

*Addis Ababa*  
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**Addis Ababa University**  
**Faculty of Technology (South)**

**Project follow up System in Addis Ababa Building project**

**BY:**

**TIHTINA SEBLU**  
**KIBROM TESFAYE**  
**YORDANOS KAHSAY**

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**ADDIS ABABA UNIVERSITY  
FACULTY OF TECHNOLOGY**

**DEPARTMENT OF  
CONSTRUCTION TECHNOLOGY AND MANAGEMENT**

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**BY:**

**TIHTINA SEBLU  
KIBROM TESFAYE  
YORDANOS KAHSAY**

**ADVISOR:**

**ATO WONDIMU KASSA ( Msc.)**

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**APPROVED BY BOARD OF EXAMINERS**

**ADVISOR:** \_\_\_\_\_

**SIGNATURE:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

**EXAMINER:** \_\_\_\_\_

**SIGNATURE:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

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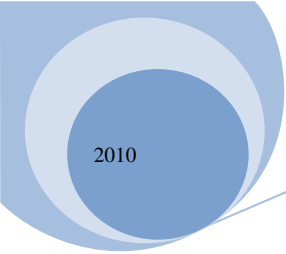
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## ABBREVIATIONS

BCWP	Budget cost of work performed
ACWP	Actual cost of work performed
BCWs	Budget cost of work scheduled
MOWUD	Ministry of works and urban development
CPI	Cost performance index
CSI	Cost schedule index
SPI	Schedule performance index
MAN.hr	Man hour

## ABSTRACT

This study tries to identify the practice and challenges of project follow-up system in Addis Ababa building projects. The study begins with review of the important aspect of project follow-up system. It then takes a survey study analysis to identify the current practice and challenges of project follow-up system. It further tries to address what has to be done to improve follow up system practice and tried to suggest improved type of follow up system to control cost overrun, time delay, poor quality and workmanship.

## Chapter One

### **1. Introduction**

#### **1.1 Background**

Construction is a unique investment than other sectors because of uncertain events and involvement of many stakeholders. It is the largest industry in developing country like Ethiopia which requires huge capital overlay Hence, this amount of capital and time should be managed properly.

Some of effects of unsuccessful project monitoring are:-

- Wastage of materials
- Defected methodology
- Slippage from schedule mostly time and cost
- Poor quality of work and performance
- Poor communication with stakeholders
- Poor resource productivity

Most construction projects usually suffer with the problem of time delay and cost overrun. Delay can alter the planed level of resources and their mobilization, increase overheads, reduce planed revenue and create cash inflow problems besides the uncertainties have a tendency to push away the project from the plan.

The above discussed effects of fluctuations are unavoidable but to minimize such kinds of problems close follow up and monitoring systems must be implemented. The current practice of project follow up is not effective to minimize fluctuations besides it is not well organized and integrated in addition to other management problems and uncertainties this weakness of the system in turn will lead the projects to unsuccessful end. Most projects at Addis Ababa also faces the same problem hence, this study trys to asses the current practice and to suggest improved ways of project follow up systems.

## **1.2 Objective of the Study**

The general objective of this study tries to assess the current practice and challenges of project follow up systems in Addis Ababa building projects and recommend improved follow up systems.

## **1.3 Research Methodology**

Literature review, semi structured interview and questionnaire were designed in such a way that detailed information could be collected. The study used descriptive statistical analysis. Literature review is done to build a conceptual background on procedures and tools for project follow-up systems.

- The interview and questionnaire prepared and distributed to randomly selected contractors, consultants and employers.

## **1.4 Significance of the study**

Identifying the practice and challenges of project follow-up in an industry helps to find out actual problems that the industry faces. To that end, appropriate project follow-up systems have significant contribution for construction industry growth. It helps contractors, and employer to complete a project within the given time, standard quality and the allotted budget.

### **1.5 Scope and Limitation**

The scope of this study limited to Addis Ababa building projects. Many Projects fail to meet their goal due to lack of close follow-up and monitoring. The following factors have been faced to affect the final outcome of the research work:

- Time constraint
- Difficulty to get organized project follow-up system of completed, ongoing or proposed projects.

### **1.6 Structure of the paper**

This paper comprises of four chapters, Chapter one is the introductory part; which includes background, aim and objective, methodology, scope and limitation.. The second chapter presents an overview of different literatures on construction project follow-up systems and related topics such as construction management in order to develop conceptual frame work of the study. The third chapter is the analysis of the Response of Questionnaires and Interviews. Conclusion and Recommendations are provided in the last chapter.

## **CHAPTER TWO**

### **2 LITERATURE REVIEW**

#### **2.1 Introduction:**

The construction industry has special futures than other industries due to uncertainties during the planning period and involvement of many stakeholders.

Infrastructure works such as buildings, roads, water works, hydro- power works, which are major aspects for development of one country it consumes huge amount of capital and considerable time. Hence as a whole the industry needs proper management and close follow up.

#### **2.2 Construction Project Management**

The development of technology and the concepts of competitions opened a considerable role for management functions such as planning, implementing and controlling cycles.

Principle of construction management by Webeshet Jekale (Dr.Eng) April 2006 explains construction management as:-

“Management is defined as the art of arranging and/or organizing various activities, operating equipment and group of people in a suitable manner to create systematic operation with continuity to achieve a common goal”.

As construction is also one of the industries which need the proper systematic coordination of activities, materials, labor and operating equipment, therefore Proper management of such industry is necessary.

Generally construction project management is utilization of resources and meeting the project goal through effective ways of time usage and establishing appropriate system.

In the real world construction resources are scarce, hard to obtain easily and becoming expensive every day in spite of the fact that their demand is getting higher. This reality which

obliged to utilize them efficiently and effectively. In other words, that is the basic reason why construction industry needs to be managed properly and carefully.

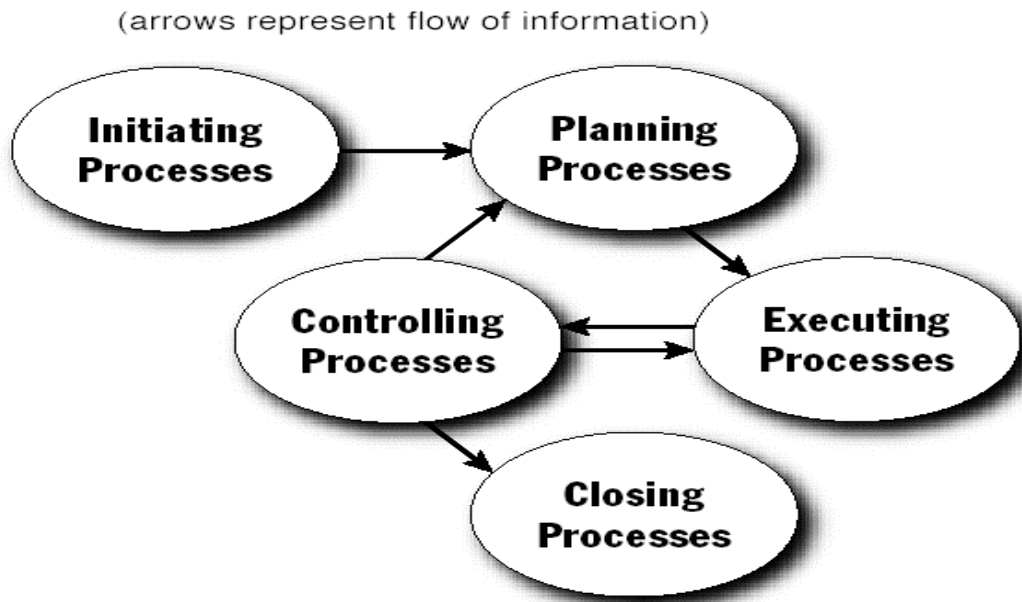
K.K Chit Kara (2004) “Construction project refers to a high value time bounded, special construction mission with predetermined performance activities.” Hence the project manager attempt to achieve the mission by managing the time, cost, quality and performance and organization behavior by project management processes.

