Cost Control Techniques Used On Building Construction Sites in Uganda

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ABSTRACT

Many projects in Uganda and the world over have suffered from cost and time overruns due to factors stemming from poor cost control during the design and project implementation stages. Research aimed at studying the cost control techniques being used in Uganda was done on a selection of 130 contractors involved in the construction of buildings in Nakawa division, Kampala City. It specifically studied the cost control techniques currently being used by individual developers; the problems faced and proposed solutions. The research was able to identify seven commonly used cost control techniques which include schedules, budget, inspection, meetings, reports, records, monitoring & evaluations. It was noted that most project managers and contractors in Uganda find difficulty in controlling project costs due to problems which include delays by clients to release money, delay to make a decision, lack of materials and equipment, bad weather, overlapping of activities, unclear and incomplete drawings, making good defective works, and generally failure to control the productivity of resources. Others of paucity were due to theft and vandalism, interference by clients, high labour turnover, and insufficient knowledge on cost control techniques. The study was able to establish that the problem was actually not the techniques to use but rather the lack of knowledge of the techniques, the poor management of the cost control methodology, and the general poor site organisation and inadequate supervision.

KEY WORDS: Buildings, Control, Cost, Techniques, Uganda

1.0 INTRODUCTION

In construction almost all clients are interested in obtaining fully functional facilities completed in time, cost, quality and scope. A builder who is able to construct within the estimated time and budget, to the right standards and scope is an excellent builder. Cost control is a process where the construction cost of the project is managed through the best methods and techniques so that the contractor does not suffer losses when carrying out the activities of the project. One of the aims of cost control is to construct at the cheapest possible costs consistent with the project objectives. Ultimately the decision of the manager that something should be done differently and the translation of that decision into practice are the actions to achieve control (Harris and McCaffer 2002). Raina (1999) observes that it is of little use after a process has been completed to discover that its cost was actually too much. Most project managers and contractors in Uganda find difficulty in controlling costs on their construction sites due to a number of problems which include poor project preparation, lapse in management and control, over budgeting, poor materials, labour shortages, increased cost of materials, delays in deliveries, wastage of materials, unexpected weather changes, loss of materials, insecurity and poor communication. This results into cost and time overruns, conflicts, and sometimes abandoning projects. This study was therefore carried out to identify the cost control techniques used in Uganda and propose effective

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ones to the building construction parties. It specifically looked at problems faced by the contractors in controlling the costs on site, studied the cost control techniques commonly used by the contractors during the construction stage and proposed remedies to be used by contractors on sites to control their costs.

2.0 COST CONTROL IN CONSTRUCTION

During the execution of a project, procedures for project control and record keeping become indispensable tools to managers and other participants in the construction process. According to Dharwadker (1985), cost control can be achieved by selecting the right man for the right job, the right equipment and tools for the right work and the right quality of materials, in the right quantity, from the right source, at the right price and delivered at the right time. Managers are expected to be well equipped to execute the project, with due consideration to the quality of work, yet within the estimated cost and limits.

2.1 Project Resources and Controls

Resource inputs at the project site which produce outputs in the form of work include: men, materials, machinery and money. The success of a project depends upon the performance of these input resources when controlling costs (Hendrickson 1998). The clients should do everything possible to avoid unnecessary delays as it is one of the leading causes of cost escalation.

