



**ST. MARY'S UNIVERSITY  
SCHOOL OF GRADUATE STUDIES  
MASTERS OF BUSINESS ADMINISTRATION IN  
PROJECT MANAGEMENT**

**ASSESSMENT OF QUALITY MANAGEMENT  
PRACTICES OF GRADE ONE BUILDING  
CONTRACTORS IN ADDIS ABABA**

**BY  
AZEB FISSEHA**

**JULY, 2021  
ADDIS ABABA, ETHIOPIA**

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**ID NUMBER: -SGS/0548/2011A**

**A THESIS SUBMITTED TO ST. MARY'S UNIVERSITY,  
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## DECLARATION

I, the undersigned, declare that this thesis is my original work; prepared under the guidance of Dr. Ababaw Gualu. All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

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July, 2021

## ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

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July, 2021

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## **List of Abbreviations and Acronyms**

<b>ISO</b>	International Organization for Standardization
<b>PM</b>	Project management
<b>PDCA</b>	Plan-Do-Check-Act
<b>PMBOK</b>	Project Management Body of Knowledge
<b>PMI</b>	Project Management Institute
<b>EQA</b>	Ethiopian Quality Award
<b>QA</b>	Quality Assurance
<b>QC</b>	Quality Control
<b>QIP</b>	Quality Improvement program
<b>QMP</b>	Quality Management Practice
<b>QMS</b>	Quality Management System
<b>QS</b>	Quality System
<b>RII</b>	Relative Important Index
<b>TQM</b>	Total Quality Management

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***Abstract***

*Quality Management has increasingly been adopted by construction companies as an initiative to solve quality problems and to meet the needs of the final customer. This research deals with the assessment of quality Management practices of grade one building contractors registered in Addis Ababa and renew their licenses. The objectives of the research were to investigate how the concept of quality and quality management is adopted in the construction process to identify grade one contractor's quality management practice and to propose measures for effective quality management practice.*

*Different literatures were assessed to show the concept of quality and quality management in the construction industry and the factors that affect quality management practices. Those issues were also assessed in Ethiopia situation by using interview and questionnaire. The interview was conducted with different professionals in order to help the questionnaire design. The questionnaire survey was performed on different selected Ethiopian contractors to assess their practices. A total of sixty-four questionnaire survey was distributed to different selected Ethiopian contractors. A total of fifty two questionnaire survey was returned 52 (81 %) from different selected Ethiopian contractors. In order to determine and rank the quality awareness and implementation level in building construction projects use relative importance index method (RII).*

*The research finding indicated that most respondents were familiar with the concepts of quality and quality management but its application was relatively low. The majority of the contractors, (40%) don't implement quality management system in their company and also Labors & Design related issues are the most important factors to reduce the quality problem issues in Ethiopia building construction projects. Finally based on the findings and results some recommendations were given.*

**Keywords:** *Construction industry, Execution stage, Practices, Quality management, Success factors.*

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1. Background of the study**

Project management and implementation focuses on three basic parameters: Quality, cost and time. Best quality, time and costs are the important aspects to successfully managed construction project. Qualities are one of the critical factors in the success of construction projects. Project success with quality of construction projects can be considered as the fulfillment of expectations (i.e. the satisfaction) of the project participants (i.e. client, consultants and building contractor). In Ethiopia construction industry quality issues has been struggling for many years. For infrastructure and other development projects a significant amount of the budget is spent each year. Since the quality outcomes of the projects are not according to the required standards this leads to faulty construction. Consequently additional investments are required for removal of defects and maintenance work. In construction project it have different phases goes through in its life span. These phases can be described as: conceptual planning, feasibility study, design, procurement, construction, acceptance, operation and maintenance (PMI, 2008).

The quality management concept is to ensure efforts to achieve the required level of quality for the product which are well planned and organized. From the construction company perspective in the construction projects, quality management should maintain the quality of construction works at the required standard so help to get customers' satisfaction that would bring business survival for the companies and long term competitiveness (Juran, 1999).

In Construction Company to sustain the current construction market which is highly challenging and competitive matter so quality management is critically required. Quality management has to give the environment related tools, techniques and procedures can effectively leading to operational success for a company (Ashokkumer, 3(1),36-43).

Based on the Ethiopian Quality Award (EQA) self-assessment model, quality management practice in Ethiopian manufacturing and service industries was found to be poor. (Kitaw, 2014). A study by (Beshah, 2011) identified that quality management was the cause for many Ethiopian industries for their weak performances and low competitiveness in the global market. One of the

industries in this research was the building construction sector. (Ayalew, 2016) noted from a study in the UK that the quality management practice in Ethiopia is even far behind from those poor performing developing countries in Africa. This brings our attention to the level of quality management practices in our current building constructions.

Addis Ababa is official diplomatic capital of Africa and the capital city of Ethiopia .In the city there are different building construction projects, Most of higher building projects constructed by grade one building contractors because grade one building contractors are the biggest construction contractors classification in Ethiopia qualified to undertake construction of building. Building construction companies in Addis Ababa do not regard quality management practices as a critical success factor. The important critical success factors will have direct impact on a construction project. Therefore these studies were focused on the Practice of QMS in Building construction activities and try to reveal the existing situation regarding too it's the practice and implementation in the building construction project.

### **1.2. Statement of the problem**

In Ethiopia, construction industry plays an essential role in socio-economic development of the country (Tekelebrhan, 2014). However, as indicated by (Garomsa, 2019), the current management practice in the Ethiopian building construction projects is more conventional and the industry is still facing delays, cost overruns and poor quality. In Ethiopia construction industry has been struggling with quality issues for many years.

Based on the Ethiopian Quality Award (EQA) self-assessment model, quality management practice in Ethiopian manufacturing and service industries was found to be poor. (Kitaw, 2014).

A study by (Beshah, 2011) identified that quality management was the cause for many Ethiopian industries for their weak performances and low competitiveness in the global market. One of the industries in this research was the building construction sector. (Ayalew, 2016) Noted from a study in the UK that the quality management practice in Ethiopia is even far behind from those poor performing developing countries in Africa. This brings our attention to the level of quality management practices in our current building constructions. Building construction companies in Addis Ababa do not regard quality management practices as a critical success factor. The important critical success factors will have direct impact on a construction project. All industries



nowadays are dynamic and the construction industry is not excluded. Within quality management efforts, modern organizations pay more attention to improving the quality planning process. However, construction contractors in developing countries still lag in their practice of effective quality planning. (Jayarathna, 2012).

The research will intends to analyze the construction sector's activities regarding quality by using existing quality management systems. In addition, the lack of quality due to deficient construction quality management is detected through non-conformance to established requirements. (Yimam Abadir H., 2011) In construction, non-conformance occurs when the finished state of a project and its components deviates from the established requirements and also non-conformance occurs because of time and cost of a project if it's not managed properly. During construction phase Quality-related problems can be projected on the operating life of the finished project. To a contractor, non-conformance can yield penalties as well as cost time burdens for re-work, which can convert into productivity loss.

In the Ethiopian construction firms there is a lot of mismanagement that results in unsatisfied customers due to the delay of delivery of project. This could be as a result of highly discouraged employees due to late payments, miscommunications and so on. Because the construction projects are poorly managed, the top management is witnessing the effect as clients leave to another company. This eventually will cause the decrease in firm performance.

In the Addis Ababa city there are different building construction projects, Most of higher building projects constructed by grade one building contractors because grade one building contractors are the biggest construction contractors classification in Ethiopia qualified to undertake construction of building. This research is focus to grade one building construction companies helps to know the level of their implementation of QMS, to identify their gap and to understand what they have to do in the future. Most of contractors focus on only the completion of work , this research would have be conducted and shows the existing gaps, the problem in the area would be left unanswered for a while and able to identify the root cause of the ineffectiveness in their implementation of the QMS. The findings of this study are also expected to guide them and show proper direction on how they can effectively practice the implemented QMS in their overall activities. Therefore this research will intends to analyze mostly challenging the quality management system during the construction phase and investigating how

the concept of quality and quality management are adopted in the building construction projects and offer some recommendations where appropriate.

### **1.3. Research Questions**

- How Could Expressed quality management system in the grade one BC contractors?
- To what extent the objectives of quality adopted in the grade one BC contractors?
- What is the main quality management practices implemented in the grade one BC contractor?
- What are the challenges that may face the quality of construction projects during construction phase?

### **1.4. Objective of the study**

#### **1.4.1. General Objective**

- To study quality management practice of Grade one Building contractors in Addis Ababa.

#### **1.4.2. Specific Objectives**

- To identify major challenges faced by the quality of building construction during the construction phase.
- To know how the objective of quality and quality management are adopted in the grade one BC contractor.
- To know the level of practicing quality management system in the grade one BC contractors.
- To propose measures for effective quality management practices in Ethiopia building construction.

