

Study on Construction Delay and The Factors of Delay in Construction Project

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Abstract. Now-a-days construction delay has become one of the biggest problems' construction firms facing in Bangladesh. This problem is affecting in every developing steps of the country. The aim of this study is to investigate every possible reason that is working behind the construction delay in Khulna city. The factors related to delay has been selected by literature review and the survey data has been collected through face to face interview with construction experts. Forty-two factors have been selected and divided into eleven categories and these are materials, laborer, lengthy procuring process, owner, contractor, Subcontractor, machines and equipment, engineer, construction, political situation, miscellaneous. The factors are sorted by their impacts on delay. According to the investigations and analysis of survey data the top five reasons are: (1) Number of construction training center is very little; (2) Lack of skilled laborer; (3) If the budget crossed; (4) Lack of planning; (5) Not practicing the construction law. This investigation has been done through all over the Khulna city. This study can significantly contribute to the construction sector of Khulna city.

Keywords: Construction delay, Factors, Khulna City, Construction project

1. Introduction

Bangladesh is dreaming of becoming a middle-income country by 2021 (Star, 2017). Bangladesh is also going for mega infrastructure projects worth billions of dollars, so their management is becoming ever more important for ensuring the maximum benefit for Bangladesh. Almost 2.4 million people are working in highly invested construction industry, which contributes about 20% to the

national GDP (Mohammad Saiful Islam, Trigunarsyah, Hassanain, & Assaf, 2015). This means the construction projects developing in Bangladesh is related to a huge amount of money and people's profession and livelihood. But due to improper management, the construction of the projects is getting delay and Bangladesh is facing a huge amount of losses every year (Muhammad S Islam & Ahmed). Construction delay affects the project owners by losing revenue and the contractors by losing money (Mohammad Saiful Islam et al., 2015). Because of improper management, delays in construction may arise at feasibility stage of the project and continue till to the end of construction work.

During the last 50 years, applications of principles and techniques of modern project management have spread from their origins in major engineering projects to an ever-widening variety of corporate endeavors (Partington, Pellegrinelli, & Young, 2005). Which gives a clear indication that the environment of the system of construction management is changing and people are concerned about the upcoming construction process of the world and are trying to find the most suitable way to run a project without having any delay in schedule. In construction industry delay is a term which refers to a difference between estimated time and actual time to complete a project (Rahman, Lee, & Ha, 2014). Delays can be happened for any parties direct and indirect action who are related with the construction of a project. In addition, some other factors for example country's general economy, inflation of resource prices, lack of managerial service, environmental factors etc. are the causes of project delays (Muhammad Saiful Islam & Trigunarsyah, 2017). So, as a under developing country before going for mega infrastructure projects or high rise projects, it has become necessary to find out the actual reason that are working behind the delay in construction.

According to the above discussion, the aim of this study is to find out the actual reasons that are impacting negatively to the construction industry and influencing the development of Bangladesh through Khulna city. The local factors and geographies position of Khulna city are also considered in this study.

2. Literature Review

In recent days the amount of construction projects is increasing in large rate. So the necessity of developing the projects in a fixed time is also increasing. For this reason, the factors that hamper the time of construction work is needed to be identified. With the aim of identifying the factors, many studies have been done till now. Kumaraswamy and Chan (1998) carried out a survey in Hong Kong depending on 83 factors. They concluded that improving productivity is a useful approach to controlling delays. Ramanathan, Narayanan, and Idrus (2012) presented a review paper on construction delay by reviewing around 41 studies. They collected a list of 113 causes for delays categorized into 18 different groups. Singh (2010) carried out a study based on a large dataset of 894 projects from 17 infrastructure sectors, attempts to answer certain important questions on time and cost overruns in publicly-funded infrastructure projects. Assaf and Al-Hejji (2006) has done a survey on time performance of different types of construction projects in Saudi Arabia. Owolabi et al. (2014) conducted a study on delay in construction projects in Nigeria depending on 43 causes. Study by Duy Nguyen, Ogunlana, and Thi Xuan Lan (2004) on large construction projects in Vietnam identified 62 causes of delay, which were grouped into four categories, i.e organizational, project attributes, coordination, and environmental. Fugar and Agyakwah-Baah (2010) identified 32 factors of delay in building construction projects in Ghana.

