

Application of Quantity Surveying techniques for cost control of building project

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Abstract - Client investments huge amount of finance for the construction of project. Also during the project duration it incurs additional costs and expects the project to get complete within approved contract value so as to overcome extra financial burden. Hence there is need for financial control of project so that the project gets completed within the approved project cost. Many techniques have been used such proper project planning, resource utilization management, materials controls, earned value management. Earlier Quantity Surveying was considered to estimate quantities of construction material. Quantities take off for estimations of project, and billing for work completed for project works. Rate analysis for civil construction works to find per unit cost of work.

Project cost control can be done by utilizing Quantity surveying techniques. These techniques are used at pre construction, during construction and post construction stages. At every stage Quantity surveying technique is applied to achieve cost control of project. Quantity surveying techniques include cost planning, procurement and tendering, contract administration and commercial management. It also includes many other activities managing costs and finances of a project, advising on procurement routes and deciding on construction contracts, Control cash flow, financial control of construction costs and create financial statements. Cost monitoring so as to know the status of project. The components of quantity surveying are structured in this paper. Quantity surveying cost control techniques are investigated and which have influence & impact on cost of project. Definitely by utilizing quantity surveying techniques cost control of project can be achieved.

Keywords—Quantity Surveying; cost control; construction contracts administration; construction management,

1 INTRODUCTION

Construction projects involve very high costs, towards completion of project. Client investments huge amount of finance for construction of the project. Also during the project duration there are changes in drawings, delays, availability of manpower, additional items, fluctuation in rates, conflicts, which incur additional costs. Client expects the project to get complete within approved contract value, so as to overcome extra financial burden. Hence it is necessary to control project cost. There is need for financial control of project so that the project gets completed within the approved project cost. The cost can be controlled by proper planning, controlling recourses, and earned value management techniques. Another new model for cost control for building construction project is provided.

A quantity surveying is a technique of costing a building at all its stages, and provide expert advice on construction costs. This involves project costing, cost planning, procurement and tendering, contract administration and commercial management. Quantity surveying involves strong financial, analytical and teamwork skills. Clients need a cost control mechanism and rely on judgment to ensure the smooth running of any project and provide value for money.

Quantity Surveying is not only estimate quantities of construction material but in reality it includes many other roles including managing costs and finances of a project, advising on procurement routes and deciding on construction contracts and related clauses and documentation. The relationship between time, cost and quality in the construction procurement process and the alternative procurement routes available, Management and administration of construction contracts.

II LITERATURE REVIEW

Managing cost, contracts communication, and claims A Quantity surveying perspective on future opportunities, JJP (Basie) Vester, (2006) Identified the importance of costs, contracts, communication and claims. Focuses on Management of costs. Quantity surveying and cost management methods cost planning, and cost control. Management of communication, and its different types. General communication and Leadership communication. Management of claims and disputes, which includes Conciliation, Adjudication, Mediation and Arbitration. Recommends that quantity surveyor should be able to all methods that are cost effective. Should also have expertise in Contractual management. Communication is also important part of day to day functions. Quantity surveyors must be able to advise use claims and dispute resolution methods.

Project Cost Control in the Nigerian Construction Industry C I Anyanwu, (2013) carried out investigation work regarding the need to have cost data available for development of cost planning. Also focused on resource monitoring which included material, labour and equipment cost control. The material cost control was made to ensure that purchases do not exceed the planned expenditure. Lab our cost control involved the use of lab our time and equipment cost control by time reports and also overheads & indirect costs. Various management techniques in planning have been developed such Network analysis and bar-chart. Finally concludes that The key to the success of our construction investment industry is professional management. There are requirement innovations in the management of our construction resources.

3 The work and skills base of the Quantity Surveyor in Ireland An introduction, Tony Cunningham, (2014) Author focuses on range on range of surveying quantity surveying disciplines. The role of Professional quantity surveyor and the contractor's quantity surveyor and their functions. The study outlines the various competencies and skills required in providing professional duties. Quantity surveying as evolving role in construction industry. Also states that there will be always demand for the type of services from the quantity surveying practices

Duties and responsibilities of quantity surveyors in procurement of building services engineering Abdul Lateef Olanrewaj, *et al* (2015) Identifies that Quantity surveyors involvement in all phases of a facility s life cycle such as feasibility, design, construction, maintenance. It focuses more on the Quantity surveying services provided at different stages of project. It also emphasis on competencies of quantity surveyors aimed at producing constructions that meet client's value system and involvement of quantity surveyors in

procurement, and cost advice during construction professionals. The study showed that quantity surveyors are actively involved in procurement of building services.

