

BUILDING CONSTRUCTION SCHEDULE DELAYS DUE TO COST CONTROL METHODS

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Abstract- The building and construction sector is essential to the expansion of every nation. The client will consider a project to have been unsuccessful if it fails in meeting its goals in terms of the cost, the quality, or the timeliness. Two of the most important factors that will determine whether a project is successful are careful planning of the project and the presence of an efficient monitoring system. Cost overruns are a significant issue for contractors in many instances since they cut into the profit margin of a project and pose a broad variety of other complications for everyone involved in the endeavor [1]. These problems could not be fixed in any other way than by using efficient systems of cost control. Because of this, it is of the utmost importance to recognize techniques for decreasing costs and how their effects contribute to budget overruns [2]. An online questionnaire survey was distributed to all contractors with a rating of A1 through A5. The data were translated into quantitative values by using a combination of % age analysis and weighted score analysis. According to the findings, the most prevalent cost-control techniques, and their efficacy in lowering over-budget and overhead costs while maintaining projected profits are highlighted. Also highlighted is the fact that these measures can help ensure predicted profits. According to the Institute for Construction Training and Development (ICTAD)[3], by conducting training opportunities and awareness campaigns, CIDA could urge contractors to use cost-control strategies, and other similar endeavors. In addition, it is suggested that the submission of certain documents to the ICTAD be made mandatory.

Keywords: Cost Control, ICTAD, Budget Overrun, Construction, Cost Control Method.

1. INTRODUCTION

When it comes to preparing a project, planning and scheduling by themselves are not enough. Project control[4], which involves monitoring and updating of the project, to match the dynamic nature of the construction industry's operations, another significant action may be undertaken: Though the construction system is not effectively regulated, it is possible for it to experience problems, delays, and cost overruns, even if it has been carefully planned and scheduled. During the

course of their implementation, building projects will, as a general rule, experience both delays and increased costs (though this is not always the case). Cost overruns are widely regarded as among the most significant issues that can arise during construction projects [5].

It is essential to maintain close watch not just on the progress of the project but also on the costs. Our inquiry's principal concentration was on finding ways to cut down on expenses. The construction industry is currently utilizing a wide variety of strategies with the purpose of containing costs. When it comes to keeping expenses under control, from the perspective of contractors, it is critical to have a firm grasp on the effectiveness of various cost-cutting strategies [6].

To successfully manage a project's budget, one must have a solid understanding of the processes involved in cost management. This makes the process difficult. As a result of this, professionals who operate in the construction industry are anticipated to have a solid understanding of methods for controlling costs. It is of the utmost importance that the person in charge of the project, whether it be the project manager, the planning engineer, or some other competent expert in the field, has a solid understanding of the fundamental aspects of the undertaking. These fundamental aspects of a project include knowing how to select an efficient strategy for managing costs, when to put the strategy into action, and other similar This indicates that effective cost management of construction projects is absolutely necessary in the modern construction industry. Despite this, significant organizations such as ICTAD they haven't yet created laws or regulations, or incorporated correct terminology in their contract conditions, that are needed to fix this issue. ICTAD Therefore, it appeared that now would be a good moment to address the issues raised earlier in this study. This study was expected to provide a comprehensive understanding of the management and cost-control processes used in the construction sector [7].

Among the goals of this study was to identify the most common cost-control techniques employed by building contractors [8, 9], as well as the impact that these tactics have on the amount that project costs go over budget. For the purpose of this study, only A1-A5 building contractors were questioned.

2. LITERATURE REVIEW

As depicted in Table 1 [10], there are 3 key components to managing costs; namely: Cost Estimation; Cost Planning; and Cost Control.

Table 1. The elements of cost control [10]

Element	Description
Estimation of costs	Estimating and quantifying the expenses of a resource's time and effort to perform a project's activities and tasks
Expense forecasting	The process of gathering and compiling cost estimates to arrive at an overall project cost and a starting point for comparison
Controlling the costs	Keeping tabs on and reining in variables that have the potential to impact the budget

The appropriate control of construction expenses is critically important to the on-time and on-budget completion of a project. A substantial degree of cost overrun is virtually always an unavoidable consequence, despite the fact that efficient cost management occurs only in an extremely small percentage of cases. As a consequence of this, having access to detailed project estimates and budgets is going to be required in order for the project to be finished on time and without going over its allotted spending. For the sake of preparation, it is necessary to conduct preliminary estimations and make preliminary plans. If the actual expenses for the project are not tracked and managed as they occur throughout its duration, it will not be possible to finish the work within the allotted budget [7].

