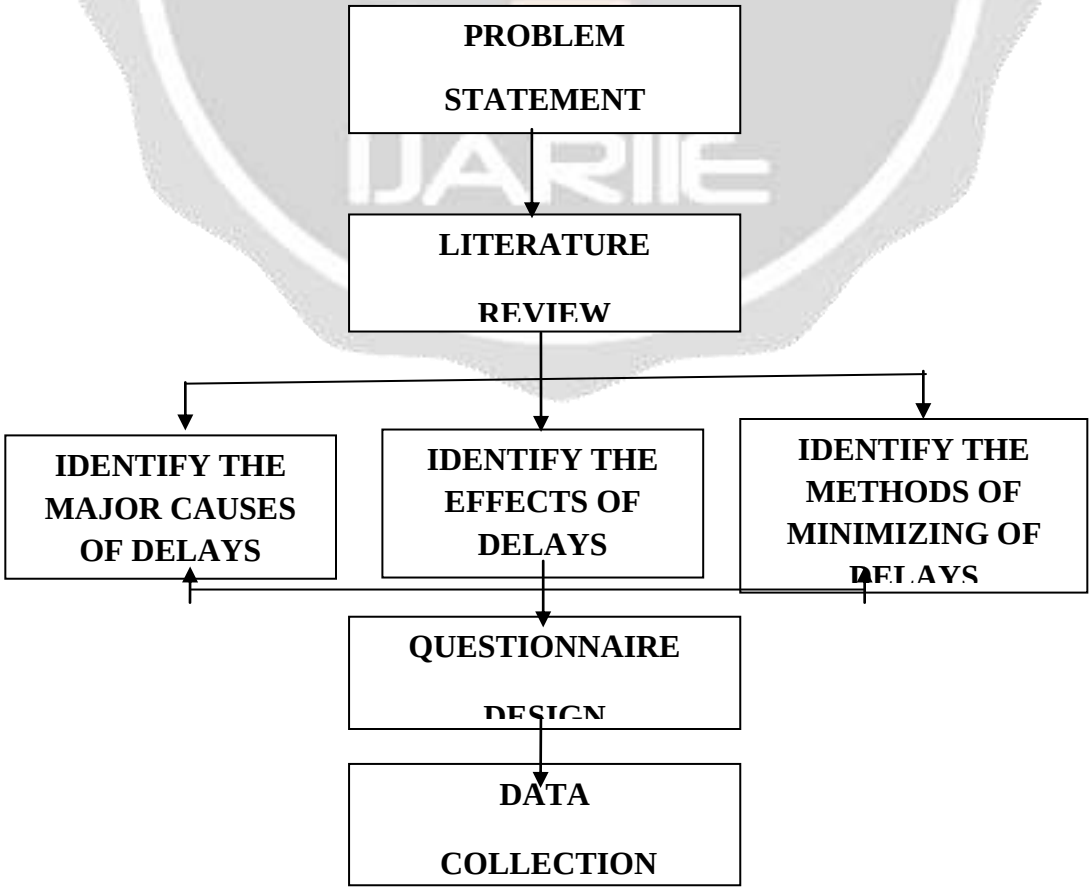
3.RESEARCH METHODOLOGY

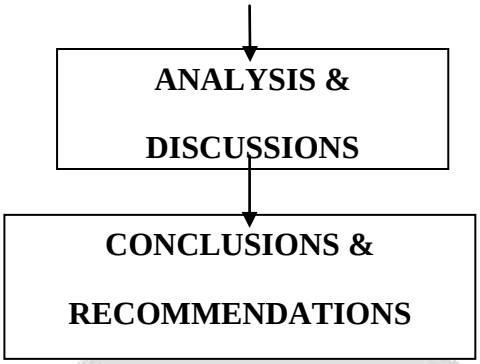
First we have read the 20 earlier published paper and some books also. On the basis of that study we have discovered the list of 66 causes of delays in construction project. For making the list of causes of delays we found help from guide book and construction site also. From the help of these sources we have formed this course. After that by visiting around 18 construction sites, 7 construction sites has responded to us. Some respondents' sites are:

CONSULTANT GROUP
SITE EXECUTION GROUP
ARCHITECTURE GROUP
HIGHER MANAGEMENT AUTHORITY, etc.