Global professional standards for project cost management. Peter Smith, (2015) Author provides and suggests that the key for global development of cost management profession is collaboration between Collaboration between project cost management and their representative associations. A range of global standards and guides have been developed for the project management profession as a whole but there have not been any developed specifically for project cost management. There are number of global professional associations that represent the interest of project cost management professional. The key associations are the International Cost Engineering Council (ICEC), the Royal Institution of Chartered Surveyors (RICS), the Association for the Advancement of Cost Engineering International (AACE International), the International Project Management Association (IPMA), the International Federation of Surveyors (FIG) and there are many more.

Utilization of Quantity Surveyors' skills in construction industry in South eastern, Nigeria. E.O.E. Nnadi *et al* (2016) Provides classification of quantity surveyors, roles of quantity surveyors in Nigeria economic development. Availability of quantity Surveyors in their region, South eastern Nigeria. Benefit of using quantity surveyor at one construction project at Enugu. They have given difference in cost at execution stage of project by using quantity surveyor and with not using quantity surveying. Quantity surveyors involvement during pre contract stage is important to provide proper estimation& also in post contract stage for proper completion of project with suitable profit margin.

Impact of Cost Control Techniques on Cost Overruns in Construction Projects S.N. Malkanthi, *et al* (2017) Studied on cost estimating cost budgeting, cost control. The problem with cost control is not actually the techniques that are used, but rather the poor management of those techniques and the laxity in supervision. Cost overrun was the major problem encountered during execution of construction project. Project should use update MS Project Daily material and labor controlling and earned value management. Conduct awareness programs on the importance of MS project and earn value management. Provide updates information regularly through workshops, seminars, etc. Training is required for the responsible professionals.

A. COST MANAGEMENT ELEMENTS

Project Cost: Project Cost is defined as budgeted expenditure for providing a construction structure as per conditions of contract.

Project Cost control: Project Cost Control is defined as total processes which includes applying techniques and monitoring the status of a project in order ensures that the contract sum is within the approved budget

Cost control is “the total process which ensures that the contract sum is within the client's. Approved budget or cost limit” (source: produced by RICS committee (1982))

Control costs are the process of monitoring the status of the project to update the project costs and managing changes. (Source: Featured in 5th edition of PMI book)

Project Cost overrun: Project cost overrun is defined as the project costs that have exceeded the value of contact sum for providing the construction structure.

III QUANTITY SURVEYING COMPONENTS

Quantity surveying includes following main components and objectives for completion of project. Quantity surveying is more focused on cost of project and financial control of project.

- ❖ Feasibility and viability studies
- ❖ Estimating and quantification of works
- ❖ Tendering and tendering procedure
- ❖ Cost planning
- ❖ Procurement of work
- ❖ Cost control
- ❖ Construction management

Feasibility studies & Estimating Feasibility and viability studies are carried to find whether a project idea is economically viable The result of the feasibility study helps the client to decide whether to go ahead with the project or with to use other alternatives.

Estimating & Quantification The estimating is process of calculating the cost of project close to approximation of its actual cost. Estimating is necessary to give the client a reasonably accurate idea of the cost to help him decide whether to go ahead with the project or needs to be curtailed or abandoned, depending upon the availability of funds and prospective direct and indirect benefits. Estimating forms the base to decide projects initiation. Estimating covers the preparation and developing of cost estimates at the different stages of design.

The quantification process involves recording dimensions and is referred to as taking off because it involves reading or scaling (taking off) dimensions from a drawing and entering this information in a standard manner The squaring column is used to calculate the quantities of work .This is done in consideration of measurement rules adopted for the project

Tendering & Tendering procedure Tendering is the process in which bids are invited from interested

contractors to carry out specific packages of construction work. Tendering provides competitiveness among contractors which is benefited by client to get the best lower price to offer for the project.

Contract award procedure is preparation of contract document for the project contract documents include conditions of contract, specification, and bill of quantities preparation of clauses pertaining to project. Contract administration is process which involves managing of contract agreement with agrees contractual conditions between parties of the contract and construction activities and performance with proper control.