### **1.5. Significance of the study**

The important of the study was expressed in the following ways. First, it may benefit the different stakeholders involving in construction projects in general and particularly for new building construction projects related to quality and quality management system. Second, it helps

grade one building contractors to know the causes and effects of quality and quality management system in building construction projects and the thirdly to take remedial measures to prevent the occurrence of the problems. And finally, serves as a benchmark for further studies.

### 1.6. Scope of the study

Due to different constraints the study was limited both in scope and depth.

**Geographical scope:** Geographically the research is limited to Grade one building contractors in the building construction projects in Addis Ababa city only.

**Sectoral Scope:** There are various sectors in Construction industry such as road, water works and bridge that are managed by different government offices. Hence sectoral scope of this research is building construction project.

**Project stage scope:** Quality Management practice of construction project can be assessed at different stages of projects relating to the objectives of stakeholders particular to the stage. Each stages has its own deliverables that can be reviewed whether the stage's goal is attained or not by using various performance measurement parameters. Therefore, project stage scope of the research is limited to construction stage of the project

Accordingly, the study was intends to assess the quality management practices in the building construction project of grade one building contractors limited to Addis Ababa city only. The main reasons beyond these limitations are the numbers of contractors in the country are a lot, so it's very important to take representatives sample to assess in time.

### 1.7. Structure of Research

The research was consists of five main chapters as follows:

1. Chapter one: Introduction: this chapter shows background of the study, statement of the problem, research questions, objectives of the study, hypothesis (if any), definition of terms, significance of the study, and scope of the study.

2. Chapter two: Literature review: this chapter shows a detail review from concepts and definitions to identify the main factors affecting the quality and quality management system in Building construction projects.
3. Chapter three: Research methodology: this chapter shows the methodology used in this research in order to achieve the required objectives and to answer the research questions.
4. Chapter four: Result analysis and discussions: this chapter shows result, description and discussion of research results.
5. Chapter five: Conclusions and recommendations.

## CHAPTER TWO

### REVIEW OF RELATED LITERATURE

#### Introduction

This section covers review literature of different scholars and authors that have been reviewed in the area of Quality management with special focus on Quality management Practice. It deals with both theoretical and practical findings of various researchers concepts related to Quality, Quality management, quality management process, Total quality management system, quality management implementation and management challenges. It deals with the review of related literature gathered from different secondary sources such as published books, articles and related websites. In this regard, efforts were exerted to include as much significantly related literatures as possible by reviewing available documents that exhibits points, targeting at the attainment of the research objectives.

#### 2. Theoretical Literature Review

##### 2.1. Definitions and Concepts

Before we study the subject of quality, we must be clearly known about what we mean by the term “quality”. Quality has been defined from various perspectives (vincent o, 1995); define quality as the integration of all functions and processes to achieve continuous improvement of the quality of goods and services to meet customer satisfaction. According to Shen Quality as satisfying customers’ requirements and expectations, and it is the customer who eventually judges the quality of a product (Shen, 2000) . Moreover, the definition for quality is manifested in different ways as conformance to requirements (Crosby’s definition) where the lack of not meeting “zero defects” in production will be the cost of non-conformance.

The quality management concept is to achieve the required level of quality for the product which is well planned and organized. According to (Tan, 2005), In construction projects quality management should maintain the quality of construction works at the required standard helps to obtain customers’ satisfaction that would bring long term competitiveness and business survival

for the companies. For construction firm Quality management is required to sustain itself in the current construction market which is highly challenging and competitive.

In building construction projects in Ethiopia Quality is an important issue. All construction projects the main objectives is to finish the construction within the estimated budget, time and according to the quality requirements. The owner has right to ask for rework when the executed job is not complying with the agreed quality standards. But if not clearly defined the required quality standards in the contract agreement, the client might overstate the quality requirement which will create problems with the contractor.

### **2.2. Overview of Quality management**

Many authors characterized Quality as something that relates to the results of an ongoing improvement that includes services, products, processes and people to fulfill customer expectations and customer satisfaction. Quality management is can be define as the act of overseeing different activities and tasks within an organization to make sure that products and services are obtainable, as well as the means used to achieve them are consistent. According to Crawford the overall aim of quality management is to satisfy the customer, conform to requirements, ensure fitness for purpose, and to ensure the product for use. Project model looks at quality management as set of activities or tasks that are required to ensure the project satisfies all the needs for which it was undertaken based on documented in the state of work and includes a focus on quality management from the perspective of product, processes, and the people needed to make quality as successful project completion with effective and efficient aspect (Crawford, 2002).

Moreover, Wysocki in his effective project management book states that: A sound quality management programs with processes prepared that monitor the work in a project is a good investment. He described that quality management programs is not only contributes to customer satisfaction but also it gives to help organizations use their resources more effectively and efficiently by reducing waste and rework. He additional described “Quality management is one area that should not be compromised. The payoff is a higher probability of successfully completing the project and satisfying the customer”(Wysocki, 2014).

### 2.2.1. Quality planning

(Harris & Macaffer, 2001) Defined quality planning as a set of activities whose purpose is to define quality system policies, objectives, and requirements, and to explain how to apply these policies, how to achieve these objectives, and how to meet these requirements.

Quality management Planning is the method of identifying quality requirements and/or standards for the project, and documenting how the project will demonstrate compliance with relevant quality requirements. Providing guidance and direction on how quality will be managed and validated throughout the project is the key benefit of Quality management planning. Quality plan should include;

- Quality policy statement (vision and mission)
- Project quality structure and quality management system
- Quality objective
- Rectification of defects and prevention of future problems

The Project Management Book of Knowledge“PMBOK”also addressed quality planning from a different position to enhance the thoughts earlier expressed. The Project Management Book of Knowledge believed that quality planning has a process input generated by predecessor processes referred to as the project scope statement and project management plan. The processes are introduced by external units like enterprise environmental factors and organizational process assets. Additionally defined quality planning as the process for "identifying which quality standards are relevant to a project and determining how to satisfy them": "Quality is the degree to which a set of inherent characteristics fulfill requirements". By planning the quality one has to respect some principles, and these are:

- ***Customer’s (i.e. client or its representative) satisfaction comes first:*** Quality is defined by the requirements of the client (i.e. Client or his representative who have enough knowledge about the requirements).
- ***Prevention over inspection:*** To inspect the result and repair the defects it's better to avoid mistakes.
- ***Management responsibility:*** The Management must be approved Costs of quality.
- ***Continuous improvement:*** Becoming improved is an iteratively structured process.

### **2.2.2. Quality Assurance**

(Harris & Macaffer, 2001) Defined quality assurance as a set of activities whose purpose is to demonstrate that an entity meets all quality requirements. Motivate the confidence of both customers and managers, confidence that all quality requirements are being met are in order to approve Quality assurance activities. Moreover, the main objective of quality assurance measures in information processes is to fulfill a required quality level(Harris & Macaffer, 2001).

Quality assurance starts with customer satisfaction. One of the key elements in total quality management (TQM) is Customer satisfaction, an approach that emphasizes overall satisfaction through the continuous improvement of products. In general quality assurance is a process to provide confirmation based on evidence to ensure to the donor, beneficiaries, organization management and other stakeholders that product meet needs, expectations, and other requirements. It assures the existence and effectiveness of process and procedures tools, and safeguards are in place to be confident that the expected levels of quality will be reached to produce quality outputs. Therefore, quality assurance occurs during the implementation phase of the project and includes the evaluation of the overall performance of the project on a regular basis to make sure that the project will satisfy the quality standards defined by the project.

(Chung H.W, 1999)Define basic concept of quality assurance that Consistent quality can only be achieved when such avoidable mistakes are avoided in the first instance. To minimize the risk of managerial and communication problems Preventive measures must be taken.

The performance of an individual in an organization could directly or indirectly affect the quality of their finished product. Responsibility for quality gives from the chief executive to the person-on-the-job. If consistent quality is to be assured, all staff in the organization, both in the head office and on site must to practice quality assurance, an organization has to establish and maintain a quality management system in its day-to-day operation.

A quality system contains a set of documented procedures for the various processes carried out by the organization. Implementing a quality management system does not replace the existing quality control functions, nor does it result in more inspection and testing; it just ensures that when and where it is planned to be done performed by the appropriate type and amount of verification.



According to,(Tekelebrhan, 2014) quality assurance is oriented towards prevention of quality deficiencies. It goals to minimizing the risk of making mistakes in the first place, thus avoiding the necessity for rework, repair or reject.

Evaluating overall project perform on a regular basis to provide confidence that the project will satisfy the relevant quality standards (Lakshmi, 2015).