### 2.3 Construction Project Management Processes

Project management functions can be organized into four groups (as stated in Project management planning and controlling techniques by Roy Burke)

- **Planning processes** defining and refining objectives and selecting the best of the alternative courses of action to attain the objectives that the project was undertaken to address.
- **Executing processes** coordinating people and other resources to carry out the plan.
- **Controlling processes** ensuring that project objectives are met by monitoring and measuring progress regularly to identify variances from plan so that corrective action can be taken when necessary.
- **Closing processes** formalizing acceptance of the project or phase and bringing it to an orderly end.

The under laying diagram shows the general flow of project management process as described by Roy Burke.



**Fig 2.1 project management process** (Project management planning and controlling techniques by Roy Burke)

- **Initiating Processes**

The main task at this stage is defining the scope of the project and it is mostly interrelated with business plan of the owner.

- **Planning Processes**

**Scope planning & Definition**

**Activity**

**Schedule development**

- Definition
- Sequencing

- analyzing activity sequences,
- duration & resource requirement
- Duration estimation

**Resource Planning**

**cost estimation and budgeting**

**Project plan development**

- Man power
- Material
- Equipment

- **Executing Processes**

The executing processes include Project Plan Execution, Quality Assurance, Team Development, and Contract Administration.

Project performance must be monitored and measured regularly to identify variances from the plan the next step will be adjustment of Variances. For example, a missed activity finish date may require adjustments to the current staffing plan, reliance on overtime, or tradeoffs between budget and schedule objectives. Controlling also includes taking preventive action in anticipation of possible problems.

- **Monitoring Process**

The follow up process contains core processes and facilitating processes: - Cost Control, Quality Control, and Performance Reporting

- **Closing Processes:** this step involves closing of contractual and administrative cases of the project.

Since this study is wanted to focus on follow up systems of ongoing construction projects the next part will try present main features of follow up systems.

## **2.4 Construction project follow up system & methodology**

### **2.4.1 Construction project follow up system**

The project follow up objectives are generally stated in terms of the specified completion time with in predetermined costs and profitability. The project plan shows the path of achieving these objectives. But even with the best efforts, the probability of execution of a project exactly as per planning is low. There will be unpredictable resource limitations and unforeseen activity delays. Project needs an effective follow-up system to continuously monitor the devotions from the planned paths, and to apply corrective measures.

Project follow up follows the systems concept. Each organizational unit in a project usually referred to as a responsibility center, can be viewed as a sub systems are interdependent and interactive.

Project follow up involves two main kinds of systems these are monitoring and evaluating systems ongoing construction projects.

An efficient follow up system generates information that can improve the productivity of labor and materials economize the employment of resources, enable understanding of time and cost effects, provide early warning signals of ensuring dangers, update resource planning.

The inherent variables in the construction projects make it impossible to drive solution for developing and implementing a project follow up systems. Further managers and site engineers are generally hesitate to face predetermined performance evaluation measures specified in follow up systems. A follow up system involves interactions among managers and the system collapse when conflict and communication gaps exist. The problems and conflicts inherent during the follow up process can be minimized if the management has clearly defined policy on how to organize a follow up system and each participant understands it.

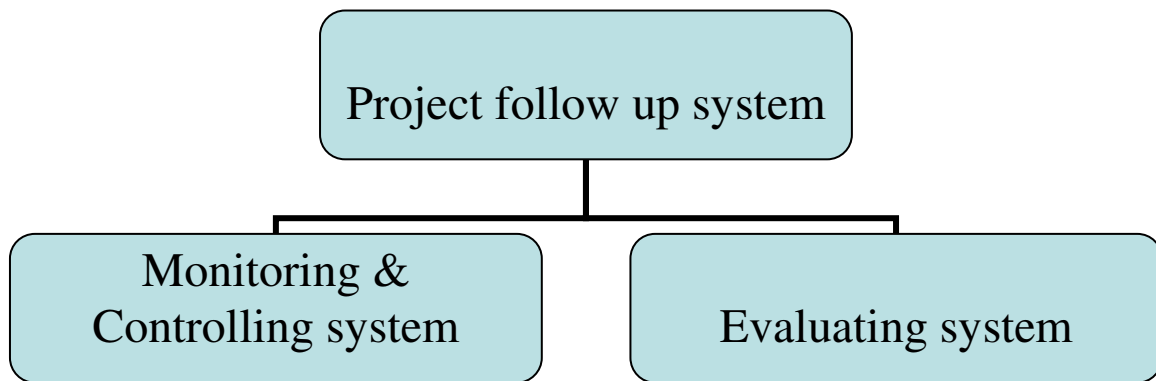


Fig 2.2 project follow up (construction project management Fredrice gould, anancy e. joyce)

Since construction Project is a time bound and high capital intensive by its nature. An effective, well organized and energetic Project follow up system must be implemented in order to meet the intended goal of the project. It involves the methodology for measuring, monitoring and evaluating performance and also describes the features of the information communication process.

### 2.4.2 System Framework

**System approach** the control system design involves deciding what kinds of systems to be implemented. It is assemblage or a combination of things or parts forming a complex or unitary whole.

Procedures and people grouped together to perform the work. Project follow up system collect and process data to extract and disseminate information about time, resource, cost and quality performance. The information communication sub system deals with collection, dissemination, communication and retrievals of information for decision making. (k.k chitkara 1998)

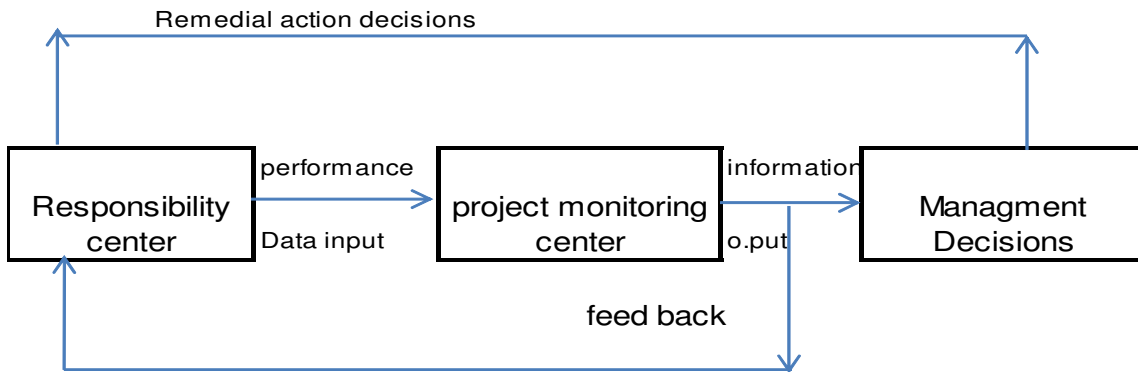
### 2.4.3 Follow Up Process

Project follow up also include project coordination or facilitation and monitoring and there are steps to go through to achieve the desired goal of the project. A firm needs one group to coordinate, communicate, monitor, evaluate and give feed back to the project under progress. The necessary actual existing information can be communicated through site visit, periodical reports, meetings and others. This information is an input for the system to evaluate the progress of the project.