2.1.1 Materials

One of the big problems on most building sites is the large amount of materials wastage due to varying circumstances (Butler 1982). This problem requires a supervisor to constantly be on the lookout for the losses. According to Hendrickson (1998), wastage of materials can take place during the procurement process, storage, and during utilisation. Wastage during procurement can result from one or more of the following causes: buying materials of wrong specifications, buying more than the actual requirements to cater for unrealistic and unforeseen eventualities, untimely buying of short-life materials, improper and unnecessary handling of materials, and wastage in transportation. Wastage during storage can occur due to the following reasons: damages and breakages during handling, deterioration due to incorrect storage, incorrect maintenance and short-shelf life and losses due to fire, thefts/vandalism, and exposure to extreme climatic conditions. Other causes are lack of pre-work preparation and coordination, improper accounting and poor storekeeping, negligent and careless attitude of the supervisor, high rate of deterioration due to long storage at the place of work, and over-issues from the central stores and failures to return unused surplus materials to the stores. According to Chitkara (2005), some unavoidable wastages are inherent during utilisation, but excessive wastage is of concern to the management as it affects the productivity adversely, with consequences of extra costs. Most problems relating to material wastage revolve around requisitioning and ordering, receipt and checking of deliveries from suppliers, offloading and handling, storing and protecting, and issuing, distributing and use of materials.

2.1.2 Plant

In construction, some tasks are labour intensive, some predominantly employ equipment, and some use a combination of both. While the actual work done and the associated labour is accounted by the supervisor concerned, the equipment and productivity control is undertaken to determine its employment time, the output achieved, and its productivity at site (Hendrickson, 1998). The main purpose of the control is to minimize wastage in utilisation so that the overall project cost is not affected (Chitkara, 2005). Alinaitwe (2006) observed that industrialising construction would probably reduce the cost of construction by about 30% which would likely settle the back log of 25% of Ugandans without proper housing.

2.1.3 Labour

Labour productivity achieved at the site for a given work provides a measure of the labourer's efficiency and effectiveness and the level of site organisation. It shows the total time for which the labourer was employed at work, the time he was productive on work and the time he remained unproductive (Chitkara 2005). Craftsmen use about 40% of available time on productive activities, and about 33% of the time on non-value adding activities (Alinaitwe 2006). Productive times are wasted for various reasons such as idle waiting, unnecessary travelling, late starting, early quitting, unscheduled breaks, and delays in the receipt of tolls, delays to receive materials and work instructions. Assessment of the level of industrialisation in Uganda and the effect on productivity and other metrics were done by Alinaitwe, (2006) and the results indicated that the cost of labour is of the order of 30 to 40% of project costs. The metrics confirmed that labour is a significant factor in the cost of buildings and more efforts are required to industrialise the industry. According to Chitkara, (2005) cost control process involves accounting of actual productivity, and comparing with the standard, analysing the causes for variations taking remedial measures for improvement. Raina (1999) emphasises the need for close supervision and good working relationship.

2.1.4 Time-Cost Relationship

Chitkara (2005) said the relationship between time and cost is a very important aspect in the control of costs on site as any variation in time has automatic implication on cost. It is important to report and record all the works involving materials, plant and labour on sites. This enables the contractor be able to know the costs and expenses of the resources used on site and compare with the initial cost budget. Various report techniques used include; daily or weekly and monthly recording, schedule control, site daily diary report and the project budget.

3.0 RESEARCH METHODOLOGY

3.1 Introduction

Over 130 sites in Nakawa division in Kampala city were identified for the study. Consideration of costs, ease of access to site, availability of information, nature of the site and the type of data required was made, the research adopted 98 subjects with acceptable responses for the study. It was not possible to use statistical methods in designing the research as no organised data was available. Observations, use of interviews and questionnaires were employed in gathering information pertinent for the study. Scaled questionnaires were used to measure attitudes and beliefs of the technical personnel using Likert scale, in which respondents were given choices reflecting varying degrees of intensity. Generally the level of agreement or disagreement was measured using a five ordered response levels, (Likert, 1932).

| Ordinal scale 5 to 1 in descending order | | | | | | |
|--|---|---|---|---|---|--|
| | 5 | 4 | 3 | 2 | 1 | |
| Decreasing degree of disagreement | | | | | | |

Figure 1 : Five ordinal measure of agreement (Likert, 1932)

3.2 Pilot Survey

A pilot survey was run on a few questionnaires so as to eliminate any ambiguous statements: negative statements or statements which were unduly 'leading' and to refine the questionnaire.