**1. INPUTS:** Quality management plan, result of quality control measurements, operational definitions

**2. TOOLS AND TECH.:** Quality planning tools and techniques, quality audits

**3. OUTPUTS:** Quality improvement

### **2.2.3. Quality Control**

Quality control is the method of monitoring specific project results to determine if they convey with relevant standards and identifies different methods to eliminate the causes for the unsatisfactory performance. It is the procedure of techniques and activities that compare actual quality performance with goals and define appropriate action in response to a shortfall. Improve quality and monitoring the project outputs used to determine if they meet the quality standards or definitions based on the project stakeholder's expectations is the goal of quality control.

Refers to the PMBOK quality control as the technical aspect of quality management, in quality control system Project team members have specific technical expertise on the various aspects of the project play an active role. Project team members are set up the technical processes and procedures that ensure that each step of the project provides a quality output from design to development through implementation and maintenance. In each step's output must conform to the overall quality standards and quality plans, thus ensuring that quality is achieved (PMI, 2008).In the construction industry Quality control will play an incomparable role. The important of monitoring specific project results are to determine if they comply with relevant quality standards and identifying ways to eliminate cause of unsatisfied performance contract documents comprise a clear, complete, and accurate description of the facility to be constructed, correctly conveying the intent of the owner regarding the characteristics of the facility needed to serve his or her purposes.

There are many factors affecting the quality of construction in the construction projects, such as design, materials, machinery, topography, geology, hydrology and meteorology, construction technology, methods of operation, technical measures, and management systems and so on. Construction companies must follow to the principle of quality first, and sustain on quality standards, to provide more high quality, safe, suitable, and economic composite products.

Harold (2003) stated that a good quality control system will; “Select what to control, set standards that provide the basis for decisions regarding possible corrective action, establish the measurement methods used, compare the actual results to the quality standards, act to bring nonconforming processes and material back to the standard based on the information collected, monitor and calibrate measuring devices and include detailed documentation for all processes” (Harold, 2003). Similarly Juran quality control relies on five basics: a clear definition of quality; a target, a clear goal; a sensor, a way to measure actual performance; a way to interpret the measurement and compare with the target; and a way to take action, to adjust the process if necessary (Juran, 1999).

The facility is constructed in accordance with those documents (Lakshmi, 2015).

1. **INPUTS;** quality management plan, operational definitions, checklists, Work results
- 2- **TOOLS AND TECH.;** **Inspection**, trend analysis, control charts, statistical sampling,pareto diagrams, flow charting
- 3- **OUTPUTS;** **Quality** improvement, completed checklist process adjustment, acceptance decisions, rework

### 2.3. Quality Management System

Quality management (QM) focuses not only on the quality of the product but also on the means to achieve it. It is centered on the following four activities: quality planning, quality control, quality assurance and quality improvement.

Quality management system can be defined as managing structure, responsibilities, procedures, processes, and management resources to implement the principles and action lines needed to achieve the quality objectives of an organization. Quality in the construction industry is linked

with client's satisfaction and the implementation of a Quality management system. Quality management system is a key tool in consistently and reliably managing the goal of client satisfaction. A good QMS will Set direction and meet customers' expectations, Improve process control, Reduce wastage, Lower costs, Increase market share, Facilitate training, Involve staff, Raise morale etc.

### **2.3.1. Quality Management in Construction**

The construction industry development depends on the quality of construction projects. In the Success of construction projects quality is one of the critical factors. In the project life cycle quality of construction projects improvement is linked with quality management. Although quality management at every stage of project life cycle is important but the quality management at the execution (construction) stage contributes significantly on final quality outcome of construction projects. (Ashokkumar, 2014)

For Rumane, construction project quality management is defined as the fulfillment of owner's needs per defined scope of works within a budget and specified schedule to satisfy the owner's / user's requirements. The phenomenon of these three components (Scope, Budget & Time) can be the construction project trilogy(Rumane, 2011). Construction projects are custom oriented and custom designed, it have specific requirements set by the customer to be completed within a finite duration and assigned budget. Every project has elements that are unique that means no two projects are identical. Always the owner's accept that his project be unique and better. To some extent, each project has to be designed and built to serve a specified need. Construction projects are more customized than a routine and repetitive business (Rumane, 2011).

### **2.3.2. Quality Plan in Construction Project**

According to Chung typical quality plan contains most, if not all, of the following: (Chung, 1999: 45).

- brief description of project;
- list of contract documents and drawings;
- project quality objectives;
- site organization chart;

- responsibilities and authorities of project staff;
- site layout plan;
- construction programmed and sub-programmed;
- schedules of subcontractor nomination, material and equipment
- procurement, based on the construction programmed;
- list(s) of materials and appliances used for the project,
- inspection and test plans;
- list of quality procedures and work instructions applicable to project;
- list of project-specific procedures, work instructions and inspection
- checklists, or target dates for their provision;
- list of quality records to be kept, including pertinent quality records from subcontractors;
- frequency (or provisional dates if possible) of internal quality audits;
- Frequency of updating the quality plan.

### **2.3.3. Quality Assurance in Construction Project**

Quality assurance defined as “is oriented towards prevention of quality deficiencies. It aims at minimizing the risk of making mistakes in the first place, thereby avoiding the necessity for rework, repair or reject” (Chung H.W, 1999). He also stated factors that staffs at organizational levels must know, these are; to have appropriate organization structure, clear lines of responsibility and communication, clear definition and description of duties, correct specifications and drawings, proper training, appropriate procedures, and ready access to necessary instructions, motivation, have the right resources, plant and materials; appropriate checking, measurement or testing of products and keeping proper records (Chung H.W, 1999).

Spread of the concepts to conventional types of construction has been gradual but slow. This is because the product of construction is in a sense always unique, unlike consumer goods which are repetitive in nature.

### **2.3.4. Quality Control in Construction Project**

A good quality control system should have the to consider; select what to control, set standards that provide the basis for decisions regarding possible corrective action, establish the measurement methods used, compare the actual results to the quality standards, act to bring nonconforming processes and material back to the standard based on the information collected, monitor and standardize measuring devices, include detailed documentation for all processes (Chung H.W, 1999).

Quality control in construction is the process of verifying that the project is built to plan, that the tolerances allowable by industry standard and engineering practices have been met and that the finished project meets with quality standards of the project as inspected by the involved stakeholder.

### **2.4. Total quality management in construction industry**

Total Quality Management (TQM) is a comprehensive and structured approach to organizational management to improve the quality of products and services through ongoing refinements in response to continuous feedback.

The main principles of the TQM concept are to achieve customer satisfaction and this is an important objective for any organization, including construction firms. However, the implementation of TQM might differ from one industry to another, while the construction industry differs from the manufacturing industry in implementation of TQM .The manufacturing industry is characterized by steady-state processes; the construction industry is usually a onetime process (uniqueness). Construction industry is also unique to manufacturing industry in the following ways: (1) the mobility of staff; (2) diversity in the types, forms, and shapes of construction projects; (3) geographical dispersion; (4) the contractual relationships; and (5) frequent prototyping of projects.

The two aspects of quality management are quality assurance and quality control. While some quality assurance and quality control activities are interrelated, the two are defined differently.

According to ISO 9000:2015: Quality management systems:-

- **Quality assurance** consists of that “part of quality management focused on providing confidence that quality requirements will be fulfilled.” The confidence provided by quality assurance is twofold—internally to management and externally to customers, government agencies, regulators, certifiers, and third parties.
- **Quality control** is that “part of quality management focused on fulfilling quality requirements.” While quality assurance relates to how a process is performed or how a product is made, quality control is more the inspection aspect of quality management.

Inspection is the process of measuring, examining, and testing to measure one or more characteristics of a product or service and the comparison of these with specified requirements to determine conformity. Differences between QC, QA and TQM are quality assurance is process oriented and focuses on defect prevention, while quality control is product oriented and focuses on defect identification. QA and QC are applied during implementation of project while TQM is a strategic philosophy adopted by an organization and implemented on a continuous basis, even if the organization is waiting to perform a new project.

### **2.4.1. Critical success factors in TQM**

#### **2.4.1.1. Customer Focus**

In the TQM philosophy, total customer satisfaction is the goal of entire system, and in general customer focus is what gets us there. The purpose of the construction industry is to provide customers with facilities that meet their needs. For a company to remain in business this service be provided at a competitive cost. TQM is effectively determines the needs of the customer and provides the framework, environment, and culture for meeting those needs at the lowest possible cost. The quality of the final products should satisfy the final customer by ensuring quality at each stage in the construction process, and thereby minimizing costly rework& other costs.

#### **2.4.1.2 Process Improvement**

A process consists of the tasks, procedures and policies necessary to satisfy an internal or external customer need. According to the TQM philosophy if the process is correct, so will be the end result (product). The organization should work to improve the process so as to improve

the end product or service. Three different approaches have emerged for improving the efficiency or effectiveness of a process. Continuous improvement is an approach used on an ongoing basis for incremental gains. Benchmarking should be used periodically, and reengineering can be launched occasionally to achieve dramatic breakthrough.