However, construction delay factors are also identified in many countries in number of researchers. Akogbe, Feng, and Zhou (2013) in Benin, Doloi, Sawhney, Iyer, and Rentala (2012) in India, Ezeldin and Abdel-Ghany (2013) in Middle-East Egypt, Abd El-Razek, Bassioni, and Mobarak (2008) in Egypt, Morris and Hough (1987) in UK, Haseeb, Bibi, and Rabbani (2011) in Pakistan, Shrestha, Burns, and Shields (2013) in USA, Abdul-Rahman et al. (2006) in Malaysia, Kikwasi (2013) in Tanzania, Pourrostam and Ismail (2011) in Iran, Gündüz, Nielsen, and Özdemir (2012) in Turkey, Yau and Yang (2012) in Taiwan, Enshassi, Al-Najjar, and Kumaraswamy (2009) in Gaza, Toor and Ogunlana

(2008) in Thailand, Gidado and Niaza (2012) in Afghanistan are examples of such studies.

A number of studies have been also carried out in Bangladesh to investigate the actual reasons of construction delay. Anamul (2012) has identified the overall condition of the construction management of Sylhet city. Rahman et al. (2014) carried out the main causes of schedule delay in construction project in Bangladesh. Risk assessment of construction projects in Bangladesh is founded by Muhammad S Islam and Ahmed . Also Jabeen (2013), Salam, Staines, Blackwood, and Sarkar (2001), M. Islam (2014) are the studies which are done according to the geographies condition and political crisis of Bangladesh.

3. Research Methodology

3.1 Questionnaires Design

Before going on this study, a lot of articles related to causes of delay in construction projects, published in various technical journals are reviewed. During the literature search, some keywords like construction delay, delay in project delivery, developing countries, and the name of an individual developing country were used. Based on the literature review, a survey questionnaire was designed for this study. 42 factors are selected to design the questionnaire which are given in table 1. The questionnaires are measured on their impact level on delay. A likert scale is designed to measure the impact level of the factor on construction delay. The five-point Likert scale with value ranging from 0 to 4 was used as the followings: '0 = no; 1 = rarely; 2 = sometimes; 3 = often; and 4 = always'. The question composed to ask the respondent is, "what is the impact level of this factor on construction delay?" Thus the questionnaires are designed for this study.

3.2 Data Collection

The designed questionnaires are distributed to the respondents who have much experience in construction management in Khulna city. The data are collected from the respondent by two process. (1) by face to face interview. (2) by electronic mail. The respondents were selected from the catalogue of KDA (Khulna Development Authority). More than 60% of all the respondent have more twelve years of experience in this sector. A total 50 data set are collected from the respondent. After eliminating the uncompleted and improper data set, 43 data set are taken to use in this study.

3.3 Data Analysis

All the data set which are collected from the respondent are gathered and their impact on construction delay are measured by their mean value of each factor. The raking is also done from largest to smallest mean value. The following equation Eq. (1) is used to find the mean value.

$$\text{Mean} = \frac{\text{sum of all value for each factor}}{N} \quad (1)$$

Where, N= no of total respondent. To test the data reliability SSPS software is used. In this test the value of alpha is more acceptable when it is too much near to one. According to Cronbach's alpha test the value is 0.812 with is very much acceptable. Data interpretation is also done by SSPS. The rank of the delay factor is also determined by their mean value.

4. Results and Discussions

This study has shown a result by finding the main factors working behind the construction delay of Khulna city. The result of this study in shown in table 1. The ranking of these factors are also given there. According to the study the top five reasons behind delay are: (1) Number of construction training center is very little; (2) Lack of skilled laborer; (3) If the budget crossed; (4) Lack of planning; (5) Not practicing the construction law.