When we have visited the site location first of all we have taken the ratings between (1-5) 1 is the lowest and 5 is the highest. And in the table of causes of delay in construction we also mention the average ratings.
The study required both primary and secondary data. The Primary data has been collected by interviewing the officials of the construction industry.

FLOWCHART OF RESEARCH METHODOLOGY





RESEARCH METHODOLOGY TABLE

3.2DATA/INFORMATION SOURCES

3.2.1PRIMARY SOURCES/DIRECT SOURCES:

Problem Identification Literature Review, Determination of Delay Factor.

3.2.2SECONDARY DATA/INFORMATION SOURCES:

Questionnaire Preparation, Questionnaire Survey, Data Collection, Analysis of Data, Obtain causes of Delays, Comparison of delay Factors, Relative Importance Index, Result and Interpretation, Recommendation.

4. DATA ANALYSIS

4.1 RELATIVE IMPORTANCE INDEX

Data analysis is done by detailed study of site conditions. A lot of questionnaire survey with Clients, Contractors, Consultants including field workers and detailed study of past literature reviews. For data analysis various researchers used RII (Relative Importance Index) to determine the relative importance of the various causes of delays. The Relative Importance (RII) ranking method had been applied to determine the ranks of the different delay causes. It is able to identify the most critical delay factors in the construction industry by the ranking assigned to each causes of delays. To evaluate the comparative importance of a single item to others the RII has been used in many domains.

The five-point Likert scale ranging from 1 (Very low significant) to 5 (Extremely significant) was adopted and transformed to relative importance indexes (RII) for each factors as follows:

Where, **RII**= $\sum \frac{W}{A*N}$

W= Weightage given to each factor (ranging from 1 to 5)
A is 5 (highest weight)
N is the Total number of Respondents.
The RII value is ranging from 0 to 1, the higher the value tells that the more important was the delay to the Construction industry. Importance Index (I):The collected data was analyzed using an importance index. The importance index was computed by the formula.

4.2CAUSES OF DELAYS BY WORKING AGENCIES WITH RII VALUE.

S. No.	Delays Causes	RII Value	Responsible Person
1	Frequent design changes requested by employer during construction	0.860	Employer
2	Delays in work approval of employer	0.831	Employer

3	Ineffective planning and scheduling of projects	0.800	Shared
4	Conflicts between drawings and specification	0.800	Consultant
5	Poor financial control of the project	0.800	Contractor
6	Shortage of labour under contractor	0.790	Contractor
7	Omission and design errors	0.786	Consultant
8	Selection of inappropriate contractor	0.78	Employer
9	Poor coordination & communication with other parties	0..77	Employer
10	Lack of knowledge by the consultant's supervision staff regarding new construction methods, materials, and techniques	0.757	Consultant
11	Incomplete drawings/specification	0.757	Consultant
12	Inefficient flow of information from employer department	0.754	Consultant
13	Shortage of construction materials	0.743	Contractor
14	Ineffective delay penalties	0.74	Employer
15	Experience of contractor	0.737	Contractor
16	Difficulties in financing project by contractor	0.728	Contractor
17	Inefficient control of the project progress of the contractor	0.72	Consultant
18	Lack of application of construction management tools and techniques by consultant's project and staff	0.786	Consultant
19	Unrealistic time estimation	0.72	Consultant
20	Delusive/wrong schedule program submitted by the contractor	0.714	Contractor
21	Unqualified workforce	0.714	Contractor
22	Low productivity of labour	0.714	Contractor
23	Late in approval of work permit by consultant	0.711	Consultant
24	Rework due to wrong drawing	0.708	Consultant
25	Materials management problem	0.703	shared
26	Legal disputes between various parties	0.7	Shared
27	Slow decision-making process by employer department	0.688	Consultant
28	Lack of technical personnel	0.686	Employer
29	Improper scheduling of project by contractor	0.686	Contractor
31	Lack of high-technology mechanical equipment	0.686	Contractor
32	Delay due to political issues	0.684	