Step in project follow up as specified by (k.k chitkara 1998)

- 1 Define the parameters to be control
- 2 Establish bench mark to measure the performance

- 3 Account the performance by:
  - Measuring performance
  - Recording performance
  - Periodical reports
- 4 Monitoring performances by
  - Consolidating reported performance data
  - Analyzing performance variation
  - Forecasting performance trained
- 5 Communicate information
  - Feed back
  - Management report
  - Record keeping



**Fig 2.3 the whole follow up process (K K chitkara 1998)**

The data found from the project will be analyzed and evaluated with respect to the project objectives and a feedback issued to responsible parts in order to take remedial actions, the remedial action might be re planning this process continues up to the completion of the project. The data to be analyzed should be communicates in terms of measurable parameters.

#### 2.4.4 Parameters to be follow up in Construction Projects

Any control system needs an objective against which performance can be measured. If the control system is to have a beneficial effects by keeping the project oriented towards a meaningful result, then the objectives needs to be framed .An efficient control system generates information that can improve the productivity of workers, materials & equipment.

Performance in simple words implies the degree of achievement. Parameters define the goals to be achieved. Each responsibility center accounts for the performance of the assigned parameters, and transmits the deviation between the actual and planned performance to the monitor. In construction project, the typical parameters that may be controlled are as follows:

- A. **Project Time progress follow up:** it aims at the timely execution of the work as per the work programmed and applying corrective measures in cases of deviations so as to achieve the project time objective .As we know construction projects are time bound and all projects activities are directed towards the achievement of project time objectives. All construction projects are having its own scheduled targets; a small delay in a critical activity can affect many schedules. Delays can alter the planned level of resources and mobilization. Time overruns increase overheads, reduce planned revenue & create cash inflow problems.

Time controlling of complex project can broadly be divided into following three stages.

- Measuring the actual progress
- Compare the actual progress with the planned progress(analyze performance)
- If there are any deviations take remedial measures to achieve the planned progress.

I.e. updating the schedule

- B. **Resource productivity follow up:** it aims the effective utilization of direct resources of labor, material, & Equipment.

**The objective of resources productivity control is:**

- Assure the delivery of resources required at the right time & right quantity
- Effectively utilize the resources & minimize time and cost
- Compare actual utilization to the plan
- Take corrective actions if deviation occur

**i. Material productivity control**

The main purpose of material productivity control is to minimize wastage in utilization.

Wastage of materials can occur during: -

- Procurement process
- Storage and utilization
- **Wastage during procurement can result from**
- Buying materials of wrong specification
- Buying more than the actual requirements
- Untimely buying of short life materials
- **Wastage during storage can occur due to:-**
- Damage and breakage during handling
- Deterioration due to incorrect storage, incorrect maintenance and short shelf -life

**ii. Equipment productivity control**

Equipment productivity can be improved by:-

- Suitably matching machines with the job.
- Employing experienced operators and competent maintenance staff.
- Adopting correct methods for work execution.

### iii. Labor productivity control

The labor productivity control can be improved by cutting down unproductive time of laborers. The control process involves measuring and evaluating actual productivity, comparing the actual with standard, analyzing the causes for variations between actual and standard, and finally taking remedial measures to improve productivity.

#### Typical Causes of Low Labor Productivity

There can be many assignable causes for variation in actual productivity from standard productivity.

It is the moving average of actual productivity that indicates the extent of variation from standard productivity. One of the causes of variations between actual and standard productivity may be due to the incorrect estimation of standard productivity. However, low productivity at the steady state

#### **Level can be broadly attributed to the:-**

- Low morale of workers
- Poor pre work preparation by the responsible party , and
- Directional failure of the project management

#### **Workers low moral can results from;**

- Non fulfillment of employment terms & conditions by the management.
  - In security of employment.
  - Sub standard working conditions.
  - Frequent transfers.
  - Frequent changes in the scope of work and work methodology.
  - Conflicts between supervisors and workers.
1. Poor pre work preparation by the responsible party the lack of preparation for the execution of the assigned work prior to commencement can result in inefficient handling of resource due to:
    - Insufficient instructions for the execution of work.

- Incorrect sequencing of work activities.
- Shortage of tools and materials at the site.

2. Directional failures of management include:

- Failure to make provision for timely resource support.
- Failure to provide feedback.
- Failure to motivate workers.

These all can be improved & the productivity can be increased in many ways such as:-

- Reduce unproductive time by constantly reviewing and minimizing causes contributing
- Reduce unproductive time
- Replace labor by appropriate equipment where economically feasible.
- Improve working conditions.

### C. Project cost control

The application of ideas from control theory is easy and obvious when applied to something like cost control. The cost plan must be framed by reference to the financial environment of the project. (In its turn, the financial environment must be understood with reference to the wider economic situation.) Cost control is the activity which compares cost performance against the cost plan, adjusting one or the other dynamically by reference to the changing circumstances in the projects financial environment. These are the basic tenets of systems theory, applied to objectives, control and feedback. What is not so readily understood but is implied by the forgoing analysis .The time at which major cost savings can be achieved is during planning and design for the project. During the actual construction, changes are likely to delay the project and lead to inordinate cost increases. As a result, the focus of project control is on fulfilling the original design plans or indicating deviations from these plans, rather than on searching for significant improvements and cost savings. It is only when

a rescue operation is required that major changes will normally occurring in the construction plan. For control and monitoring purposes, the original detailed cost estimate is typically converted to a project budget, and the project budget is used subsequently as a guide for management .Specific items in the detailed cost estimate become job cost elements .Expenses incurred during the course of a project are recorded in specific job cost accounts to be compared with the original cost estimates in each category. Thus, individual job cost accounts generally represent the basic unit for cost control. Alternatively, job cost accounts may be disaggregated or divided into work elements which are related both to particular scheduled activities and to particular cost accounts.

The purpose of cost control is to:

- Check deviations from original budget
- Forecast completion cost
- Measure efficiency
- Planning & cost estimation of similar future projects
- Initiating cost reduction measures.
- Analyzing causes for variations.

Procedure for cost control

- Establish baseline cost for each work package and total project cost
- Measure the cost of actual work completed and compare with the baseline
- Take corrective actions if there are deviations
- Follow up the corrective measures taken for their effectiveness.
- Updating project cost status.

Basis for forecasting project cost.

- Measurement
- Collection of data
- Analysis of performance (compare with plan, trend)

Forecasting will depend on

- Accuracy of data collected
- Analysis of data
- Personal judgment & experience

**D. Work earned value control:** it aims work quantity and work done earned money.

- Measuring work done as per bill of quantity, and stock taking of direct materials and other payable item at site.
- Evaluate the monthly earned money for the work done & status of the project.
- Billing work done, work in progress and additional payable items.
- Forecasting cash inflow.
- Rising claims for deviations due to extra works.

### **E. Quality control**

As with cost, time and conflict control, the most important decisions regarding the quality of a completed facility are made during the design and construction. It is during these preliminary stages that component configurations, material specifications and functional performance are decided. Quality control during construction consists largely of insuring conformance to this original design and planning decisions.

Quality control requires

- Forms or Systematically built up information

Tolerances for quality control are specified with regards to:

- control workmanship (visual inspection)
- Removal of unacceptable work
- Protection of executed works
- Deposits of materials

The parameters required to be followed, listed above, are indicative and not exhaustive. Depending upon the nature of the project, there can be additions and alternations in this parameter.

Follow up parameters are not mutually exclusive. They are interrelated as well as interdependent. Example the work progress time goals do get affected if the productivity adopted norms change or resource are not inducted as per mobilization plan.

Similarly, the budget is interlinked with the outcomes of almost all other parameters. The weakness and deviations in each of these parameters resulting from non-fulfillment of planned targets, not only have their repercussions on respective parameter goals but they affect the project as whole.