3.3 Data Analysis and Documentation

The data collected from the survey was analyzed using Microsoft office excel and "relative Indices" (RI) technique. Presentation was in the form of graphs, bar charts, and tables. The RI technique was used by Holt et.al. (1996) in the same context of application using the formula:

$$RI = \sum \frac{1n_1 + 2n_2 + 3n_3 + 4n_4 + 5n_5}{5[n_1 + n_2 + n_3 + n_4 + n_5]} \tag{1}$$

Where, $n_x =$ the number of respondent agreeing with the x choice. This formula is also used in relation with the Likert scale. The computation of RI using this formulae yield the value of RI ranging from point two to one, where point two represent minimum strength and one the maximum strength (Holt *et al* 1996).

4.0 ANALYSIS AND FINDINGS

The investigation focused on contractors as they are the immediate victims of the consequences of poor cost control, although losses are usually transferred to clients. Out of a total of 130 questionnaires sent, 98 responses were found adequately filled for the study, representing a response of 75 percent and the findings were as below:

4.1 Cost Control Techniques Used on Sites

The seven cost control techniques used by contractors on sites were found to include: schedules, site inspection, the project budget, meetings, cost and work progress records and reports, monitoring work and cost performance and evaluation using bills of quantities and others not known as below:



Figure 2: Cost Control Techniques in Percentage

The above figure illustrates the extent to which the different techniques where used by the subjects to control cost. Work programmes were the most widely used with reported laxity in the implementation. Workers were not briefed on the time and cost targets. Evaluation of work was second to work schedule in application but was not technically applied where scientific measurement and comparison with standards would be used. Evaluation of works was by observing how much had been executed and comparing with the money allocated.

| S/No. | Cost Control | Remarks |
|-------|---------------------|---|
| | Techniques in use | |
| 1 | Work Programmes | Contractors used schedules to monitor progress and |
| | | financial performance. It is a good method since work |
| | | progress can be measured and related to cost. |
| 2 | | Inspection of works and comparison made with the |
| | Inspection of Works | budget. Sometimes subject to judgement, hence lacking. |
| 3 | The project Budgets | Cost attached to responsibility centres with work targets |
| | | to be accomplished. It's used in relation to schedules |
| | | makes it the best tool for cost control. |
| 4 | Site Meetings | Meetings held to review the progress of work and |
| | | compare to the monetary allocations. Good as it |
| | | provides some motivation to workers and all stake |
| | | holders are up to date on the performance of work |
| 5 | Record Keeping | Documentation of activities carried out to enable early |
| | | detection of deviations from the set standards |
| 6 | | Clients, consultants and the contractors used monitoring |
| | | tools of schedules, budgets, inspection and feedbacks to |
| | Monitoring Work and | keep a watch on the cost performance. With use of the |
| | Cost Performance | right tools of control, it produces good results. |
| 7 | | Quantification of works and comparing with the costs |
| | | in the bill of quantities. Inspection was also reportedly |
| | Evaluation of Works | used to evaluate works. This helps to ascertain that the |
| | Carried Out | progress of work is on the right track. |
| 8 | Others | Sites that did not have particular method to use. |

Table 1: Cost Control Techniques Used in Building Sites in Kampala

4.2 Material Wastage on Sites

The causes of material wastages on sites were found to include; poor supervision of operatives, poor handling of materials, misuse of materials, poor storage and stacking of materials, delivery of excess material on site, poor site organization, late delivery of materials, poor coordination of management and technical side, poor time management, bad weather conditions, use of unskilled operatives. Poor site supervision with a RI of 0.521 (7.5%) was found to be the leading cause of materials wastage. The most effective control was found to be the proper supervision of workers on site with a RI of 0.455 (7.9%) and the most ineffective was the self control by all site staff or workers with a RI of 0.8 (13.8%).

4.3 Equipment Use on Site

Forty six contractors (47%) obtained equipment on site by hiring. No contractor obtained equipment by purchasing as most of the activities were manually carried out. Mechanised construction of buildings in Uganda is insignificant yet Hendrickson, (1998) and Alinaitwe, (2006) says productivity can be improved by substituting labour with equipment.