On the other hand, inadequate cost performance in building projects is a widespread problem all over the world, which results in significant cost overruns [8, 11]. When it comes to keeping costs down, the issue is not the procedures that are utilized; rather, the issue is the absence of administration and supervision over the utilization of such strategies.

The Project Management Book of Knowledge contains several discussions on various approaches to the management of building projects, including their monitoring and control [12]. The PMBOK contains several more advanced approaches, including earned value management, to-complete index, forecasting, variance analysis, and performance reviews, to name just a few.

Earn value management stands out as one of the most significant strategies on the list. The United States Department of Defense was the first organization in the world to put the earn value concept into practice. Before putting this concept into action, you must first complete the numerous steps that are outlined in the next section.

1. Work Breakdown Structures (WBS) must be used to break down the project into manageable chunks of approved work WBSs [13].
2. Work breakdown structures should be defined to allow for the allocation of time and expense for the completion of each activity in the WBSs.
3. To establish a baseline, allocate costs and effort to all of the project's components.

A cost overrun occurs in a project when the actual costs are higher than the margin that was estimated for

the project. The reasons for cost overruns in construction industry can be broken down into 42 primary categories [1]. Changes in the prices of raw materials, funding methods, and payments for work that has been completed, as well as frequent changes in design and hefty machinery costs, lack of forethought, and high interest rates charged by banks on contractor loans, as well as a long period of time between the time of design and the time of bidding or tendering are just a few examples of factors that can contribute to increased costs [14].

It is highly advised that several records be preserved in order to keep track of the expenses that have been incurred in order to allow for a comparison between these expenditures and the costs that were predicted. A lot of these types of publications have been released by ICTAD already [15]. They are summarized as follows:

- 1) The cost per unit.
- 2) Direct labor expense statement for the previous week.
- 3) A breakdown of the cost of renting machines each week.
- 4) Material cost breakdowns for each week.
- 5) Payments made to subcontractors for their work each week.
- 6) Overhead costs are reported on a monthly basis.
- 7) Monthly breakdown of costs.
- 8) A report detailing each week's worth of work (Value of work).
- 9) Table for controlling monthly costs for the contractor.
- 10) The contractor's chart for controlling monthly costs.

There are several documents that need to be improved and new procedures that have to be added to the ones stated above.

3. METHODOLOGIES

Both qualitative and quantitative data for this study were gathered through the use of a questionnaire survey of professionals working in the construction business. These professionals included project managers [11], site managers [16], and others. On-site interviews were conducted in order to collect preliminary data, which were then used to inform the construction of the questionnaire. The results of the literature review served as the foundation for the development of the preliminary questionnaire [17]. In order to carry out the preliminary survey, we used an interview format that allowed for free-form responses, which was based on the pre-survey. These are just some preliminary results. The input of construction site workers helped to refine the final survey [18], and their assistance was solicited in order to complete it.

ICTAD has currently accepted registrations from more than one thousand different contractors in grades ranging from A1 to A10. In the scope of the study, only grades A1 through A5 were considered. After that, a sample size was selected using the statistical approaches that will be detailed further down, and a minimum of 23 different contractors were taken into consideration [19]. We are able to do so by utilizing the Chi-Squared Distribution [20].

During the interviews, both an online questionnaire and hardcopy questionnaires were utilized. For the purpose of analyzing the data collected, Microsoft Excel was utilized. For each of the questions, the data was compiled, and then it was represented graphically using graphs and bar graphs. Most of the time, the results were released as a proportion of all the answers, and it was assumed that those who answered the most frequently had the best answers.

In certain instances, relative ranking approaches were utilized to ascertain the relative significance of the variables that were being taken into consideration. When calculating the relative index, a scale with five points was used. It's a question of life and death right now. Calculating the relative index values of several different factors will allow you to arrive at the most important element [1].