**2.4.5 performance base line**

Performance is measured with respect to predetermined specified targets or standards termed 'performance base line'. These base line are a devices used for measuring performance variation by comparing the originally planned path. The purpose of establishing performance baseline is to assist the monitor in measuring deviations in the actual performance from the planned standards. It is these deviations that serve as early warning signals of ensuing dangers to the goal controllers.

Some of goal measuring base lines or standards used for various follow up parameters are:

Table 2.1 parameters and base lines

follow up parameters		performance base lines
1	Time process	project masert time schedule
2	Resource productivity	Resource performance standards
3	Resource mobilization	Project resource indication plan
4	Work-packege direct cost	Standard direct cost
5	project cost	project budget

**The base line for time control** is the project master time schedule. The schedule, generally prepared as a bar chart, covers the entire scope of the project work and its execution plan. It depicts the time schedule for commencement and completion of all work packages. The project master time schedule is supported by part plans developed for sub projects and construction tasks. These sub-projects and construction task plans are prepared using planning techniques like network analysis and line. In its summarized form, the master schedule is used for reporting progress to corporate authorities and forming the data base for engineering activities, resource mobilization and time saving.

**Resource productivity base lines** are defined in terms of productivity standards. These standards are used to measure deviations of the actual resource productivity from its base lines. It is the deviations that give the early warning of ensuing dangers to the goal controllers.

**Project budget** acts as the base line for measuring cost and performance. It is supplemented by standard cost and earned value estimates for each work package.

These base lines may be equal to the performance estimated by the estimators at the time of tendering. Further, the planned performance reflects the average value over a period of time. An important point to remember is that a given task can be executed by different methods, but the actual performance is based on the method actually adopted for excavation and not on what was considered at the time of planning.

#### **2.4.6 Performance measuring & recording process**

Performance is measured in relation to specified base lines. Recording involves documenting facts about the actual progress of activities and presenting these facts in a concise and form of analysis. The performance measured is documented.

The records of performance can be collected by directly from the site or by engineering calculations.

In particular, it is the usual practice to maintain a works diary to daily record the weather, activities in progress, man power engaged at the site, major materials received, equipment deployed, important events of the day, and comments of the visitors.

**Document used for recording performance on the site**

Table 2.2 typical recording documents

Control Parameter	datas Recorded	Typical Recording Documents
work progress	actual starting and completion date of each activity	work diary. Daily work progress report, work package performance sheet
material utilization	receipts and issues	materials ledger
man power utilization	daily worker employment	time keeper muster rolls register
plant and machinery utilization	hour utilized	equipment operation log books
production cost	actual cost	construction accounts
Excutions	quantity and value of work done	measuring books, monthly invoice of work done, materials on site, & extra work statement

**2.4.7 Reporting performance**

A performance report is generally a written document that shows the up to date performance status of a task. Performance report transmits the performance data covering the actual data covering the actual achievements and deviations from standards, and highlights the reasons for such deviations in standard format at a predetermined frequency to the specified monitoring center. The frequency of reporting varies with the nature of tasks and the efforts required compile it.

Out of mass of accounting data, monitor needs relevant easy to analyze that effects the assigned goals and objective of the control center. The desired input data can best be obtained by the monitor through suitably designed performance reports taking the following in to consideration:

- a) What are the short term goals and long term objective assigned to the responsibility center?
- b) What is the data needed to monitor the performance of these goals and objectives?

- c) How should this data be obtained from the initiator, viz. in a verbal or written form?
- d) What should be the nature, format and frequency of reports to be submitted by each control responsibility center to the monitor?

Table 2.3 typical responsibility center control performance reports.

<b>Responsibility Center Designation</b>	<b>Purpose of Report</b>
<p><b>Construction sites</b></p> <p>Activity wise progress report</p> <p>Labor employment report</p>	<p>To monitor daily physical and financial progress activity.</p> <p>To asses manpower output activity</p> <p>To control effectiveness of machine employment</p>
<p><b>Personal department reports</b></p> <p>Workers daily employment report</p> <p>Workers arrival/departure report</p> <p>Weekly site staff allocation report</p>	<p>To control distribution of workers with the project</p> <p>To update manpower planning records</p>
<p><b>Quantity survey section</b></p> <p>Weekly status of quantities estimates</p> <p>Weekly material sample approved status</p> <p>Monthly value of work executed</p>	<p>To monitor the progress made in estimation of quantities.</p> <p>To track the materials procurement plan</p> <p>To monitor the value of sales income from the work done</p>
<p>Weekly work progress materials monitoring report</p> <p>Weekly resource mobilization monitoring report</p> <p>Monthly site report</p> <p>Monthly management information report</p>	<p>To analyze the implication of deviations from the project plan</p> <p>As per requirement of the client</p> <p>To report performance and hold ups/bottle necks to corporate management</p>

- a) Is the data reported required for controlling the performance of other control center?  
If so, who should be asked to initiate the report?
- b) How accurate should each report be? The degree of accuracy will depend upon the purpose of the report
- c) Will the report initiator need additional assistance to submit the report? If so, what and how much?
- d) Can the report under consideration to be eliminated, substituted, combined, rearranged or simplified? This should be reexamined before finalization.

It is emphasized that there are no tailor made formats for reporting the performance. Generally, the contents of report should show the performance goals in the form of current and cumulative status. It should indicate variance from planned targets with reasons.

The reporting format should conform to the monitor's specification, organization, computer software requirements, and codification system. The format design should seek the participation of the performance controller prior to finalization.

In particular, responsibility centers must not be loaded with paper work. The reports should be designed in such a manner that it reduces the recording effort. The report served the following main purposes.

- a) It made the site supervisors pre plan for the next time working including the allocation of resource for each activity
- b) It provided the following valuable data to monitor and cost accountant in respect of each current activity:
  - i. State of time progress showing the dates of commencement and completion activity wise.
  - ii. Correlation of activity with resource deployed and consumed such as man days utilized for the completion of each activity the corresponding productivity achieved.
  - iii. The earned value of the work done
  - iv. Reason for hold up or work stoppage

## 2.5 Information and feedback communication

Information is crucial ingredient of the decision making process. Timely, relevant and accurate information is necessary for making quantitative analysis of the visible course of action for achieving goals and deciding the most suitable one for implementation. The greater the size and complexity of the project, the greater is the need for information

The project follow up system aims at collecting the right information in the right form through the right means at the right time from the right place and communicating it to the right person on time of taking the right action. The project monitor is assigned the task of data record keeping, data processing and timely communication of the performance feedback to the project teams and the information report to top management.

### I. Data record keeping

The project data bank, manned by the monitor, can be set up at each site to hold the following up to date records for ready reference:

- a) Contract documents including terms and conditions, drawings, specifications, bill of quantity, and active wise costs and sale price.
- b) Project models, layout pictures, tabulated scope of work statements, and photographs depicting work progress.
- c) Project planes and connected charts, network, planning assumptions including productivity standards.
- d) Statics of various reports and returns handled in the project and pictorial displays.
- e) Records of minutes of all meeting, conference, policies and important correspondence.
- f) Control charts showing progress of works, mobilization status of resources, contract cost status and the 'S' curve forecasts.
- g) Update unit rate resource planning data.

It is ideal to have a project follow-up room at site office where all updated monitoring information is displayed. The executive should be encouraged to regularly to regularly visit this room and read the feedback.

## **II. Feedback communication**

Feedback conveys information to the responsibility centers pertaining to their performance and its implication on assigned goals. It may reveal what was achieved, what was targeted for accomplishment, what is the extent of deviation in performance, what caused these deviations and what are the remedial courses of action possible.

Feedback can be transmitted verbally, in the form of brief feedback reports or as briefing during regular meetings. It is important feedback is given in time as delayed may not serve the purpose. Feedback is the only relevant information to each level.

The right feedback, the site executives can analyze their performance and take remedial measure when necessary.