### 2.4.1.3 Continuous Improvements

According to the TQM philosophy the goal of continuous improvement is specifies a specific step-by-step process to achieve. This process consists of nine steps as below: Identify the process, organize a multi-disciplinary team to study the process and recommend improvements, define areas where data is needed, and collect data on the process, analyze the collected data and brainstorm for improvement, determine recommendations and methods of implementation, implement the recommendations outlined in step six, collect new data on the process after the proposed changes have been implemented to verify their effectiveness, and circle back to step five and again analyze the data and brainstorm for further improvement.

The nine-step cycle emphasizes on: focusing on the progress, measuring the process, brainstorming for improvement and verification and re-measurement. These four elements are further illustrated in Deming's Plan-Do-Check-Action (PDCA) diagram as shown in Fig. 2.1. The PDCA diagram stresses removing the root cause of problems and continually establishing and revising new standards or goals (Deming, 1990).

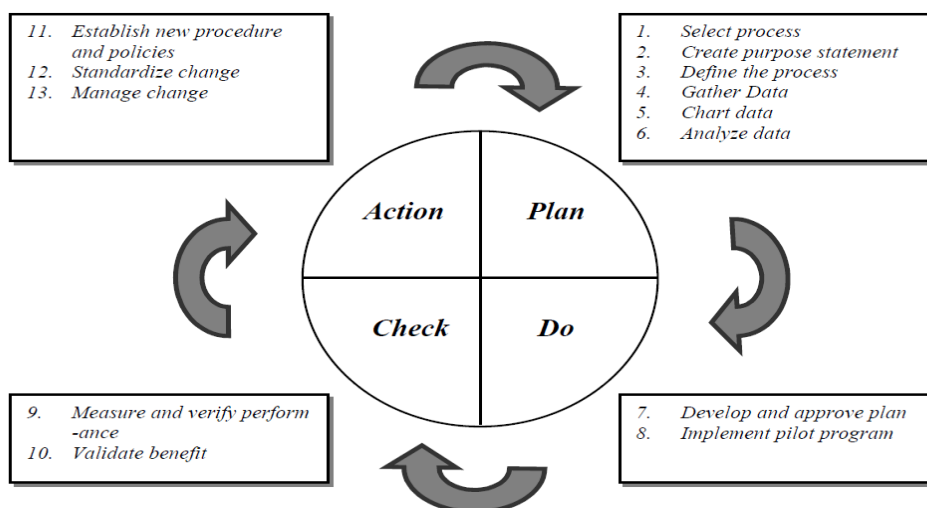


Figure 2.1 The PDCA Diagram (Deming, 1990)

### PDCA-cycle

PDCA-cycle is an important mindset of quality management. The model provides a framework for the improvement of a process. This cycle including the four components as Plan, Do, Check and Act (PDCA), was originally conceived by Walter Shewhart in the 1930`s, and later adopted by W. Edward Deming.

- **Plan:** Establish objectives and processes necessary to deliver results in accordance to specification
- **Do:** implementation of processes
- **Check:** Monitor and evaluate processes and results against objectives and specifications
- **Act:** Take actions to the outcome for necessary improvement (e.g. improve, standardize)

### 2.5. An ISO 9001 Quality Management System

The International Standard requirements are generic and are intended to be applicable to all organizations, regardless of type, size and product provided. According to ISO, the certification process is expected to provide confidence that the organization has a quality management system that conforms to the applicable requirements of ISO 9001. In particular, it is expected that the organization:

- Ensures that product characteristics have been specified in order to meet customers' and statutory/regulatory requirements;
- Analyses and understands customer needs and expectations, as well as the relevant statutory and regulatory requirements related to its products;
- Has established a quality management system that is suitable for its products and processes, and appropriate for its certification scope;
- Has determined and manages the processes needed to achieve the expected outcomes (conforming products and enhanced customer satisfaction);
- Has ensured the availability of resources necessary to support the operation and monitoring of these processes;
- Monitors and controls the defined product characteristics;



### 2.5.1. ISO 9001 QMS in Ethiopian Construction Industry

In Ethiopian Construction Companies main challenges faced during implementation of QMS are Resistance of changes by staff i.e. unwillingness of the staff to implement QMS is the main challenge. Convincing the workers to follow the procedures to implement the system at project site level was difficult. This challenge has happened due to the reason that some employees were not willing to divert from their previous tradition. Especially Engineers are more change resistant than other professionals. Most companies QMS is not implemented as per the manual i.e. the company staff are not using formats and work instructions properly and not following determined process as per QMS requirement. Some staffs could not use and keep the formats and documents" identification number and sometimes also prefer to use formats which are redundant. Generally there is lack of consistency in level of awareness of ISO 9001 among the staff when starting implementation.

However, (Yimam Abadir H., 2011)in his MSc thesis, entitled "Project management maturity in the construction industry of developing countries: the case of Ethiopian contractors," has indicated that ISO 9001 certified or in process to get certified are found to be at relatively higher project management maturity level than the uncertified contractors and not in process to get certified. Additionally in his study of maturity of project quality management of Ethiopian grade 1 contractors identified that about 43% of the contractors perform no quality management; the other 24% perform only 2 out of 3 quality management processes that are expected to be performed to achieve the goal of project quality management. The rest 33% of the contractors perform quality management formally or at higher process maturity level.

### 2.6. Benefits of QMS

Implement quality management systems successful can contribute to an increase in product quality, improvements in workmanship and efficiency, a decrease in wastage, and increased profit. An external quality system help to inspiring confidence in the client that the supplier's quality system will provide a product or service that will satisfy the client's quality requirements. Adequate implementation of QMS brings the following for an organization.

- Improved customer satisfaction;
- Improve relations with suppliers;
- Improved promotion of corporate image

- Improved quality of products and services;
- Improve process interfaces and internal communication;
- Improve staff involvement by identifying the role of their output to involving them in the review and improvement of their work.
- Better management and a more effective organization;
- Review the organizational structure, clarifying managerial responsibilities;
- Identify processes that are unnecessary or inefficient, and then remove or improve them;
- To review business goals, and assess how well the organization is meeting those goals;

### **2.7. Adoption of Quality Management in the Construction Industry**

Project design and construction planning are carried out based upon a standard derived from relevant codes, owner requirements, and design company standard practice. This composite standard as interpreted by the contractor. Quality assurance usually occurs after completion, and in some cases, after partial compensation. This process results in the following trends.

- Quality is designed and evaluated individual project each time.
- No feedback system exists for reexamining quality control work. May be Correction only occurs.
- Correction of unacceptable work is hided.
- No mechanism exists for practical implementation of standards.
- No system exists to manage quality throughout the design/construction process.

In construction, failure can result on the part of constructor, designer, or even owner. In most cases the result of a combination of actions by several or all of these parties. The quality management organization must have the ability to deal effectively with all parties involved. The following are characteristics for a properly organized quality control program in the construction industry.

- Quality management in the planning and design, construction, and operation and maintenance phases is integrated through the construction management project delivery system.

- The quality standard is derived from a current database created through feedback from previous projects, providing a more uniform and comprehensive standard.
- Feedback expands the quality data base to eliminate repetition of the identified defects.
- Defects are identified and corrected early.

### 2.8. Factors affecting quality of building construction projects

Poor management practices in each stages of the project are greatly affected by Project quality. Quality of construction projects is linked with proper quality management in all the phases of Project life cycle (Ashokkumar, 2014).

London survey aimed at improving methods of quality control for building works found that "Design" and "poor workmanship in the construction process" combined to form more than 90% of the total failure events. (Ashokkumar, 2014)

From comprehensive literature review on factors of poor quality in construction, the following Items have been adopted for this study.

1. Skilled and qualified people not assigned on jobs
2. Lack of trainings
3. Inappropriate equipment and defective materials
4. Absence of on-site quality tracking
5. Wasteful construction practices
6. Non-conformance to specifications and drawings
7. Unethical practices
8. Absence of quality planning, control and assurance methodology
9. Leadership commitment

According to(Ashokkumar, 2014), stated factors that affect the quality of building construction projects:

- **Limitation of Finance:** This was the main factor of construction where contractor had to plan for financial payment to eliminate the risk because it might affect the project.
- **Limitation of Communication:** the area of Construction site affected by transportation, It might be a cause of difficulty and delay, therefore it was a limitation that contactor had to consider.