Procurement Procurement is process which involves the selection of a contractual framework and advice on the most appropriate procurement method for the project. and includes giving advice on the most appropriate procurement route to be adopted This mainly focuses on contractor selection for project.,

Cost planning & cost control Cost planning is done to ensure that the client knows in early stages of project the anticipated different cost of woks. Project cost planning includes the cost planning process from setting the client's budget to design completion. It involves preparing, issuing and presenting cost plans at the different stages of design

Cost control is a series of activities throughout the project process which aim to control costs. this also provides the client information about actual performance of project. This covers the financial management of a project during the construction phase generally the post contract phase

Construction management During the construction stage the work progresses, the work done had to be analysed and billed. The additional works arise due incomplete drawings, instruction from client are the variation claims. The variations claim is extra from contract award value and has to be claimed with supporting documents It Covers the certification of sub contractor bills and Client billing

Finally, complete content and organizational editing before formatting. Please take note of the following items when proofreading spelling and grammar:

IV QUANTITY SURVEYING COST CONTROL TECHNIQUES

Define Quantity surveying cost control techniques are those activities carried which influence and affect cost towards controlling the project cost from inception to completion of project.

The activities include quantity take off during BOQ preparation of project, the quantity take is to be

done using standard methods. The process includes measurement reading, scaling and squaring the dimensions to find the quantity of work. This activity with standard procedure and accuracy results towards cost control.

At tendering stage a preparation of comparative statement which allows study the quoted bid by the contractor. The selection of contractor is based on the given the best lowest price. The comparative statement also allows us to study the rates quoted by the contractors. This gives an identification to analyze the rates if rates are high. Negotiations at later stage make the tendered quote to reasonable value to the client benefiting to a sum of his value. All above activities leads to cost control.

At contract award stage the contract agreement is prepared. The preparation of payment clauses, that is terms and conditions of payment which allows the client to manage costs of project. This benefits the cash flow of the project hence controls cost flow of project.

During construction work progress stage, the measurements of bills are to be checked and certified for payments. Checking Previous billed items of work for re measurements certifying Variations claims as per BOQ rates & and for new items by rate analysis. Preparation of monthly cost reports which includes cash flow projections. Use of ERP software for cost monitoring which finally contributes towards cost control.

V Block Diagram of cost control

The project cost can be controlled at pre construction stage, during construction stage and post construction stage by utilizing Quantity surveying techniques as shown in below in block diagram

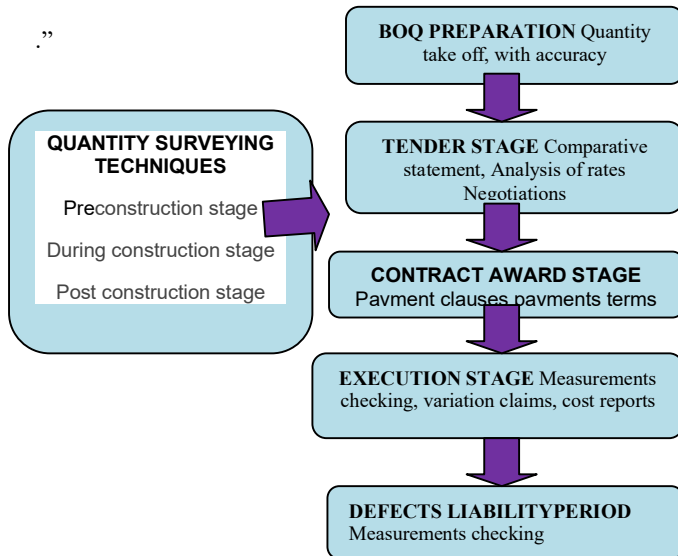


Figure 3.4 Block Diagram of Cost Control

VI METHODOLOGY

A Methodology procedure

The methodology was divided into different stages for the research. In this research a case study is of building construction project is studied. In this research Quantitative approach was adopted by using questionnaires to collect sufficient data. The methodology includes,

- Case study of building project
- Preliminary & final questionnaire survey
- Data collection and
- Data analysis

A case study of building project was considered to evaluate the quantity surveying techniques. The project details are studied in perspective of the cost control techniques. While giving works a comparative statement was prepared to finalize the subcontractor. The measurements were checked for monthly bills and certified for payments. The monthly cash flow reports were prepared and analyzed.

Preliminary questionnaire was prepared based on the knowledge gain through the literatures reviewed survey. The data has been collected by using the survey approach. The survey questionnaires were distributed to the clients, contractors and consultants firms which included project management consultants, quantity surveying consultants architectural consultants, and also to Project Managers, Quantity Surveyors and Costing Engineers through online emails, and Google Docs.

