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Analysis of Contract Clauses Affecting the Cost Performance of a Construction Project

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Abstract—*Cost overruns create a significant financial risk to both contractors and owners. The cost overrun in a project could be on account of several factors including poorly drafted contract clauses. Although a number of studies have been conducted to identify the factors causing cost overrun very few studies have been conducted to identify and evaluate the contract clauses in general affecting the cost performance of a construction project. As a case study, General Conditions of Contract (GCC) 2005 form Central Public Works Department (CPWD) 7/8 is used for the study as most of the projects in India are being executed using the form. Through a two stage questionnaire survey the clauses were found to have significant impact on cost performance of a project. The factor analysis indicates 'determination of Contact' clause as a result could help the professionals in focussing on key clauses affecting cost performance of a project and modifying them to have projects achieve cost and possibly budget goals.*

Keywords: *Contract conditions, Contract drafting, India, Cost overrun, factor analysis, contract clauses.*

1. INTRODUCTION

Overview

Infrastructure projects in India are infamous for delays and cost overrun. Recently commissioned, Bandra-Worli Sea link amply demonstrates the state of project delivery system in the country what was planned as a Rs. 300 Crore project to be completed by 2004 has actually cost Rs. 1,600 Crore along with a delay of five years.

The construction industry is the tool through which the society goals of urban and rural development can be achieved. It has a great impact on the economy of all countries (Leibing, 2001). However, the construction process is influenced by highly changing and unexpected variables, which could result from different sources. These sources include performance of construction parties, financial issues, managerial issues, resources unavailability and external conditions. As a result, poor performance in terms of delay and cost overrun in construction projects could occur. The construction industry and its parties are associated with high degree of risk due to the nature of construction business activities, processes, environment and organization. Risk in construction has been the object of attention because of time and cost overrun associated with construction projects. (kartam el al., 2001).

Cost overrun is one of the most important problems in the construction. According to Azhar et al. (2008), cost overrun is simply defined as the difference between the final actual cost of a construction project at completion and between the owner and the contractor during signing of the contract. According to Ahmed et al. (2003), cost overrun and delays on construction projects are universal phenomenon. "They have a negative effect on clients, contractors, and consultants in terms of growth in adversarial relationships, mistrust, litigation, arbitration, cash flow problems, and a general feeling of trepidation towards each other" (Ahmed et al., 2003). So it is essential to define the actual causes of cost overrun in order to minimize and avoid increasing cost in any construction project and to avoid any other negative effects.

2. IMPORTANCE OF THE STUDY

The importance involves owner should spend extra time before the release of their documents to check for conflicts and omissions, and contractors should quickly and honestly report any problems. Recognize that adversarial relations are counter to the best interests of both owner and contractors. Contractors rarely are enriched by claims and change orders. Cost effectiveness can be improved by artfully structuring the construction contract to reflect clearly the project objective of both the parties. Clear communications are enhanced by minimizing generalizations of these interests when wording contractual clauses. Lack of details or specifics will commonly result in differing interpretations and, at the least, require time-consuming clarifications.

3. OBJECTIVES

A number of results of cost overrun in construction projects. Poorly drafted contract is one of the reasons for the cost overrun. If the contract clauses affecting the cost performance are identified they can be modified right at the beginning and

it would cultivate a sense of trust between the contracting parties. It is helped that modified contract clauses would help in checking the cost overrun. Thus the objectives set for the study are:

To identify the GCC clauses in form CPWD 7/8 that affects the cost performance of a construction project.

To evaluate the GCC clauses in form CPWD 7/8 that affects the cost performance of a construction project.

4. LITERATURE REVIEW

The basic contract clauses can be classified into well identified categories irrespective of the form of contract used. By and large, the general terms and conditions in a construction contract contain clauses.

Explaining the meaning of the terms used in the contract:

- Definition clauses.
- Laying emphasis on the parties to stick to the agreed forms
- Stipulating the nature of guarantees to be given for performance of the contract.
- Specifying the method and the mode for making payments for the work done.
- Specifying time schedule and the penalties, damages, etc. payable in the event of failure to give satisfactory performance in quantitative terms.
- Emphasizing on the quantitative aspect of performance and action to be taken in the event of failure in this regard.
- Relating to remedies available to a party for defaults in performance of and for breaches by the other party.
- Specifying the obligations for making arrangement for materials a d plant and machinery.
- Pertaining to labour welfare measures for the construction labour.
- Relating to establishment to be employed or not to be employed on the work.

C. Williams Ibbs and David B. Ashley, A. M. ASCE concluded that Construction contract types and general condition clauses have a major influence on the likelihood and degree of project success. This study has successfully demonstrated the importance of thoughtful and meticulous contract preparation to achieve improved project performance. Owner and contractor alike will benefit by taking a more discerning approach to the contractual arrangements of their projects.