- **Limitation of Labor and Wage:** The problem related to labor such as lack of skilled labor, complex work, not being able to find labor might occur, which might be causes of work difficulty, delay and low quality.
- **Limitation of Building Plan and Construction Detail:** This was the main factor of construction, Problems of building plan and construction detail were found such as drawing not clear, drawing mistake.
- **Limitation of Material and Equipment:** The problem related to material and equipments Such as shortage of materials in the site, limitation of machines or equipments which contractor had to study carefully regarding performances, suitability for work and prepare enough equipment for each work.
- **Limitation of Time:** finishing construction project on time is very important for the success of construction project. If not time constraints in schedule affect the other elements of construction projects like quality and cost. This may lead failure on construction project.
- **Limitation of Construction Methodology:** In Some construction works areas could not be performed by regular method because of there were buildings around construction site, so the contractor had to find new methods that were suitable to construct.
- **Limitation of Rule or Regulation:** problem from traffic which had an effect on transportation, problem of labor hiring, problem of building construction regulation, etc.
- **Training Policies:** This was the main factor of construction where contractor had to Looking into the general training policy; the ISO 9001 registered companies have more concern on the training of their employees than the non-registered ones.
- **Lack of co-ordination among departments:** Coordination is very important for project successful. Because co-ordination between the departments is failed that may leads to wrong execution or may affect the sequence of work.

## 2.9 Empirical Literature

### 2.9.1 Quality Awareness and Implementation

Quality awareness is the way to promote quality activities by emphasizing quality at all stages of the business, which can help solving complex problems and denote excellence. Quality has become a key concern to organizations, not only because of growing importance of the quality system, but also because of the multitude challenges. Quality awareness is one of the major issues in all industries working hard to cope with the quality challenges irrespective of their working nature. (Hussain, 2006) .

Industries in Ethiopia are deficient in vigor and stagnant: hence less exposed to a highly competitive market and don't adopt the latest quality control techniques in order to gain knowledge about systems to improve quality and operational performance. (Gidey, 2016). In a study conducted by Berhe and Gidey (2016) that included 44 companies in various industry sectors most of quality departments do not fully recognize quality control tools. 62% of their respondents have indicated that they did not get any training concerning quality control tools. This is mainly due to lack of awareness and motivation of top managements.

(Aderaw, 2019) Noted that, "TQM implementation in Tigray state indicated that there is positive association between TQM variables and organizational performance, among which Top Management Commitment has the strongest positive relation with performance of the surveyed firms.

(Mack, 2017) Suggests that improving quality awareness within an organization starts with the management. In addition, he states that the company needs to create standards after which the company's quality objectives are explained to the employees. From the various literatures, the following items have been identified to study the quality awareness and implementation in the companies.

1. Availability of Quality planning, control and assurance methodology in the company
2. On-site quality tracking
3. Familiarity and application of quality management tools and techniques
4. Trainings and inductions regarding quality management
5. Aim towards acquiring international quality certifications

### **2.9.2 Cost of Poor Quality**

The construction industry has been plagued with problems associated with lack of proper standards and lack of effective project management practice. The complex nature of the industry is what made the construction industry sensitive to poor projects performance. (Yahya, 2019). An evaluating and reporting quality failures incidents is perceived as a useful indicator of project performance and provides opportunities for quality improvements and cost reduction. Researchers have shown that the cost of poor quality is substantial, and often much larger than is shown in accounting reports. For most companies the quality-related cost range from 25 to 40 % of operating expenses (Juran, 1999) Quality is one of the key critical success indicators within a firm. (Nurchahyo, 2018) argue that quality is a key element that cannot be ignored in the competition and is one of the critical issues for the success of the company, including in the construction industry. On the other hand, if the quality management policy is not implemented or limited participation will both negatively affect the management of the project and competitiveness of the firms. This will also decrease the survival potential of construction firms within the industry.

From the various researches, the following items have been identified and used to study the cost of poor quality in the Addis Ababa construction context.

1. Cost of unplanned rework
2. Long-term firm competence
3. Exposed Health and safety issues
4. Poor staff morale
5. Administrative and support costs

### **2.10 Summary of the literature review**

This chapter of the thesis reviews issues related to QMP both in a global and Ethiopian context. Construction works are carried out in the form of projects. Construction projects have five distinctive objectives to be managed like: scope, organization, quality, cost and time. From those objectives quality of construction projects is the main objective to be managed. Quality may mean different things to different people: some takes it to represent customer satisfaction; others interpret it as compliance with contractual requirements; yet others equate it to attainment of prescribed standards. The International Organization for Standardization (ISO) formally defines quality as the ‘totality of characteristics of an entity that bear on its ability to satisfy stated or

implied needs' (ISO, 1998). In this chapter quality and words related to it are defined like: quality planning; quality assurance; quality control; quality management systems; and total quality management. Those words are necessary to understand because necessary to establish quality system. The other things covered under this chapter are critical success factors in total quality management (Customer Focus, Process Improvement, and Continuous Improvements).

Quality planning as a set of activities whose purpose is to define quality system policies, objectives, and requirements, and to explain how these policies will be applied, how these objectives will be achieved, and how these requirements will be met.

Quality assurance is oriented towards prevention of quality deficiencies. It aims at minimizing the risk of making mistakes in the first place, thereby avoiding the necessity for rework, repair or reject. Quality control also refers to the activities that are carried out on the production line to prevent or eliminate causes of unsatisfactory performance. Quality assurance is broader than quality control in its activity. In other word quality control is one part of quality assurance. The other term related with quality is total quality management which is broader than the concept of both quality assurance and quality control.

The critical success factors in Total quality management are customer focus, process improvement and continuous improvements. In the TQM philosophy, total customer satisfaction is the goal of entire system, and a pervasive customer focus is what gets us there. The function of the construction industry is to provide customers with facilities that meet their needs. For a company to remain in business this service must be provided at a competitive cost.

The other word is process improvement which is very important in TQM concept. A process is a way of getting things done. A process consists of the tasks, procedures and policies necessary to carry out an internal or external customer need. According to the TQM philosophy if the process is correct, so will be the end result (product). Thus the organization should work to improve the process so as to improve the end product or service. Continuous improvement is the way of achieving specific objectives by step by step process which is essential part of the company. This process consists of nine steps as below: identify the process; organize a multi-disciplinary team to study the process and recommend improvements; define areas where data is needed; collect data on the process; analyze the collected data and brainstorm for improvement, determine recommendations and methods of implementation; implement the recommendations outlined in step six; collect new data on the process after the proposed changes have been implemented to

verify their effectiveness; and circle back to step five and again analyze the data and brainstorm for further improvement. The other issues covered under this chapter are: the cost of quality; the reporting of quality related costs had been limited to inspection and testing; and other costs were accumulated in the overhead accounts. Quality related costs are much larger than had been traditionally reported, generally in the range of 20 to 40% of revenues. Quality related costs are not only related to manufacturing operations, but to ancillary services such as purchasing and customer service departments as well. Most of the costs are result of poor quality and are avoidable.

The other issues covered under this chapter are the common factors that are mostly affecting the quality of construction in terms of successful QMP currently being faced by Ethiopian construction companies are much the same as those which have been experienced by construction companies elsewhere in the world. The elements affecting quality of the construction process are the components of both construction inputs and construction processing. These elements are: (1) all things-related to design- come from the designer and/or the owner side; (2) the prime contract between the owner and the contractor;(3) all things related to raw material and its suppliers;(4) all the main working labor in the project;(5) the main working equipment in the project;(6) the main subcontractors in the project;(7) the planning of the project site area;(8) the management teams and their shared tasks; and (9) all things required to activate the above elements and to execute the project activities.



## CHAPTER THREE

### RESEARCH METHODOLOGY

#### 3. Introduction

This chapter presents the activities and processes that were undertaken in gathering data for the research work. It provides full details of how data are collected and processes for this research work. It presents the research design; sampling techniques and sample size determination, data sources, data collection tools, describe how data collected from the research were analyzed and ethical considerations.

#### 3.1. Research Approach & Design

In this study a descriptive research method was used to measure the characteristics described in the research question. In this study under the descriptive method only qualitative analysis is used. It was therefore be suitable for this study since it helped in collecting data through interview and questionnaire in order to answer the question of the current status and describe the nature of existing conditions of the organization under the study in regard to change management. The research design for this study was the cross-sectional field survey method because data were collected at one point of time during a period of eight weeks to assess the quality management practice Grade one Building contractors in the Building construction projects.

#### 3.2. Population and sampling techniques

##### 3.2.1. Population

Target population of the study was only grade one building contractors assessed with the focus limited to Addis Ababa city which are registered with the name Addis Ababa. In the Addis Ababa city there are different building construction projects, Most of higher building projects constructed by grade one building contractors because grade one building contractors are the biggest construction contractors classification in Ethiopia qualified to undertake construction of building. Grade one Ethiopian building contractor assessed with the focus limited to Addis Ababa city which are registered with the name Addis Ababa 75 building contractors that mean a

total of 75 numbers of populations are obtained. The research population included professionals who have worked at construction projects.