4. RESULTS AND DISCUSSION

The first thing that was done with the survey was to gather information about the backgrounds of the people who took part. This information included the length of time that they had been working in the business as well as the types of projects in which they'll be involved. It was useful in assisting in the process of verifying that the data that's been obtained was accurate. The primary purpose of the research was to ascertain the amount of awareness that the contractors had with relation to the many different methods that might be utilized to cut costs. The findings that were obtained are presented in Figure 1 [21], and they prove that 5% of contractors believe that cost control methods are important, 11% believes that 50-74% are system important, 20% go to 25-49% where system are essential, 24% go to the 75-99%, and at the very end, the greatest numbers go to 100% of the contractors who believe that they also have a level of knowledge on cost control systems are crucial.

CONTRACTORS' KNOWLEDGE OF COST CONTROL SYSTEMS THEY EMPLOY

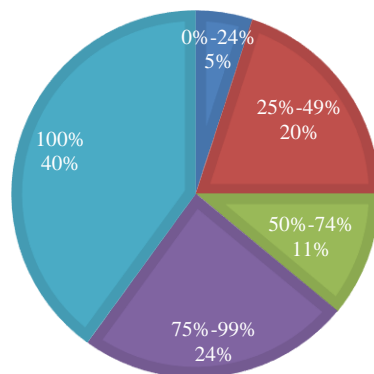


Figure 1. Contractors' knowledge of the cost-control systems they employ [21]

The findings of the survey indicate that the majority of contractors working in the construction industry are informed of the numerous ways for reducing costs that are currently accessible, even though the appropriate use of these measures isn't always obvious. As a result, it was determined that methods of cost control could be used to decrease the cost by which expenses exceeded budget. In order to keep costs under control, the contractors used MS Project, Earn Performance Management [4], plus daily monitoring of material and labor costs. The approaches that are currently being utilized to manage costs are outlined in Figure 2 [22].

Table 2. Inclusion of these records in the contract is preferred by contractors [23]

ICTAD records most often used	Percentage
A weekly report of how much each subcontractor was paid	33.3
Cost control chart for the contractor's monthly costs	12.5
Cost control table for the contractor's monthly costs	8.3
Cost on a monthly basis	58.3
Cost per unit sheet	12.5
Costs of overhead are listed every month	16.7
Material costs are reported every week	33.3
Report of direct labor costs every week	41.7
The cost of renting machinery is reported every week	41.7
Weekly report of what was done (Value of work)	8.3

All of the contractors came to the conclusion that MS Projects as well as Earned Value Analysis (EVA) have been the most effective tools for controlling expenses and reaching financial goals. As a consequence of this, the study will not investigate whether or not daily labor and material control are effective measures for cost management. It is absolutely necessary for this facet to be incorporated into MS Project as well. The adoption of these tactics by contractors who had already done so stated the most important reasons as being affordability and convenience of use as the primary reasons for their decision to do so. Contractors are unable to make use of them due to a lack of information and processes regarding their utilization. According to the contractors, ICTAD ought to provide classes on a consistent basis in order to teach these methods.

The poll inquired about the level of familiarity that contractors had with the ICTAD regulations on cost control. The research indicates that fewer than half of the contractors are aware of these rules. Contrary to what most people believe, most contractors are on board with ICTAD's plan to incorporate important documents, such as its guidelines, into the terms and conditions of the contract. The responses to this question are presented in Table 2 [23], which can be seen here.

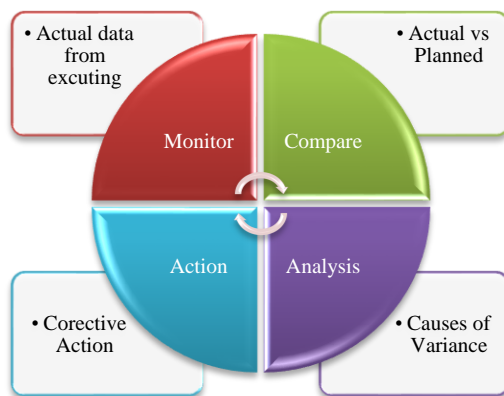


Figure 2. Techniques for cost reduction that are currently in use [22]