It may be noted that the monitor diagnoses the deviation and formulates suggested remedial options but he cannot implement these by himself. It is the site executives who are responsible for processing the work as per the project plan and correcting deviation from the planned path.

## **III. Project management information report**

The corporate management or the board of directors is primarily concerned with the progress, profitability, cash flow, and capital investment needed for achieving the objectives. The project report provides an over view of the project status. It outlines the present performance for the future targets. It focuses on actual and potential deviations from the planed path and the possible remedial action suggested overcoming adverse situation. The report enables top management to exercise an effective control over the project.

The content of project management information report can be broadly divided in to six parts:

- Particulars
- Objective status
- Project parameter performance
- Resource mobilization forecast for the next quarter
- Gist of important site meeting
- Concluding remarks

The project management information report generally, does not include classified information such as controversial issues, actual expenditure details, profitability status, and financial matter. These are dealt with separately.

The project report must be concise and meaning full. It should indicate variance from the planned targets with reasons.

#### **A. Outputs from progress monitoring**

Some of the following curves are used in conjunction with the earned value analysis

- 1) Actual progress. The actual progress is the summation of weights, based on the pre-established progress measurement criteria, accomplished in or up to a work period.
- 2) Progress monitoring curves. The progress monitoring curves are the graphical representation of the actual progress achieved in each control period, usually compared to a progress baseline.
- 3) Schedule updates. A schedule update may be originated by the observation that progress targets are constantly failing to be met. The schedule update in this case will be a consequence of changes in the activity durations and basis of estimates
- 4) Corrective actions. Corrective action is anything done to bring expected progress performance in line with the project plan. Corrective action is usually taken in another aspect of the project and reflected in enhanced progress accomplishment.
- 5) Lessons learned. The causes of variances, the reasoning behind the corrective action chosen, and other types of lessons learned from progress monitoring should be

documented, so that they become part of the historical database for this project and other projects of the performing organization.

### A. Analyzing performance variances

The term variance stands for the difference between the planned and the actual. When associated with the parameter of a work item or activity being controlled, variance, represent deference in planned and actual performance of controlled factors.

Performance variance = planned performance – actual performance

Variance when evaluated can be zero, plus or minus. Plus or zero value variance are called favorable, and the minus value variance are termed unfavorable.

Variance  $\geq 0$ , favorable

Variance  $\leq 0$ , unfavorable

### B. Trend fore cast

Performance variance analysis reveals the extent and causes of variance. On the other hand, performance efficiency, when read in junction with variance analysis, indicates the implications of the past performance on future trends.

Performance variance = planned performance – actual performance

Performance efficiency =  $\frac{\text{actual output performance}}{\text{Planned input performance}}$ , e.g.  $\frac{\text{work done per man-day}}{\text{work planned per man-day}}$

Performance efficiency determines how efficiently the task was done; performance efficiency greater than 1 shows better performance than planned than planned and vice versa.

Performance efficiency  $> 1$ , performance better than planned

= 1, performance equal to planned

< 1, performance less than planned

Performance efficiency is a trend indicator. It provides the tool for forecasting future requirement of resource.

A simple method of forecasting trends is to calculate the performance efficiency and to proportionately increase or decrease the resource for remaining work.

Understanding of some of the technique and concepts given below can help in producing a realistic forecast of future performance. There are no hard and fast rules to state as to which technique will be used, when and where:

**Time forecasting technique:** net work analysis, and line of balance technique

Statistical analysis and operations research method: data analysis forecasting, etc

Management accounting techniques: cost accounting, cost control, working capital management, cost benefit analysis, break even analysis, and performance audit.

Management concepts: management principle, behavioral science, personal management, materials management, plant management, finance, contract, and quality management.

## 2.6 Project Evaluation

### I. Major Principles of Evaluation

- Impartiality & independence of the evaluation process in its function from the process concerned with policy making, the delivery and management of assistance
- Credibility depending on expertise and independence of the evaluators & transparency to be sought through an open process, wide availability of results, distinction between findings and recommendations
- Usefulness: relevant, presented in a clear and concise way, reflecting the interests and needs of the parties involved, easily accessible, timely and at the right moment
- improved decision-making
- Participation of stakeholders (donor, recipient...); if possible: views and expertise of groups affected should form integral part of the evaluation; involving all parties.

### II. Evaluation involves:

- Looking at what the project or organization intended to achieve what difference did it want to make? What impact did it want to make?
- Assessing its progress towards what it wanted to achieve, its impact targets.

- Looking at the strategy of the project or organization. Did it have a strategy? Was it effective in following strategy? Did the strategy work? If not, why not?
- Looking at how it worked. Was there an efficient use of resources? How sustainable is the way in which the project or organization works? What are the implications for the various stakeholders in the way the organization works?

### **The Evaluation Design**

Most evaluations call for the writing of a scope of work. This is, essentially, a plan for carrying out the evaluation. The scope of work in traditional external evaluations is usually written and agreed upon by a limited number of persons interested in the project.

The following summary should be helpful to conceptualize the evaluation process. If all of these parts are adequately thought out, a well-defined scope of work should be the result

- Define the purpose of the evaluation.
- Define the priority areas to be evaluated.
- The information collection plan.
- The implantation plan.
- . Analyze and organize the information. .
- . Communicating the findings and making follow- up plans.

## **Chapter Three**

### **3. Analysis of the study**

#### **3.1 Methodology**

A semi-structured questionnaires and interviews was prepared and distributed to the major stockholders that play dominant role in day today construction activities. These are owners, consultants and contractors. Total of twelve questionnaires were distributed out of which eight were collected and six interviews were conducted to volunteer respondents. Table 5.1 and 5.2 shows the response rate of the questionnaire and interview respectively.

##### **3.1.1 Research Samples**

Our samples for this research are local contractors, consultants and contractors. These parties are major stockholders and they are engaged fully at the construction process and these parties are the one who decide the life cycle process status of the projects. Which are scope, time, cost, quality and other major futures of the project?

##### **3.1.2 Technique of data collection**

The Research is qualitative as its main objective is to propose best feat project follow up system and to evaluate the existing follow up system of ongoing projects. And it is exploratory research conducted for the purpose of diagnosing the construction processes and discovering new ideas from the population. The population selection is randomly out of the above mentioned stakeholders

##### **3.1.3 Method of Analysis**

The type of analysis used is description statistics method, graphical and tabular analysis and by using percentages. (See the table format below)

The rate of responses is 61%; Table 3.1 summarizes the number of distributed questionnaires and rate of responses.

**Table 3.1**, Summary on the response rate of questionnaires

Construction party	Distributed questionnaires	Collected questionnaires	Response rate (%)
Contractors	12	8	67%
Consultants	12	8	67%
Employers	12	6	50%

#### 3.1.4 Semi-structured interviews

The interview respondents were very cooperative and randomly selected from owner, contractor and consultants.