### 3.2.2. Sampling techniques

The purpose of sampling is used for data collection. As a sample for different building construction company's I choose professional like project manager, contract administration team and technical team member. The researcher was used a purposive sampling technique from the population of interest. The reason for choosing this technique was that the selected participant is the focal and more responsible persons in the practice and implementation of QMS in their company. Moreover, these samples could help the researcher to understand the problem and the research question since they were assumed to be rich in information in QMS. The respondents were selected based on their experience, information and area of work they have a bout project implementation and management challenges in their respective organization in relation to Quality management Practice in the building construction project.

#### 3.2.2.1 Sample Size

According to Ministry of Urban Development, Housing and Construction bureau the total numbers of grade one Building contractors registered and also renewed their licenses in 2017 budget year are 83. From this population's grade one Ethiopian building contractor assessed with the focus limited to Addis Ababa city which are registered with the name Addis Ababa75 building contractors that mean a total of 75 numbers of populations are obtained.

The sample size determination is based on Solvin's formula with confidence level 95% and confidence interval (error margin) 5%.

$$n = \frac{N}{1 + N * (e)^2} \dots\dots\dots [Eq.3.1]$$

Where n = no. of samples

N = total population

e = error margin / margin of error

$$n = \frac{75}{1+75*(0.05)^2} = 64$$

Based on Slovin's formula, the sample of 64 respondents has drawn from target population of 75 firms. From 75 a total 64 questionnaires were distributed 10 building construction companies from these 52 questionnaires returned this means 81 percent of response rate which is acceptable for research.

### **3.3. Data collection techniques**

In this study use both primary and secondary sources of data collection. The main sources of the primary data for this research are the unstructured interview and semi-structure questionnaires. Unstructured (open) types of interview were conducted with building contractors representative (engineers) to gather information on: organization quality management; organization quality problem; factors affect the quality of construction projects; the information collected used to support of the literatures in order to include them in the questionnaires.

Formulating questions from the identified variables, the questionnaire was designed to gather data from professionals with building contractors side that were involved in building projects in Addis Ababa. This questionnaire survey has been both open-ended and closed-ended questionnaires. The questionings basically focus on the efforts made by the companies towards the comprehensive application of the principles of quality management system.

Apart from primary data, secondary data were also exploited to conduct the study. Documents review and analysis of secondary data from various sources were used as useful source of information for the study. Relevant books, text books, journals, organization's past and current written documents on the relevant issues were used. Moreover, available organizational documents such as structure, accessible project documents including agreement project profile, plans and reports were also reviewed.

#### **3.3.1. Interview**

Interview method provides work for because it is believed to have an advantage of ensuring probing for more information, clarification and capturing facial expression of the interviewees. The interview was conducted face-to-face with the interviewees asking questions selected individuals. Unstructured (open) types of interview were conducted with building contractors representative (engineers) to gather information on: organization quality management; organization quality problem; factors affect the quality of construction projects; the information

collected used to support of the literatures in order to include them in the questionnaires. Because of lack of data from the companies on quality management practices Used Interview instead of desk study.

### 3.3.2. Questionnaire

It is simplest and time saving method to collect data effectively from a huge numbers of respondents. Formulating questions from the identified variables, the questionnaire was designed to gather data from professionals with building contractors side that were involved in building projects in Addis Ababa. This questionnaire survey has been both open-ended and closed-ended questionnaires.

### 3.4. Procedure of data collection

The data collection procedures through by development of questioner and interview guide checklists for the study in order to demonstrate the objective of the study to the target population of the research to individual level discussions with identified interviewees and collecting secondary data from the concerned body through an official letter written from the university. It was divided into three sections. **Section one** about company information and to what extent the quality concept is understood in the company. **Section two** about questions on major problems facing on the quality of building construction. These helps to understand the degree of effect they have on quality practices. **Section three** covered about sub main problems facing on the quality of building construction correlated to their main problem, it will be used as to establish quality system based on their ranking.

Questionnaires were sent to the top management personnel of each company. The researcher has conducted interview with the top management personnel's. The interview takes about 10 to 20 minutes. The researcher made notes during the interview and asked further clarifying questions. At the end of each interview, the researcher ensures that all necessary data is gathered from each firm.

### 3.5. Data analysis techniques

The study has adopted descriptive methods of analysis. Relationship between the grade one of contractors and quality awareness and implementation level have been analyzed using

descriptive statistic tools. The collected data was thoroughly examined and checked for completeness and clarity. Rating scales will be used ,the evaluation scale was a five-point Liker scale,(Very low important (1), Low important (2), Medium important (3), high Important (4), Very high important (5)).The relative importance index method (RII) was used to determine and rank the quality awareness and implementation level in building construction projects. And all analyzed by the programmed MS-Excel. The formula for the calculation of RII used is [Eq.3.2]:-

$$\text{Relative Important index (RII)} = \frac{\Sigma W}{(A*N)} \dots\dots\dots[\text{Eq.3.2}]$$

Where

RII is relative importance index,

W is the weight given to each factor by the respondents and ranges from 1 to 5;

A – The highest weight = 5;

N – The total number of respondents=52

### **3.6. Ethical Issues**

All data collection process was carried out after consent with the general managers of the companies. Collaboration letter issued by the University was also provided to show the legitimacy of the study. The researcher has declared that all participants were voluntary participate in the data collection by collaborating in filling of the questionnaire. By doing so, the respondents are free of any harm and more importantly their views were very confidential and anonymous.

Data collected was not used for other purposes than for the success of this research attaining the research questions and objectives. The names of the construction companies and the members who provided relevant data was concealed and not disclosed in this paper.

## CHAPTER FOUR

### DATA ANALYSIS AND DISCUSSION

#### 4. Introduction

This part of the study provides an indication of the results and discussions found from the data analysis. In this chapter analyses the data gathered from questionnaires and interviews. This chapter includes the general information about respondent contractors' profile that helps the research to get the necessary information from the firm. Then concept of quality and quality management adopted in the construction process are assessed. Finally factors affecting quality practices in the building construction projects also investigated. Data were captured and the responses were analyzed using the Microsoft Excel software package. Descriptive data was analyzed using frequencies and percentages to find the views of the respondents on quality management practices of construction projects. Finally the result of the analysis was presented in tables. Then the information is ranked in different position by using relative important index.

#### 4.1 Analysis and discussion of data from interview

The interview was conducted face-to-face by asking questions and explanations with the selected interviewees. Semi-structured interview were conducted with contractors representative (engineers) to gather information on organization quality management practice, organizations quality problems, factors affecting the quality of construction projects and important for the quality of construction.

The interviews are conducted on 1 Technical manger, 5 project managers, 2 office engineer head and 3 Site engineers. A total of 11 respondents are participated. All respondents working 10 building construction companies. All the respondents experienced on building projects for 7years and above. The interview consists of four questions those four questions prepared to meet the objectives of the thesis. The first question is how can be expressed quality in your building constructions projects? For these question five answers are identified those answers are: conformance to specifications; conformance to requirements; meeting customer expectation; meeting specified requirements; Work without defects and wastes. This shows quality doesn't have clear meaning or common meaning in the construction industry. Common understandings are very important to understand each other's and to create quality management systems.

The second question is what do you think the major objectives of quality management in construction companies? For this question four answers are obtained those answers are: To Increasing profit; to eliminate defects; to get additional works and to meet customer satisfaction. This shows how the objectives of the companies are different to different companies'. So, quality objectives of the companies should be related with more of with the quality works. Third interview question is the quality improvement program of companies which is the respondent of this thesis works in for this question only two answers are responded: quality control/quality assurance and ISO 9001 QMS system. The fourth and the final question is what are the factors that affects the quality of building construction projects for this interview question 10 factors are responded that are: 1) the drawings and specifications do not specify clearly the intentions of the designers; 2) poor workmanship; 3) the contractors pay more attention to complete the works on schedule and control the costs to within budget than to achieving quality in construction; 4) the contractors cannot plan and control the works; 5) the contractors do not know how to establish a quality system to control the works; 6) the contractors do not use good quality construction materials; 7) lacks storage and handling system; 8) lacks of good utilization of equipment; 9) contractors lacks of finance; 10) skill and experience contractor's staff. Those factors are failure factors or the causes for poor quality management practices in building construction projects.