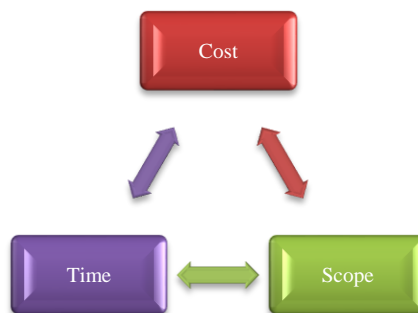


Figure 3. Contractors' struggles to keep expenses under control on the job site in cost management [24]

Using the Relative Index methodology, researchers were able to detect the causes that contributed to cost overflows the most. Standards established by the ICTAD might, amongst other things, be utilized to compensate for shortages of material, personnel, or mechanical plants. The responses to these problems, which lead to an increase in costs, are depicted in Figure 3 [24].

The bulk of the contractors reported that their project expenses were approximately 25% more than their budgeted amount due to a wide range of contributing variables., as shown in Figure 4. Second only to material waste is the lack of daily monitoring, as shown in Figure 5 [25]. This shows that appropriate project management practices can considerably reduce over-budgeting.

Due to excessive spending on projects, it was necessary to find solutions to the problem. The

techniques that the respondents suggested were based on their own personal experiences dealing with cost overruns, which informed the respondents' comments. As can be seen in Figure 6, the technique that was favored by most of the contractors was to make use of MS project in order to keep a daily watch on the progress being made.

It is difficult for most contractors to put the knowledge they have gained from working on past projects into practice because most contractors do not use project management systems. As a direct consequence of this, previous learning was thrown away, and it seemed as though a clean project, one that was beginning from scratch, would be undertaken. On the other hand, some contractors were able to draw from their prior experiences in order to successfully complete the projects they were working on at the time.

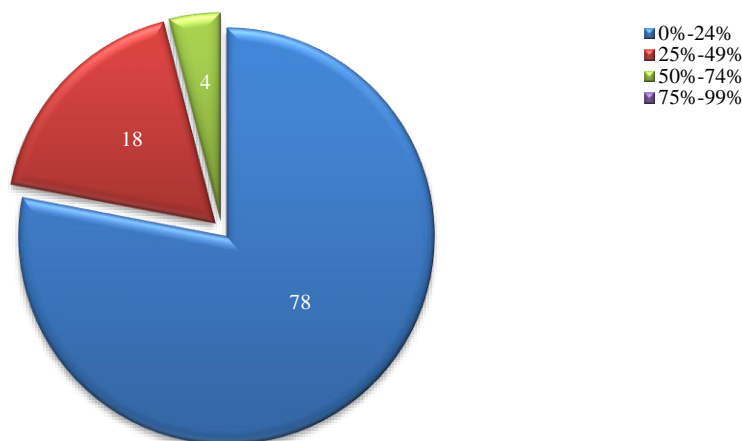


Figure 4. Ratios that are over budget



Figure 5. The causes of budgetary overspending [25]

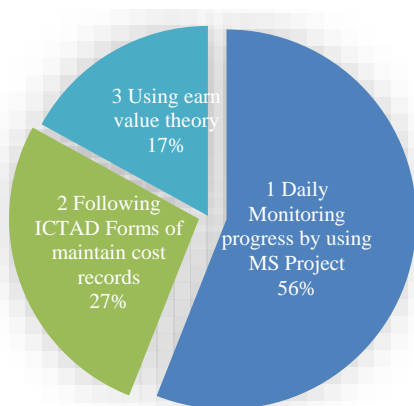


Figure 6. Efforts to keep the budget in check



Figure 7. Motives for boosting your bottom line's profit margin [18]

In the plans of many different contractors are included large profit margins. If there was a way to bring down this profit margin, it would be beneficial in many ways for both the client and the contractor. The researchers were successful in figuring out what it is that drives contractors to increase the profit margins in their businesses. As may be seen in Figure 7 [18], which illustrates the factors contributing to this as well as the feedback from the contractors.

According to the data presented in Figure 7, an increase in a project's profitability ratio can be expected if cost control processes and inspections are not carried out in an adequate manner [26, 27]. As a result, a drop in profit margin necessitates increased control over costs.