4.4 Time of Completion of Project

Only 32 contractors said they were able to complete their works within the scheduled time constituting 33% of the total sampled, and 67% of contractors were not able to complete the ongoing projects within the scheduled time due to bad weather, delayed payments, low labour productivity, alterations on drawings, delay to deliver materials in time and failure by local authority to inspect work.

5.0 CONCLUSION

The aim of this study was to study the cost control techniques used by contractors on on-going projects and propose measures that will enable projects to be completed as budgeted. The seven cost control techniques used by contractors on their sites in Uganda were found to include use of: schedules, the project budget, inspection of works, cost reports, site meetings, monitoring of cost and work performance and quantity evaluation using the bills of quantities, and others did not have well defined techniques or did not even know there were traditional cost control procedures. The research was unable to establish concrete evidences that actually the stated techniques were effectively used as documents to prove the applications were found lacking or not there at all. The survey was able to firmly state that, "the problem of cost control is actually the lack of knowledge and inadequate planning for the implementation coupled with the poor management of construction resources".

Problems reported by the contractors that led to delays and subsequent failure to construct within budget included: bad weather, low resources productivity, sickness of site labourers, lack of materials, instructions from clients to delay work as they waited to clear some issues or mobilise money. Other problems were due to delayed payments by clients, overlapping of activities, alterations by clients, making good defective work, unclear details on the drawings, and delay by local authority to inspect work and give a go-ahead. From the study, the greatest cause of delay in on-going projects was reported to be due to late release of money by clients.

6.0 RECOMMENDATIONS

The problem of cost control was actually not the techniques being used, but rather the poor management of the techniques and the laxity in supervision in most sites visited. It is therefore strongly recommended that contractors should constantly attend refresher courses in construction project management as the study identified lack of knowledge of the cost control techniques and inadequate cost control methodology as the biggest problem. In almost all sites, workers were not aware of the performance targets implying there were lack of knowledge and communication lapses between supervisors and workers. Cost is a product of the use of project resources and the only better way of controlling the cost of construction is best handled right at the design stage. During implementation, procedures of cost control of resources only helps in detecting variances and formulating corrective measures other than waiting until work has been completed and nothing much can be done (Forster 1981).

Materials: It is proposed that materials wastage should be reduced by ensuring that:

Materials are delivered as required to cut site storage time, materials delivered are those specified, issuing just the right amount of material with only a reasonable allowance for wastage to workmen, ensuring that workmen are not producing excessive amount of off-cuts, allocating and preparing storage areas so that when materials are stored, they do not deteriorate. Employing a reliable store keeper who is able to maintain well kept booking system, double signing of delivery notes, use of weigh bridges and spot checks for materials deliveries are all desirable to minimise wastage. Theft and pilfering of materials can also be safeguarded against by, issuing of items by store men and keeping records of all the materials on site including employing full-time security guards. Sites should be hoarded with alarm systems installed around key materials around the site and including ensuring that the whole site is lit up at night.

Plant: Alinaitwe, (2006) found out that in Uganda, the use of machines at building sites are insignificant yet the mechanisation of construction can reduce the cost of buildings by 30%. Contractors are encouraged to adopt the use of machine as it has the advantages of speeding up work, saving labour, producing better quality works and are economical in a number of cases,

besides being able to do what cannot be done manually. Once brought to sites, machines should be maximally utilised as any redundant time can lead to high cost.

Labour: To improve on the labour productivity on sites, the research proposed: recording labourers' work progress, daily work evaluation, recruitment of labourers with the right skills for the job, substituting labourers with equipment, and having schedules and proper control procedure and records in place. A good working environment should also be created with work motivation and proper communication system included. Regular inspections by the: client, consultant and local authority and early detection of variances using standard productivity are highly recommended. Without a good quality plan, project control cannot be achieved. Project control requires efficient, effective and vigilant processes and actions to ensure its successful accomplishment.

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