**Table 3.2 Interview Response Rate**

Interview conducted	4
Number of participants	4
Number of respondents	4
Response rate	100 %

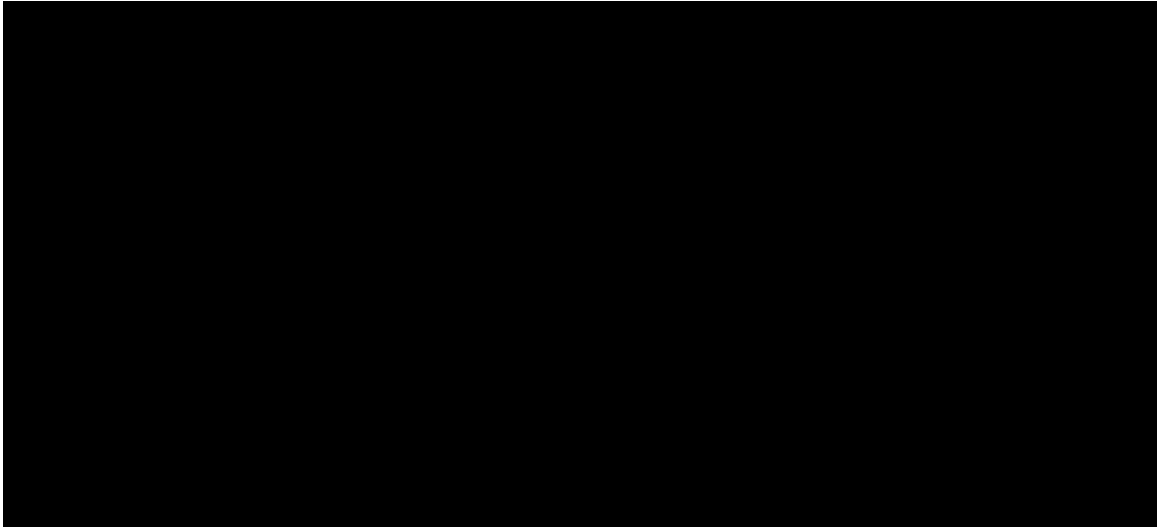
### 3.2 DATA PRESENTATION, ANALYSIS AND DISCUSSION

This section deals on the data presentation and discussion on the responded questioner according to the above mentioned technique.

The intention of this question is to know whether there is a responsible part for the project progress & the controlling process

Table 3.3 Analysis for responsibility center.

Item No-	Questions	Response	Respondents	
			In No.	In %
1	In your organization do you have a responsible center to follow up over all the project progress?			
	A. Contractor	Yes	8	100
		No	0	0
	B. Consultant	Yes	8	100
		No	0	0
	C. Employer	Yes	6	100
		No	0	0

**Fig.3.1,** Existence of responsible center**Discussion**

As it is shown in table 3.1 and the related graphical representation of the responses 100% of the respondents explain that they have a responsible party in their company like project coordination Team. General project manager, which is responsible for certain projects and Procurement & supply department to control the delivery process at head office level.

This question was designed to see the line of command or communication, power and relation with the projects under consideration.

The controlling center of most of the respondents have direct communication to the projects and the projects are subordinates to the managers ( coordinators) at head office level but this line of command is well defined only for the contractors in fact it is mandatory to be well organized to manage the projects effectively to the contractor. But the response from owner's side shows that for the follow up only some personals are assigned and their focus is checking payment certificate requested from the contractor. Consultants respond to this question that their Whole system is all about to control the project.

**Parameters to be controlled**

To make the controlling process to be significant and defined there should be measurable parameter.

## Analysis

The response for this case shows that 100 % of the respondents from all parties have some parameters but the types of parameters are different for each party. The following list shows parameters for which more attention is given.

Contractors: - Cost, quality, Time, workmanship

Consultants: - Quality of material & workmanship, time

Owner: - Budget, time, Cost, & quality

To measure something there should be reference line. The respondents requested how they set bench mark and the result is as shown below

- A. From schedule
- B. From other projects performance
- C. From standards

Table 3.4 Bench mark setting analysis

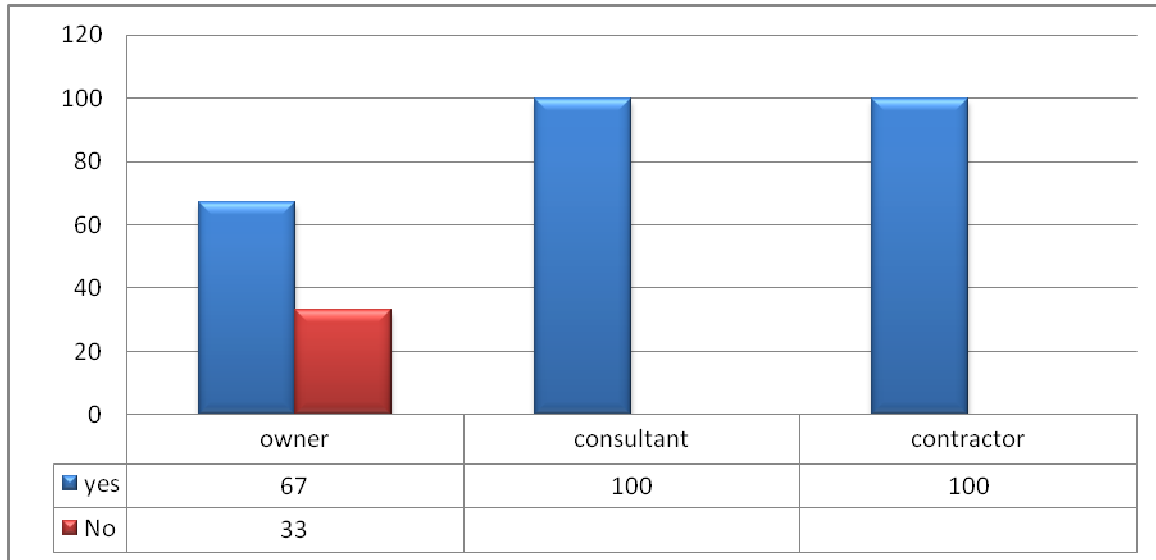
I. No.	Party	Response	%			Remark
			A	B	C	
1	Owner	6	60	25	15	Most of the owners set realistic reference in reference to their business idea and consultants and the owners schedule their base line based on the owner's interest.
2	Consultant	8	76	6	18	
3	Contractor	8	80	6	14	

**Information about day to day progress.**

Item No-	Questions	Response	Respondents		
			In No.	In %	
6	<p>As we all know Information about the day to day progress of projects is very essential for the follow up process, we raise this question to know the system of those stakeholders.</p> <p>The response for this question becomes.</p>				
		A. Contractor	Yes	8	100
			No	0	0
		B. Consultant	Yes	8	100
			No	0	0
		C. Employer	Yes	4	67
No	2		33		

Table 3.5 information of day to day progress analysis.

Fig.3.2 Information about day to day progress analysis .



Most of those who have said yes said us that they get the necessary information through site visit; report from the project and also by communication through telephone and email from their representative.

### Quality control

The intention of this question is to address the mostly used quality control system of material and workmanship.

- A. Laboratory test
- B. Standard technical specification
- C. Visual inspection
- D. Check list

Table 3.6 Quality control analysis.

I.No	Party	Total Response	%				Remark
			A	B	C	D	
1	Owner	6	20	26	50	4	
2	Consultant	8	64	20	8	8	
3	Contractor	8	61	20	12	7	