## **4.2 Analysis and discussion of data from questionnaire**

### **4.2.1 Rate of response and contractors profile**

#### **4.2.1.1 Response Rate**

The contractors included in this research are grade one Building contractors registered with the name Addis Ababa only. The total numbers of contractors fund are with the name Addis Ababa only 75. For this thesis a total of 64 questionnaires distributed for grade one Building contractors. The numbers of questionnaires retrieved are 52; this means 81 percent of response rate which is acceptable for research .The questionnaires response rates are organized as shown in Table 4.1 below

Table 4.1 Questionnaires response rate

Class	Questionnaires distributed	Questionnaires returned	Percent of Reponses
Bc-1	64	52	81

#### 4.2.1.2 General Information of Respondents and contractors profile

The firm's years of experiences are summarized in Table 4.3 the result shows 65.3% of the contractors have more than 11 years experiences in the construction industry. The others (25%) of the contractors have 6 to 10 years experiences in the construction industries. The remaining contractors (5.8%) have less than 5 years' experiences and 3.8% of the contractors have more than 15 years experiences in the construction industry. The majority (90.3%) of the contractors have more than 6 years' experiences as understood from results. This helps the study to get enough information on quality management practices. Table 4.2 shows firm's years of operations.

Table 4.2 Firms years of operations

No. year operation	Frequency(n)	Percent (%)
1-5 years	3	5.8
6-10 years	13	25
11-15 years	34	65.3
>15 years	2	3.8

The numbers of project executed with those contractors are very high in numbers that means 5.8% of the contractors executed more than 20 numbers of projects in the last five years. The majority 23.1% of contractors executed 16 to 20 numbers of projects and 46.1% of contractors executed 11 to 15 numbers of projects. The remaining 25% of the contractors executed less than 10 numbers of projects. The contractors participated in these projects have high experiences in building construction projects as shown in Table 4.3 below:



**Table 4.3 Numbers of projects executed in the last five years**

No. of projects	Frequency(n)	Percent (%)
Less than 10	13	25
11-15 Years	24	46.1
16-20 Years	12	23.1
>20 years	3	5.8

The major clients of contractors are public sectors were 67.3% of works are obtained from. The others 32.7% works are obtained from private sectors. According to the sample there are no other sectors are participated in the building construction projects. The client types have major effects on the quality of the construction because the controlling mechanisms and the emphasis they give for quality are different. These data also helps to know which clients are affected by lack of quality works as shown in Table 4.4.

**Table 4.4 Firms major clients**

Clients	Frequency(n)	Percent (%)
Public	35	67.3
Private	17	32.7
Cooperatives	0	0
Others	0	0

In every construction firm priorities are often given to certain areas or for the factors relatively to each other's in companies. The priority given to some factors within the surveyed contractors in the construction industries have been discussed in this sub-section of the studies.

The respondents were asked to rank the factors from low (1) to high (3), and the results are presented in Table 4.5.

Table 4.5 Priorities given to Some Factors in the company

Factors	Degree of Priority			Total( $\Sigma W$ )	RII	Rank
	[1]	[2]	[3]			
Achieving Success during tender	10	19	23	117	0.75	5
Meeting Project Cost Budget	0	10	42	146	0.94	1
Meeting Quality Standards	0	23	25	121	0.78	3
Meeting Project Time / Deadline	0	16	36	140	0.90	2
Satisfying Client's brief	9	18	25	120	0.77	4
Meeting Health and Safety Standard	19	12	21	106	0.68	6

\* The degree of priority numbers are standing for 1 for low, 2 for moderate and 3 for high

As presented in Table 4.5 the most important and highly prioritized factors by contractors are meeting project cost budget of the project this is obvious because companies are established to make profit that is why they give first priority in their firm. The second priority given by the firms are meeting project time /deadline and the third priorities are to meeting quality standard of the projects. This implies that a lot of work needs to be done in increasing awareness and making the contractors to focus more on quality. These three variables were subsequently followed by satisfying clients brief; achieving success during tender; and health and safety standards ranked 4th, 5th, and 6th respectively. The literature part of this thesis explained each factors are related to one another for example quality has an effect both on cost and time. If the quality of work increases our profit and our time are saved because reworks are reduced. The other interesting issue is the place given for health and safety standard it is ranked last.

### 4.2.2 Quality perception of companies

The quality of building constructions are very difficult to define. The word quality has different meaning for every construction firm for this reason the contractors asked to select words that define quality provided in the Table 4.6.

**Table 4.6 Firms quality definition**

Define	Frequency(n)	Percent (%)
Conformance to specifications	4	7.7
Conformance to requirements	5	9.6
Meeting customer expectation	23	44.2
Meeting specified requirements	20	38.5

As presented in Table 4.6 (44.2 %) of the contractors define quality as Meeting customer expectation. The other 38.5% were given to Meeting specified requirements the main reason of contractors are if customers satisfied the quality of the works are good as the same time their reputations also increased. The definitions next to those two definitions are: Conformance to specifications; and Conformance to requirements.

The contractors also ranked what perception they have on quality by selecting those three words or writing their own by the space provided as shown in Table 4.7 below:

**Table 4.7 Perception of quality**

Words	Frequency(n)	Percent (%)
Elimination of defects	16	30.8
A tool to increase profits	10	19.2
A competitive advantage	26	50.0
Others	0	0.0

Most of the contractors agreed quality works gives a competitive advantage (50%) for the next time to get another works. The next rank is given to elimination of defects by 30.8%; it is the main thing in order to do good works according to the literature of this thesis. A tool to increase profits comes next to the above variable by 19.2%.

### 4.2.3 Quality management system

The result as shown in Table 4.8 shows (50 %) of the companies does not implement quality management system and (23.1%) have the intention to develop and implement a quality management system. The other companies (17.3%) have system implement quality management system recently. A small number of companies (9.6%) have implemented a quality system.

**Table 4.8 Quality management system**

QM consideration	Frequency(n)	Percent (%)
No	26	50
Such a plan is under consideration	5	9.6
A quality improvement plan has been a part of corporate policy	12	23.1
A quality improvement program has been implemented recently	9	17.3

The construction companies' uses different kinds of quality management system as mentioned on the literatures like total quality management; ISO 9001; quality control /quality assurance; and others. This quality system improves quality of the construction projects and also gives better pictures for the companies. Quality management systems are very important in achieving project successfully. Types of quality management system used by contractors are presented as shown in Table 4.9 below:

**Table 4.9 Types of quality management system**

Type of quality management system	Frequency(n)	Percent (%)
ISO 9001	12	23
Total Quality Management	0	0
Quality Control /Quality assurance	19	37
Others	0	0
Did not answer	21	40

Table 4.9 shows the quality management system mostly practiced in Ethiopia they are: ISO 9001 and QC/QA. Contractors have the chance to create their company quality management system but there are no company mentioned other types of quality management system. Table 4.9 shows 37% contractors use quality control as their company quality management system. As literature specify that quality control specific project result to determine if they comply with relevant

quality standards and identifying ways to eliminate cause of unsatisfied performance contract documents comprise a clear, complete, and accurate description of the facility to be constructed, correctly conveying the intent of the owner regarding the characteristics of the facility needed to serve his or her purposes. The second type practiced by contractors is ISO 9001 with 23% which is the latest system know. The third which is not practiced by the contractors is TQM; it works for the totality of the company quality. As stated on literature one of the main principles of the TQM concept is to achieve customer satisfaction and this is an important objective for any organization, including construction firms.

The majority (40%) of contractor doesn't have quality management system so; we can imagine what kind's work they do. The company depend on the quality meanly achieve the projectsuccess in every part like for example meet the deadline, meeting the project cost and create safe environment. Therefore, they have to wake up to apply quality system in their organizations.

The quality management system has various objectives as specified in literature review part. Those objectives are: Increase productivity; cost reduction; involvement of employees in the quality building effort and compliance with statutory; and environment and safety requirement. The contractors have the chance to fill their own objectives but companies are not responded in space provided on the question.

Table 4.10 shows the majority (38%) of the contractors doesn't have answer. 29% of the contractors objectives are to work on compliance with statutory, environment and safety requirement. The others contractors (19%) select quality management system increase productivity of the contractors and others (13%) objective is QMS reduce the cost of construction respectively.

**Table 4.10 Major objectives of quality management system**

<b>Objectives</b>	<b>Frequency(n)</b>	<b>Percent (%)</b>
Involvement of employees in the quality building effort	0	0
Increase productivity	10	19
Cost reduction	7	13
Compliance with statutory, environment and safety requirement	15	29
Did not answer	20	38

#### 4.2.4 Main problems facing quality of building construction projects

The main problem facing quality of the construction process is the components of construction inputs and process. These problem have an issue on the quality of construction and these problem are ranked on the effect they have on the construction projects or expresses the defect and faulty work occurred because of those problems especially some have great effects on construction projects that why the relative important index high. This shows that most of the respondent knows the effect of those problems on quality management practices. These problems are stated as shown in Table 4.11.