B Questionnaire survey

Preliminary questionnaire was prepared based on the knowledge gain through the literatures reviewed survey. The data has been collected by using the survey approach. The survey questionnaires were distributed to the clients, contractors and consultants firms which included project management consultants, quantity surveying consultants architectural consultants, and also to Project Managers, Quantity Surveyors and Costing Engineers through online emails, and Google Docs.

C Questionnaire design

There are totally 10 Questions which has been designed with approach to cost control technique. The respondent has rate the technique between 0 and 5 as per their opinion. Below is the questionnaire form prepared and distributed through online medium using Google forms. The survey was conducted through goggle docs online link as given below,

<https://docs.google.com/forms/d/1kDBf3C0LScCxKTfr01TANTvRCHGLDnYPyAL9OZHjYRo/edit>

Following questionnaire was designed for the survey,
 Question: whether cost control is achieved by below techniques.

Answer: Yes/No. If yes then rate the technique from 1 to 5.

Q 1) Quantity take off while preparation Bill of quantities (BOQ) for project work.

- YES O NO O
- 1 O 2 O 3 O 4 O 5 O

Q 2) Preparation of comparative statement of tenders received for award of contract.

- YES O NO O
- 1 O 2 O 3 O 4 O 5 O

Q 3) Negotiations for value of tender received for project work.

- YES O NO O
- 1 O 2 O 3 O 4 O 5 O

Q 4) Preparation of payment clauses and terms in contract agreement.

- YES O NO O
- 1 O 2 O 3 O 4 O 5 O

Q 5) Checking measurements of R A bills for work done for progress.

- YES O NO O
- 1 O 2 O 3 O 4 O 5 O

Q 6) Approving variation claims according to BOQ rates for item already in BOQ.

- YES O NO O
- 1 O 2 O 3 O 4 O 5 O

Q 7) Approving variation claims according to BOQ rates for new item according to rate analysis

- YES O NO O
- 1 O 2 O 3 O 4 O 5 O

Q 8) Preparing and monitoring cash flow charts during execution of construction project.

- YES O NO O
- 1 O 2 O 3 O 4 O 5 O

Q 9) Preparing cost reports & cost projection reports during execution of construction project.

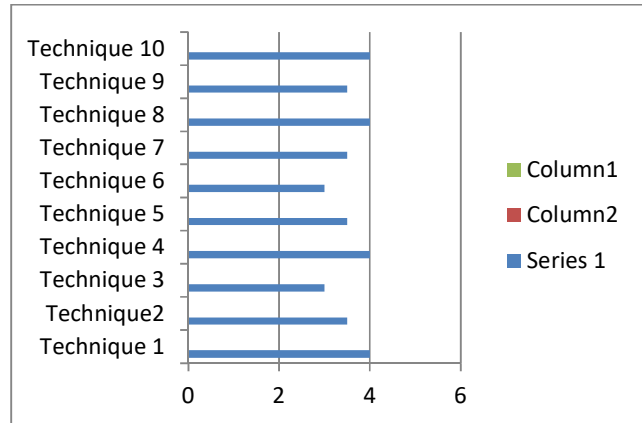
- YES O NO O
- 1 O 2 O 3 O 4 O 5 O

Q 10) Use of Construction ERP software for project cost monitoring.

- YES O NO O
- 1 O 2 O 3 O 4 O 5 O

VII DATA COLLECTION & ANALYSIS

Preliminary questionnaire was prepared based on the knowledge gain through the literatures reviewed survey. The data was collected from the respondents and analyzed. This was preliminary investigation of data collection & analysis. The results obtained are given graphically.



VIII RESULTS & CONCLUSION

The results showed that the quantity surveying techniques can be utilized for cost control of construction project. The measurement checking with standard method forms the effective cost control technique. During tendering the comparative statement analysis, negotiations provides cost impact to the project. Certification of monthly bills of subcontractor actively during execution stage keeps constant cost control of project. The monthly cash flow provides a statement of cost of project which can be utilized to prepare cash flow projects and cost reports.

The Quantity surveying techniques provides an effective control on projects costs. The Quantity surveying techniques if implemented carefully and using standard methods on construction project can ultimately provide cost control of project. The cumulative effect of the techniques will definitely have positive impact to the project cost. The Quantity surveying techniques have the overall financial control throughout the project. Knowledge and application of Quantity surveying have to be applied in professional manner.

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