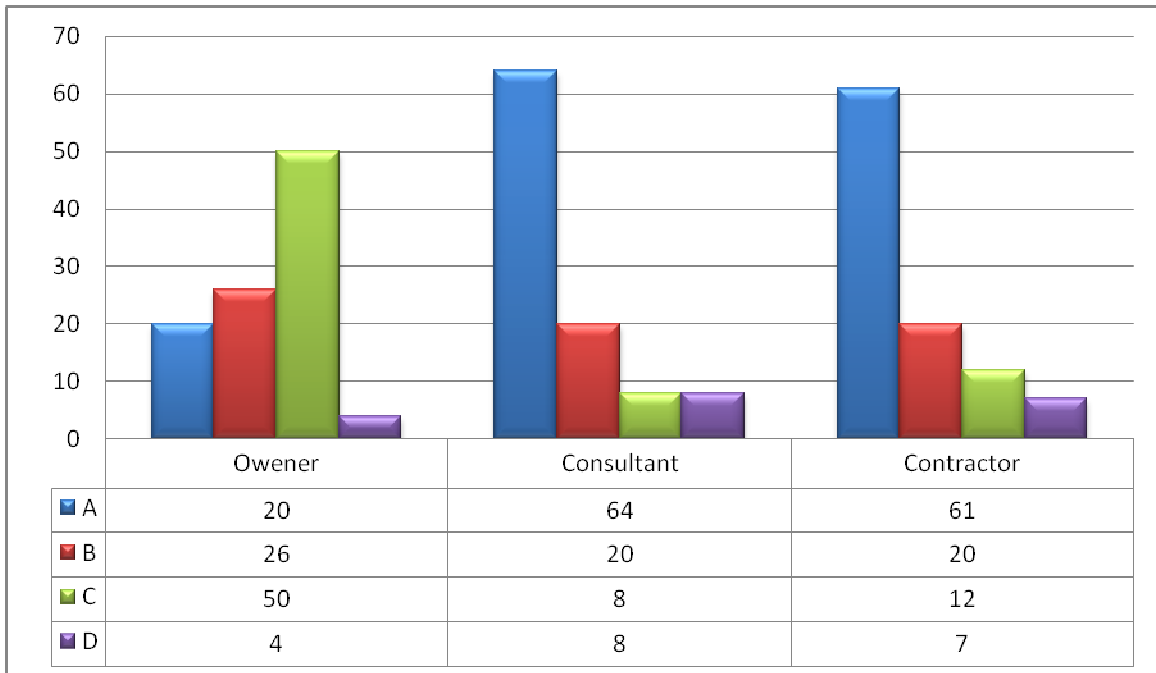


Fig. 3.3 Quality control analysis.

Most of the owner says that, they control the quality of materials and workmanship through visual inspection during their site visit, but the contractor and the consultant since they are governed by the contract document they will follow the standard technical specification, and also it is known that these parties are the project runners hence, we can guess that technical specification and laboratory test are the most frequently used methods rather than visual inspection and check list. Consultants also informed us they usually order laboratory test when they have doubt on the quality.

### **Dispute resolution system**

Construction project needs smooth relationship b/n the stakeholders and peaceful environment for the successful completion of the project hence this part seeks the method used to resolve conflicts.

Ongoing projects are under the law of the country which the project exists since our assessment is on the project at Addis Ababa only serious conflicts b/n the stockholders will be judged by the contractual laws of the project stated on the contract document.

All of our respondents describes that they will handle disputes through negotiation at site and head office level.

**Time, manpower and equipment control**

Table 3.7 Time and resource control analysis

<b>I. No</b>	<b>Title</b>	<b>Analysis description</b>	<b>Target</b>
	<b>Time control</b>	<p>Most of response use checking current activity against the day to day plan to evaluate time progress and rough checking of % age of time and work executed. Some of the response they update their performance plan and check with the current status of activity And least No. of them used to control their time by updating master schedule.</p> <p>But time schedule programs are prepared by the contractor or consultant such as – master schedule work program- bar chart (monthly quarterly updated). In most cases the project owners relate the time progress with business plan and budget timing (For governmental organization).</p> <p>-most of our respondents reply they have faced time delay and describe different reasons such as variations, contractor performance, late requisition and delivery of resource, material approval.</p>	<p>On this section we need to know the current practice of time progress controlling system also there is a related question No. 14 which request wither they have faced time delay. And the cause for it.</p>

	<b>Manpower and Equipment control</b>	<p>For manpower and equipment productivity controlling most of our respondents uses monthly updated man power plan. But only the contractors control the current man power at the project. The consultants and owners do not even check the present man power at the project.</p> <p>Most of our respondents also mention they use MOWUD and some of them use their own labor and equipment productivity standard.</p>	<p>The main idea of this part is to address the current practice of the controlling mechanism and to know the standard often used.</p>
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### Cost control

This question is designed to assess the frequently used cost control system and to check how often they check the variances. If a project is evaluated within short period of time interval, the cost control will be effective and it will be easy to detect the loss or gain of the project at the earliest time.

Question was raised how often they prepare budgeted cost of work schedule, budgeted & actual cost of work performed, cash flow of the project and check the schedule and cost variances of work performed. This question is answered by only by the contractors.

- A. Weekly
- B. Monthly
- C. Quarterly
- D. Annually

Table 3.8 cost control analysis

I. No.	Party	Total Respond	%				Remark
			A	B	C	D	
1	Contractor	8	34	41	15	10	This question is answered only by the contractors.

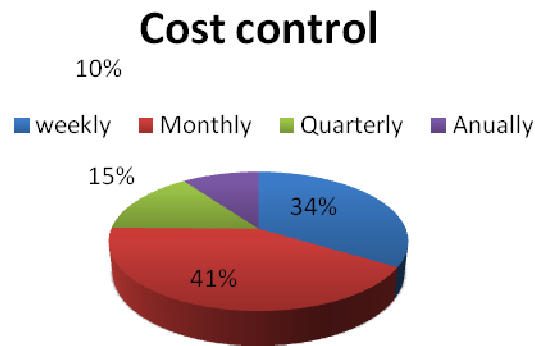


Fig. 3.4 cost control analysis.

The other question tries to address whether they have faced cost overrun and to know the possible causes. This question is responded only by the contractors.

**Discussion:** above 65 % of our respondents respond that they have faced cost overrun but they differ in the cause of the overrun also from these domain most of them agree that the reason for the cost overrun is time delay and defected material usage. But some of them raised different reasons such as let requisition and delivery resource price inflation.

## **Material wastage control**

### **How do you control material wastage problem?**

This question is raised to evaluate the current practice of material utilization and controlling mechanism of wastage of materials. Only contractors have responds this question then their response shows that all of the contractors controls material wastage of materials by avoiding unscheduled request, minimize inefficiency of material usage, by introducing appropriate system of storage and avoid excess quantity of materials estimation.

### **What remedial action do you take to solve the above mentioned problems which are cost overrun, time delay, material wastage, inefficient man power productivity? At head office and project level.**

The intention of this question is to know mode of communication and possible actions to be taken.

## **Discussion**

Most of our respondents are contractors and their response is almost the same as described below.

### **By the head office**

Methods of communication discussed are by feedback from evaluation of periodical reports, arranging periodical meetings and do things which are expected from them such as facilitation of on time delivery of materials and support the project in coordination with the rest stockholders.

### **By the project**

Report timely the compiled data for the concerned, try to work efficiently as much as possible discuss on the problems encountered if any. Keep proper record of the result supported by detail explanation on reasons on improvement or failure.

## **What are the key factors for successful & unsuccessful projects?**

### **Response of Owners and Contractors**

Although owners and contractors may have different perceptions on project management for construction, they have a common interest in creating an environment leading to successful projects in which performance quality, completion time and final costs are within prescribed limits and tolerances. It is interesting therefore to note the opinions of some leading contractors and owners who were interviewed for this study.

From the responses of two contractors, the key factors cited for successful projects are:

- well defined scope
- extensive early planning
- good leadership, management.
- positive client relationship with client involvement
- proper project team detail organization
- quick response to changes
- engineering managers concerned with the total project, not just the engineering elements

Conversely, the key factors cited for unsuccessful projects are:

- poor management
- poor planning
- breakdown in communication between engineering and construction
- unrealistic scope, schedules and budgets
- many changes at various stages of progress
- lack of good project control

The responses of two owners indicated that they did not always understand the concerns of the contractors although they generally agreed with some of the key factors for successful and unsuccessful projects cited by the contractors. The significant findings of the interviews with owners are summarized as follows:

- All owners have the same perception of their own role, but they differ significantly in assuming that role in practice.
- The owners also differ dramatically in the amount of early planning and in providing information in bid packages.
- There is a trend toward breaking a project into several smaller projects as the projects become larger and more complex.
- Most owners recognize the importance of schedule, but they adopt different requirements in controlling the schedule.
- All agree that people are the key to project success.