Abdulaziz A. Bubshait highlights the variation in owner and contractor perception about incentive/disincentive contracting in industrial projects. Most of the respondents agree on the effectiveness of I/D contracting in promoting contractor performance while few companies use I/D contracting in their contracts.

A number of studies have been conducted in India and abroad related to time delay and cost overrun in projects. Majid and McCaffer (1998) reviewed factors of cost overrun that influence contractors' performance. Materials, equipment and labour related delays and cost overrun were identified as major causes of contractors' performance delays.

GCC 2005 form CPWD 7/8 is used for the study as most of the projects in India is being executed using this form. While going to press, Standard GCC 2008 form CPWD 7/8 has been issued which is more or less same as the previous one except few changes.

For high rise projects in Thailand Albinu and Odeyinka (2006) showed that problems of shortage of inadequacies of industry infrastructure, clients and consultants' problems and contractors' incompetence inadequacies were the major problems of the construction industry in developing economies (Oguniana et al. 1996). Chan and Kumaraswamy (1997) identified the five principal delay factors, namely: poor risk management, poor supervision, unforeseen site conditions, slow decision making involving variation and necessary variation works. Elinwa and Joshua (2001) concluded that mode of financing and payments of completed works, improper planning as underestimation of time/duration for projects were the important factors causing cost overrun in Nigerian Construction Industry.

Wang et al. (1999) examined the adequate of key contract clauses used in china's BOT power project and identified the critical rising associated with the BOT projects in China. However, they have also mentioned that there are areas of improvement especially in the area of approval delay and compensation and on issues related to the change in risk. Though there were a lot of factors affect the cost of the project, all factors come from the governing agreements that binds the contractor and the over to the 'the Contract document' and the claim in it. Thomas and Messner (2003) studies the interpretation of the contract clause by court and concluded that breach worded clauses tend to create problems to the contractor in substantiating the delay for monetary claims.

A study conducted by infrastructure and project monitoring division of ministry of statistics and programme implementation (http:www.mospi.nic.in) reports that out of 8 central sector projects (which are of the order of more than $4.76 million) costs around $ 80 billion, about 35% are behind schedule and the delay ranges from 1 to 195 months. Most of these central sector projects are executed based on form CPWD 7/8.

Literature suggests a number of results of cost overrun in construction projects. Poorly drafted contract is one of the reasons for the cost overrun. If the contract clauses affecting the cost performance are identified they can be modified right at the beginning and it would cultivate a sense of trust between

the contracting parties. It is helped that modified contract clauses would help in checking the cost overrun.

5. RESEARCH METHOD

Steps in the study:

1. Identification of clauses
2. Preparation of questionnaires
3. Choice of Respondents
a. Preliminary Questionnaire
b. Second stage Questionnaire
4. Analysis of data
5. Validation of results

1. Identification of clauses:-

As discussed earlier Form CPWD 7/8 is the widely used form of contract and accordingly the General Conditions of Contract (GCC) for Form CPWD 7/8 will be studied and the clauses from these documents will be identified for the study. In our study, the general contract conditions will be classified into number of clauses. All the clauses will be briefly mentioned in Table No. 1.

Table 1: Brief Description of Contract Clauses from CC 2005 CPWD 7/8

Sr. no.	Contract clause description in brief	Clause number
1.		
2.		

2. Preparation of questionnaires

The study is based primarily on the responses of selected professionals to questionnaires circulated. The questionnaires will be prepared and circulated in two stages. In the first stage, the respondents will be asked to give their assessment of the clauses affecting the cost performance of a constructing project. The second stage questionnaire is aimed at further understanding the impact of top contract clauses affecting the cost performance of construction projects obtained from the analysis of first stage questionnaire. These responses will be used to develop a better understanding of the contract clauses affecting the cost performance of a construction project.

3. Choice of Respondents

Respondents for both questionnaires were selected to cover all the stakeholders in construction projects from among senior professionals working in government agencies, contractors and consulting organizations and a few individuals known to the authors. Thus the effort was to cover all the stakeholders to construction projects from owners to designers and builders. Respondents occupied middle to top level positions and had executed a wide range of projects. The questionnaires will be mailed electronically, and also sent by post where email facility was not available in order to expedite the process; the respondents will be also contacted over the phone to get the responses.

a) Preliminary Questionnaire

A questionnaire is prepared with number clauses *(refer table 1)* in it. The respondents were asked to indicate how serious is the impact of these contract clauses on the cost performance criteria on a 0 – 3 scale. The sample questionnaire is shown in Fig 1. A total of questionnaires will be sent to construction industry professionals.