Table 1: Ranking of factors according to their mean value

No	Delay Factors	Category	Mean	Rank
1	Resources of materials at a long distance from the construction site	Materials	3.2222	23
2	Frequent change of the price of the materials	Materials	3.0000	28
3	Waste of materials during construction time	Materials	2.3333	42
4	Lack of skilled laborer	Laborer	4.1111	2
5	Low wages	Laborer	2.6667	36
6	Lack of safety	Laborer	3.5556	11
7	Communication problem between the worker and field engineer	Laborer	3.6667	6
8	Discrepancies in contract documents	Lengthy procuring process	3.4444	18
9	Viciousness in the tendering process	Lengthy procuring process	3.5556	12
10	Carelessness of the procuring entity	Lengthy procuring process	3.1111	24
11	Bad behavior of the owner with the employees	Owner	2.6667	37
12	Take too much time to make a decision	Owner	3.6667	7
13	Poor understanding between the owner and contractor	Owner	3.5556	13
14	If the contractor does not get money in time	Contractor	3.0000	29
15	If the contractor runs more than one contract at a time	Contractor	3.5556	14
16	Carelessness of the contractor	Contractor	3.5556	15
17	Lack of effective and adequate machines	Machines and Equipment	3.6667	8
18	Moldering of machines and equipment during working time	Machines and Equipment	3.1111	25
19	If old machines with low efficiency are used	Machines and Equipment	3.1111	26
20	Poor quality estimation	Engineer	3.5556	16
21	Lack of planning	Engineer	3.8889	4
22	Delay to respond to RIF (request for information) of the engineer	Engineer	3.1111	27
23	Poor coordination and supervision	Engineer	3.4444	19
24	Inconsistencies in drawing specification	Engineer	3.0000	30

25	Errors in project schedule	Engineer	3.0000	31
26	Change of project manager or any member during construction time	Construction	2.7778	35
27	Termination of contract during construction time	Construction	2.8889	32
28	Change in plan during construction time	Construction	3.5556	17
29	Lack of sufficient subcontractor	Subcontractor	2.8889	33
30	Delay in bill submission by the subcontractor	Subcontractor	3.3333	21
31	Poor understanding between the contractor and subcontractor	Subcontractor	3.6667	9
32	Change in government	Political situation	2.6667	38
33	Influence of public strikes	Political situation	2.6667	39
34	Influence of worker strikes	Political situation	2.5556	40
35	Direct political interference	Political situation	3.3333	22
36	Not practicing the construction law	Miscellaneous	3.7778	5
37	Climatic disaster	Miscellaneous	2.8889	34
38	Act of god	Miscellaneous	2.4444	41
39	Lack of construction technology	Miscellaneous	3.4444	20
40	Delay to get permission from the local authorities	Miscellaneous	3.6667	10
41	Number of construction related training center is very little	Miscellaneous	4.2222	1
42	If the budget crossed	Miscellaneous	3.8889	3

The first factor says that there is not enough construction related training center in Khulna city. And the second factor is related with the first factor. If there is not enough construction related training center, then it is quite difficult to provide sufficient skilled worker. The third factor says that when the amount of budget is crossed, delay occurs. And the budget is crossed when the execution plan is not happened properly in the site, which is the fourth factor. So planning should be done properly to avoid the budget crossed. And the fifth factor says that the

construction is not practiced in here. There are many legal matters related to a construction project. So if these matter are not handled in a proper way then delay could happen to solve these matters in improper way.

Table 2: High ranked causes

Factors	Category	Mean	Rank
Number of construction related training center is very little	Miscellaneous	4.2222	1
Lack of skilled laborer	Laborer	4.1111	2
If the budget crossed	Miscellaneous	3.8889	3
Lack of planning	Engineer	3.8889	4
Not practicing the construction law	Miscellaneous	3.7778	5
Communication problem between the worker and field engineer	Laborer	3.6667	6

Comparing the top five factor of this study with other studies top five factor, some similarities are identified between the factors. Doloi et al. (2012) says that in their study, fourth ranked reason was improper planning and this study also says that lack of planning is ranked as fourth. Akogbe et al. (2013) also shown in their study the impact of inadequate planning. The other factors are also in their list, but not in top five.

5. Conclusion

This study has identified the main factor working behind the construction delay of Khulna city. After reviewing different study on this subject 42 factors are selected for this study. The factors are examined by the most experienced people on this subject of Khulna city. Depending on their judgment the rank on the factor has been sorted on the basis of their impact level on construction delay. Finally, the factors are compared with the other studies done by the researchers of different country. And according to the entire study, the parties related to delay factors should give extra attention on the following things:

- Sufficient construction training center should be established to create skilled worker so that it can able to handle responsibility in the projected time.
- Planning before executing the work should be done without having any discrepancies so that the budget not crossed the projected value for design change.
- The practice of construction law should increase in the construction field, in terms of legal aspects.

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