From the results of these interviews, it is obvious that owners must be more aware and involved in the process in order to generate favorable conditions for successful projects. Design professionals and construction contractors must provide better communication with each other and with the owner in project implementation.

## 4 CONCLUSION AND RECOMMENDATION

### 4.1 Conclusion

- The building construction industry needs to be managed thoroughly due to its wide scope and as it incorporates huge amount of investment. It is mandatory that construction projects should be completed in a certain period of time because of the unique nature of construction projects. As a result of this; the client forced to give the work to well organized contractors. But most this contractors are not familiar with well structured construction project follow up system, Because of these reason, it's obvious that inefficient follow-up system leads to poor quality, conflict, time delay and cost overrun.
- It seems all contractual stake holders have a responsible center to control and follow up progress of projects. But it is not well organized and the communication with the project under execution is unsatisfactory. In addition to this the line of command is not stated clearly.
- There is no clearly defined responsibility and power of this controlling team in connection to the projects.
- The controlling process is going on only on the major and common parameters does not give the necessary attention to some events such as contractual cases which sometimes affect the overall the project progress badly.
- The bench mark for different stakeholders is different the integration power of the stockholders will be very low.
- Evaluating the day to day activities will make the projects alert and it will help to take remedial actions at the earliest time but the day to day information by itself is nothing unless it is evaluated and converted to analysis based on the project objective.

- Time control system in practice seems good but there is always time delay in projects this shows that there is failure to evaluate and implement the evaluation feed back at the project site.
- There are other problems which affect time progress
  - Late material order and delivery
  - Late material approval
  - Inefficiency on man power and equipment productivity
- There is no integrated cost controlling system of the concerned stakeholders.
- The cost controlling system seems to be fair but there is always cost overrun this shows that there is a problem of implementation of the feedback from the evaluation.
- There is unsuccessful material wastage control in most case

#### 4.2 Recommendations

Based on the findings of the survey, the following is recommend to rectify the observed problems related to follow up and monitoring of building construction projects in Addis Ababa.

- Well organized and empowered project follow up team with clearly defined scope, responsibility and duty in addition to this there should be close relation and very frequent communication with the project.
- The controlling should include all aspects which can affect the progress of the project.
- An integrated follow up system should be implemented in coordination with the stakeholders.
- Practicable and valuable feedback should be given to the project at the earliest time since the information communicates to the concerned.
- The implementation of the feedback must be checked at the project, this might be done by periodical meeting or other means.
- There should material wastage control mechanism and the monitor should suggest possible methodologies.

The project should support the follow up system and should contribute something for the successes of the system by:-

- ❖ Use of consistent reporting format
  - ❖ Making up-to-date performance and put new targets.
  - ❖ Periodic review of the schedule based on the productivity achieved
  - ❖ Increase efficiency in project coordination
  - ❖ Measure performance against standards
  - ❖ Increase personal professional skill for their target
  - ❖ Evaluating the performances and taking corrective measures to problems.
  - ❖ Setting important targets and evaluating achievement
  - ❖ Producing quality product and ability to control quality
  - ❖ Using efficient construction method and techniques
  - ❖ Have the perception of minimizing costs and maximizing profit always.
  - ❖ Maintaining smooth and healthy interfaces with consultant and other parties around the project.
- **For resource controlling we propose the following evaluating format which can be used in parallel to the other system**

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## Appendices

### Appendix I

#### Construction Technology and Management

Faculty of Technology

Addis Ababa University

#### *Research Questionnaire*

The final year students of this academic year, 2010 are conducting research on “*Project follow up system in Addis Ababa Building Projects*”

To achieve this, you can help the research by providing information through completing the following form. Filling out the form may take you few minutes. Your input will help us to serve you and other professionals involved in the construction industry better.

You are NOT expected to write your Name. All of your suggestions are to be kept CONFIDENTIAL.

Thank you in advance for giving us your time to fill this Questionnaire

#### 1) Type of organization

Employer  Contractor  Consultant

If other (please specify) \_\_\_\_\_

2) In your organization do you have a responsible center to follow up over all the project progress? If yes or No explain how it works?

Yes

No

3) Describe your organizational structure at Head Office and project level

4) Do you set parameters to be controlled at the project under your organization? If yes please list them

Yes

No

5) How do you establish bench mark to measure performance?

- From schedule
- From other projects performance
- From standards

If Any other

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6) Do you always get information about the day to day progress of your projects? If yes explain how?

No

Yes

No

- Through site visit
- Report from project
- Communication through telephone, email...

If any other

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7) What system do you apply the quality control of material and workmanship?

- Laboratory test, on site test
- Standard technical specification
- Visual inspection
- Check list

Any other method

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8) How do you manage (solve) if there is conflict between consultant and contractor, contractor and

Employer, Employer and consultant?

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9. Time control

a. How do you control time progress of your projects?

- By measuring the progress of current activity and checking against the day today plan
- By updating performance plans and check the current time is going parallel

or not.

Updating the project master schedule. And check all activities against it

If Any other \_\_\_\_\_

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**b. which work programmed was prepared for the project time control**

Project master work schedule

Project quarterly bar chart work programmed

Monthly bar chart work programmed

Frequently updated project master schedule

Frequently updated quality bar chart work programmed

Frequently updated monthly bar chart work programmed

C) IS there time delay of the project?

Yes

No

What was the reason for time delay?

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10) Man power controlling

a. Which of the manpower schedule was prepared?

Project master manpower schedule

Project quarterly man power schedule

Monthly man power schedule

Updated man power schedule

b. Do you have man power productivity standard? If yes please specify

Yes

No

International standard

National standards

Owen standards

Any other method \_\_\_\_\_

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### 12) Equipment Control

a) Which of the equipments schedule was prepared for the project?

Project master schedule of equipment

Project quarterly equipment plan

Project monthly plan

b. Do you have equipment organization plan for the project?

Yes

No

c. Do you have equipment productivity control standard? Which one do you use?

Yes

No

International standard

National standard

Owen standards

If any other method \_\_\_\_\_

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### 13) Cost control

a) Do you prepare the budgeted cost of work schedule? If yes how often?

Yes

No

Weekly  Monthly  Quarterly  Yearly

b) Do you amend the cash flow for the project? If yes How often

Yes

No

Weekly  Monthly  Quarterly  Yearly

a) Do you prepare budgeted cost of work performed? If yes how often?

e)  Weekly  Monthly  Quarterly  Yearly

**d. Do you** prepare the actual cost of work performed? If yes how often

Yes  No

Weekly  Monthly  Quarterly  Yearly

e) Do you check the schedule variances for the given project if yes? How often?

Yes  No

Weekly  Monthly  Quarterly  Yearly

F) Was there cost overrun in your projects.

Yes  No

G) What was the possible cause of cost over run?

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**14) How do you control material wastage problems?**

- Avoid or minimize unscheduled request of martial
- Avoid wastage occurring as a result of negligence, inefficiency, lack of follow up
- Introduce appropriate system for handling & storage to protect from damage
- Avoid excess quantity estimation

**If any specify**

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15) What is the remedial measure for the above problems which are cost overrun, time delay, material wastage? From head office and project level.

- Increase the efficiency of supply & delivery process

- Increase efficiency in project coordination
- Pre scheduling of material requirement at the projec

If any other

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16) What are the key factors for successful project are?

- Well defined progress
- Quick response to change
- Positive client relationship

17) What are the key factors for unsuccessful project are?

- Poor management
  
- Poor planning
  
- Many changes at various stages of progress
  
- Lack of good project control