Sr. no.	Brief description of contract clauses (GCC 2005 Form CPWD 7/8)	Clause Number	Impact on cost performance of construction project			
1.			0	1	2	3
2.			0	1	2	3

Fig. 1: Sample Question of First Stage Questionnaire

Legend: 0: No effect 1: Low effect 2: Medium effect 3: High effect

Sr. no.	Brief description of contract clauses (GCC 2005 Form CPWD 7/8)	Clause Number	% of cases where this clause has affected the cost of project				
1			1	2	3	4	5
2			1	2	3	4	5

Fig. 2:- Sample Question of Second Stage Questionnaire

Legend: 1. Very Low (< 20% of cases)

2. Low (20-40% cases)

3. Average (40-60% cases)

4. High (68-80% cases)

5. Very High (> 80% cases)

b) Second Questionnaire

The focus of second stage questionnaire is to find out the percentage of cases in which such of the clauses had affected the cost performance of the project. For this, a five – point scale was framed, in which, “T” refer to very low < 20% cases, “2” to “low 20 to 40% cases”, “3” to “medium 40 to 60% cases”, “4” to “high 60 to 80 % cases”, “5” to “very 80 to 100% cases” and respondents will be asked to mention percentage of cases in which each of the clauses had affected the cost performance of the project.

4. Analysis of Data

Widely used statistical methods such as univariate and multivariate analysis techniques were adopted to analyse the responses and identity significant contract clauses and evaluate their impact on the cost performance at a construction project. Besides finding out summary statistic of responses such as means, standard deviations and frequencies, most univariate analyses included hypotheses testing using t-test and one way analysis of variance (ANOVA). Multivariate analysis comprised mainly of factor analysis. Details of the

actual tools adopted in the different stages of the study will be discussed at appropriate places.

5. Validation of Results

Phase I Activities

The collection and analysis of data from the preliminary questionnaire survey dealing this phase. As shown in fig 1, respondents will be asked to indicate how serious is the impact of the contract clauses on the cost performance created on 0 – 3 scale.

Phase II Activities

Based on the results of the I phase , second questionnaire will be circulated in the phase of the work and the responses will be used to identify groups of clauses, which are critical from the point of view of cost performance of a construction project. The second stage questionnaire also addressed the impact of contract clauses on the project profitability from the point of view of contractor. However this part is not discussed in this phase. A relevant part of questionnaire is represented in fig 3.

High Impact			
Medium Impact			
Low Impact			
No Impact			
	Low Frequency	Medium Frequency	High Frequency

Fig. 3: Impact on cost performance and frequency (% of the cases) of contract clauses

6. DISCUSSION

From the analysis shown in the GCC form CPWD 7/8, it can be concluded that the clauses affecting the cost performance of a project can be altered/modified to aid in improving the cost performance of project. We should remember sometimes apparently small unimportant delays due to these clauses causes increase in costs.

There is general agreement in the respect of belonging to owner and contractor organizations regarding the impact of cost performance as well as percentage of cases in the clauses affect the cost performance of construction project. Thus there should not have any problem in redrafting these contract clauses. Reference may be made in the form of contract and suitable change in clause wordings in consulting the experts may be made to avoid schedule overrun, in order to possibly have potential cost overrun.

7. CONCLUSION

Deviation, Measurements and escalation related clauses occupy the top ranking in terms of their effect in influencing cost performance of construction project.

There is a high degree of agreement between the responses from employers' organization and contractors' organizations on clauses affecting cost performance.

Determination of contract which includes clauses pertaining to 'determination of contract', 'cancellation of contract in full or part', 'suspension of work action in case work not done as per specification', 'foreclosure of contract due to abandonment or reduction in scope of work' are the major factor affect the cost performance of a project.

The clauses that affect the cost performance of the project can be altered/ modified to aid in improving cost performance.

REFERENCES

[1] Ibrahim Mahamid and Nabil Dmaidi, "Risks leading to cost overrun in building construction from consultants' perspective", an international journal 5(2)2013, organization, technology and manament in construction.
[2] C. William Ibbs and David B. Ashley, "Impact of Various Construction Contract Clauses", Journal of Construction Engineering and Management, 1987, vol. 113, on. 501-521,
[3] Ram Singh, "Delay and Cost Overrun in infrastructure projects: an enquiry into extents, causes and remedies". Journal of department of economics, delhi school of economics, paper no. 181.
[4] Aibinu, A. A. And Odeyinka, H. A. "Construction delay and their causative factors in Nigeria". Journal of Construction Engineering and Management. Vol. 132, no. 7, pp. 667-677, 2006.
[5] Elinwa A. U. And Joshua M. "Time Overrun factors in Nigerian construction industry". Journal of construction Engineering and Management Vol. 127, no. 5, pp. 419-425-2001.
[6] Jha K. N. "Factors for the Success of a construction project: An Emprical Study". A Doctoral Thesis submitted at Indian Institute of Technology, Delhi, 2004.
[7] Wang, S. Q. Tieng, Robert, Li Ting, S. K. And Ashley, D. "Political Risks: Analysis and mitigation of contract clauses in China's BOT project". Journal of Construction Engineering and Management, Vol. 125, no. 5, pp, 190-197, 1999.
[8] http://www.cpwd.gov.in/newsite.dwg.com
[9] http://www.mospi.nic.in