Because of increases in the price of both goods and labor, there has been an expansion in the margin of profit. Figure 8 demonstrates that the majority of the contractors were successful in cutting project overhead costs as a direct result of their use of cost control techniques.

According to the estimations of a typical contractor, implementing efficient procedures for cost management can save them up to half of what they currently pay in overhead expenses [31]. Some contractors have already reduced their overhead expenses by more than half thanks to the cost-cutting techniques they've used. As a direct consequence of this, efficient control of costs is an absolute requirement in the construction industry.

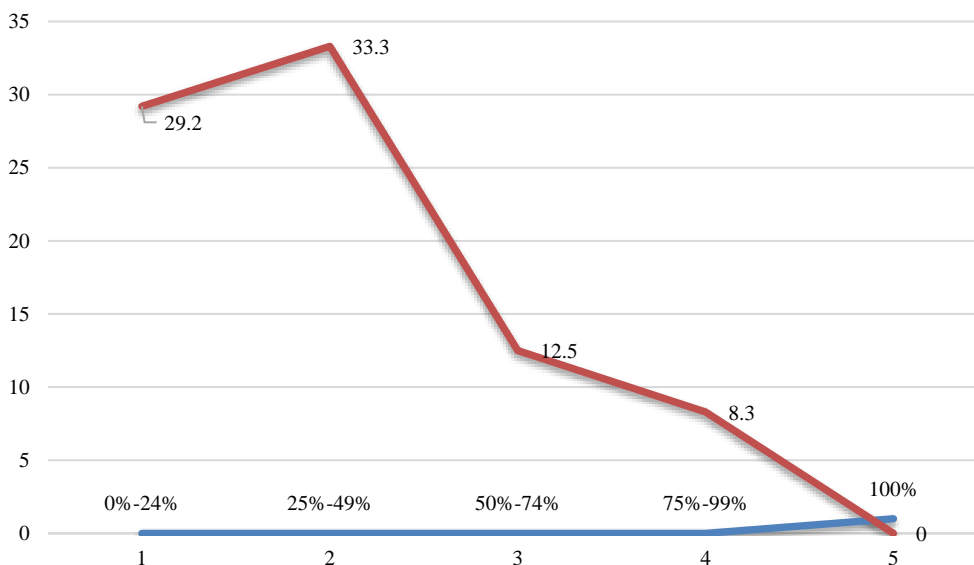


Figure 8: Reduced overhead as a percentage because of cost management

5. CONCLUSIONS

Even though there are techniques to limit the possibility of cost overruns, contractors are unlikely to fully apply these tactics due to a lack of resources, according to the responses gathered. ICTAD has provided contractors with guidelines; nonetheless, it appears from the collected data that the majority of contractors do not adhere to these standards. The contractors deemed several of the ICTAD made available materials to be of the utmost importance. Therefore, the authors would like to suggest that the following documents become mandatory submissions.

1. A sheet that summarizes monthly expenditures.
2. A weekly breakdown of the overall cost of direct labor
3. A weekly breakdown of the costs associated with hiring machinery

On the basis of the survey's findings, it is feasible to draw the following conclusions regarding the most effective cost management strategies:

- 1) MS Project.
- 2) Controlling the daily input of materials and labor.
- 3) Earn value management.

It has already been described in full the barriers that prevent the implementation of such plans, as well as the opinions of individuals who participated in the poll on how to overcome them. The following is an overview of the most significant solutions proposed by the contractors in response to ICTAD's action requirements (the conditions of the contract).

1. You are in charge of creating initiatives that will increase knowledge about how important MS project management as well as earned value management will be in the workplace.
2. In the form of seminars, workshops, and other similar events, regularly provide information that has been updated.
3. Educate the knowledgeable individuals who will be held accountable.

Additional research involving A6-A10 contractors as well as all projects can be conducted to verify the findings of this study. They believe that even if contractors followed the instructions in this document, they would indeed be able to effectively manage their projects as well as ensure that they earned the expected revenues.

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BIOGRAPHIES



Ahmed Mahmood Issa Al-Ghuraibawi was born in Kut, Iraq, on January 1, 1978. He received the B.Sc. degree from Civil Engineer Department, University of Baghdad, Baghdad, Iraq in 2000. He works as supervising engineer in his field till now.



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