33	Insufficient data collection and survey before testing	0.683	Consultant
34	Unequal design team experience	0.683	Consultant
35	Inexperience and poor judgement in estimating procedures by the contract	0.680	Contractor
36	Detain in producing design documents	0.671	Consultant
37	No or less time extension associated with change orders initiated by the employer	0.671	Consultant
38	Inadequate experience of contractor's supervision and Poor qualifications	0.670	Employer
39	Misinterpretation of drawings and specifications	0.663	Shared
40	Long-time taken to resolve the right of way issues	0.66	Employer
41	Type of project bidding and award (lowest bidder)	0.657	Employer
42	Improper construction method	0.657	Contractor
43	Delays in inspections by consultant	0.657	Consultant
44	Insufficient equipment	0.657	Contractor
45	Equipment allocation problem	0.648	Contractor
46	Inaccurate initial project scope estimate	0.646	Consultant
47	Supervision of contract and poor site management	0.643	Contractor
48	Employer initiated variations	0.64	Employer
49	Poor qualification of the contractor's technical staff	0.637	Contractor
50	Correction of work due to error during constructions	0.626	Shared
51	Delay in the preparation of contractor submission	0.614	Contractor
52	Conflicts between contractor & other parties.	0.614	Shared
53	Frequent change of sub-contractors because of their insufficient work.	0.614	Contractor
54	Deficient inspectors by consultant	0.608	Consultant
55	Poor communication with other construction parties	0.603	Consultant
56	Contractor's staff not adequately trained in professional construction management techniques	0.600	Contractor
57	Low level of equipment operator's skills	0.600	Employer
58	Delay in site mobilization	0.600	Shared
59	No application of construction management procedures on the part of employer contributes to late detection of construction problem	0.586	Employer
60	Understaffed project and site personnel	0.586	Consultant

61	Improper technical study by the contractor during the bidding stages.	0.563	Contractor
62	Delay on delivery of material and equipment.	0.560	Contractor
63	Delay caused by major site accidents.	0.300	Contactor
64	Delay due to Historical/Religious monuments.	0.25	
65	Delay due to natural or man made hazard.	0.100	

Fig -2 RII Value table With Delay Agencies

6. RESILTS AND DISCUSSION

Many Residential construction projects have faced different kinds of problems and delays of time is one of the major problem in construction project. The delay in different settlement has given the effects such as it will give termination to the relationship between owner and contractor. Moreover, it will also contribute to the cost and time overruns. It is generally said that the contract language is considered difficult to comprehend and they are therefore a major source of delays.

5. CONCLUSION

The researched is mainly based on questionnaire survey , all the data collected from site in the numerical based ranking from 7 site. With the help of relative importance index method to find out the importance of each causes of delay. All causes have been divided into four range.

Range A = this range lies b/w 0.860 to 8 it is most important causes of delays
Range B = this range lies b/w 0.790 to 7 it is important causes of delays
Range C= this range lies b/w 0.688 to 6 it is moderately important causes of delays
Range D= this range lies b/w 0.586 to 560 it is less important causes of delays
Range E this range lies b/w 0.300 to 1 it is least important causes of delays.

These top 5 causes of delays on R.I.I. value base these can be minimized upto least stage but not be 100% eliminate if employer choose very skilled and trained person for plaining and decision , Early estimation cost of project , right selection of Contractor and consultant.

Most important thing to avoid much alteration in drawings & Owner must have 20% extra budget than estimation cost**.**

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