**Table 4.11 Main problem of quality**

Item No.	Main problems of Quality	Degree of importance					Total( $\Sigma W$ )	RII	Rank
		1	2	3	4	5			
1	Project (type and complexity) related issues	6	5	21	16	4	163	0.63	10
2	Design related issues	2	0	4	26	20	218	0.84	2
3	Contract related issues	0	9	22	14	7	175	0.67	9
4	Materials related issues	0	5	9	18	20	209	0.80	4
5	Labors related issues	0	0	10	19	23	221	0.85	1
6	Equipment related issues	0	7	10	17	18	202	0.78	5
7	Subcontractors related issues	0	12	9	17	14	189	0.73	7
8	Site layout of the project	4	8	10	18	12	182	0.70	8
9	Systems (quality control, cost control, safety program )	1	2	11	16	22	212	0.82	3
10	Site staffs (cooperation, understanding, experience)	1	2	8	20	21	214	0.82	3
11	Financial Issues	3	5	10	14	20	199	0.77	6
12	Owners (public, private)	8	5	20	9	10	164	0.63	10

\* Note that the responses are ranked according to the importance of the problems on quality of construction projects. very low important (1), low important (2),medium important (3), high important (4),very high important(5)

Table 4.11 shows labors related issues comes first with relative important index of 0.85. These show the problem related to this have high degree of effect on quality in Ethiopia. The labor force has an effect on the project according to the contractors the labor don't have enough skill, miscommunication because of different language they used and they come directly from rural area of Ethiopia. The second variables in the table are Design related issues with relative important index of 0.84. Design related issues happened mainly because of reliability of all information used as basis of the products for projects. The other is reliability of design solution and detailed specification. The third variables in the table are systems and site staff with the relative important index of 0.82. The system of the company consists a lot of issues especially related to management that why second on list but these variable need a lot of resources to apply in company. Site staff also another problem comes second on the list which has high effects on the practices of quality. As stated on the literature review coordination was very important for project success because if the co-ordination between the departments were failed that may leads to wrong execution or may affect the sequence of works. The fourth variables in the table are materials related issues with RII of 0.80. The materials related problems are the major problems that face on the quality of the projects.

Those variables were subsequently followed by equipment related issues; financial Issues; subcontractors related issues; site layout of the project; contract related issues; project (type and complexity) and owner (public, private); related issues respectively. To summarize the ranks: labors, designs, systems, site staff, materials, equipment, financial, subcontractors, site layout, contract, project and owners.

### **4.2.4.1 The effect of labors on quality of building construction projects**

Labors are an important resource we use to construct building especially when the resource for equipment are limited and also some work could not be done by equipment only so, using labors are necessary. Labors related an issue comes first with RII of 0.85. These show the problem related to this factors have high degree of effect on quality in Ethiopia. The labor force has an effect on the project according to the contractors the labor don't have enough skill, miscommunication because of different language they used and they come directly from rural area of Ethiopia. In our country construction needs a lot of labors because of the capacity we have (the development) but the problem are not that the problem are the skills and the deduction they have for works. In other hand the managements of the company are very important in order

to develop the skill and motivations of the labors. The contractors ranked the variables under labors considering the effects on quality practices of building construction projects as shown in Table 4.12.

**Table 4.12 Labor related problems on quality practices**

Item No.	Sub problems effect on Quality	Degree of importance					Total( $\Sigma W$ )	RII	Rank
		1	2	3	4	5			
1	labors experience	0	6	7	13	26	215	0.83	1
2	Communication skills of labors	0	6	10	13	23	209	0.80	3
3	Motivation System	2	9	12	14	15	187	0.72	5
4	Training courses for labors	0	5	9	14	24	213	0.82	2
5	Income level and wages of labors	0	6	11	15	20	205	0.79	4

**\* The responses are ranked according to the importance of the problems on quality of construction projects (for example labors experience is very important for the success of quality). very low important (1), low important (2),medium important (3), high important (4),very high important(5)**

Table 4.13 shows the level of labors experience is very important on quality practice when compared with the other factors with RII of 0.83. The labors impacts on the quality of the construction are very high but the labor forces did not get enough attention by Ethiopian contractors. So, in order to develop or grow their capacity training courses are important. The second variable selected by the contractors is giving training courses for labors to improve their skills with relative important index of 0.82. The third problem ranked in the table is the impact of communication skills of the labors on the quality of construction project were ranked with RII of 0.80. Communication problem is the main factors which observed in Ethiopia construction project. The main reason is as we know Ethiopia is multi linguistic country this makes it difficult to understand each other on the site. Therefore, Interpersonal relations of labors are important because it reduces the differences they has on working place. The final ranking is given to income level and wages of labors with RII of 0.79. This was somewhat low effect on the quality of building construction projects as contractors ranking.



#### 4.2.4.2 The effect of design on quality of building construction projects

The majority of the construction problem occurred because of design. The issues raised are: the completeness and consistency of design documents; drawings are prepared in details; conformance to codes and standards; and bill of quantity are detailed and accurate. Those issues are compared according to the importance they have on quality. The completeness and consistency of design documents comes first with RII=0.86 which is very important for quality achievement when it compared with other factors. The design document should be complete to understand fully some people also say if design is complete the work ideally 50% completed even not constructed on the ground. The consistent of design is very important for constructability of project because reliable designs are easy to apply to the ground. The second variable ranked by the contractors is drawings should be prepared in details the RII is 0.84.

The other issues are conformance to codes and standards; and bill of quantity are detailed and accurate with RII=0.83 and RII=0.79 respectively. Those issues are ranked as shown in Table 4.13.

**Table 4.13 Design related problems on quality practices**

Item No.	Sub problems effect on Quality	Degree of importance					Total( $\Sigma W$ )	RII	Rank
		1	2	3	4	5			
1	Drawings are prepared in details.	0	5	6	15	26	218	0.84	2
2	Bill of quantity is detailed and accurate.	0	5	13	14	20	205	0.79	4
3	Completeness and consistency of design documents.	0	2	9	13	28	223	0.86	1
4	Conformance to codes and standards.	0	4	9	15	24	215	0.83	3

\* The responses are ranked according to the importance of the problems on quality of construction projects. very low important (1), low important (2),medium important (3), high important (4),very high important(5)

#### 4.2.4.3 The effect of systems on quality of building construction projects

Organizations are a combination of different systems to work together to develop the company. Construction company have different system like quality control and quality assurance system, cost control system, time control system and safety control system. The above systems are some of them which are considered in this research. The other systems are included under others problems. Those problems mentioned above are ranked according to the degree of importance they have on quality of construction projects as illustrated in Table 4.14 below:

**Table 4.14 Systems related problems on quality practices**

Item No.	Sub problems effect on Quality	Degree of importance					Total( $\Sigma W$ )	RII	Rank
		1	2	3	4	5			
1	Quality control and quality assurance system	0	2	8	19	23	219	0.84	1
2	Cost control system	5	20	10	9	8	151	0.58	3
3	Time Schedule	4	20	12	9	17	201	0.77	2
4	Safety program	12	25	8	5	2	116	0.45	4

\* Note that those problems are ranked according to the importance they have on quality of building construction projects.

Table 4.14 shows implementing quality control and quality assurance system is ranked first with RII=0.84. The literature part of this thesis shows in order to achieve success in quality the best way is to apply quality management system in the company. QC/QA system is one of quality improvement program were used to improve the quality construction work. So, using this system has great degree of influence on quality. QC/QA systems are one of the contributing factors for the success of QMP in contractors firms. The other problem is using time schedule ranked with RII of 0.77 which isn't have direct effect on quality but very important for the quality of construction work. The third and the fourth issues are implement and using Cost control system and implement a safety program with RII=0.58 and RII=0.45 respectively. The above three issues cost, time and safety need further study specifically in Ethiopia condition.

#### 4.2.4.4 The effect of site staffs on quality of building construction projects

In construction industry cooperation of site staffs are must to achieve success in time, cost and quality of construction project therefore, without cooperation of site staffs we cannot achieve project objectives. Like for example cooperation between supervision and contractor’s staffs were very important for quality construction.

The other issues were important for quality management is the understanding of supervision staffs about contract administration of the construction projects. The skill and experience of supervision staffs are very important for quality management practices. The contractor’s staffs skill and experience are also very important for QMP. The site staffs issues are also ranked by the contractors on the level of importance that have on quality management practices.

The first rank given by the respondents are skill and experiences of contractor’s staff with RII=0.84. It is very important for the quality of construction work according to the literature review part of this research. The other next to above are: skill and experience of supervision staff; and cooperation between supervision and contractor’s staff were ranked with RII=0.82 and RII=0.79 respectively. The last place ranked by the respondents are understanding of contract administration by Supervision staffs with RII=0.72 as shown in Table 4.15.

**Table 4.15 Site staffs related problems on quality practices**

Item No.	Sub problems effect on Quality	Degree of importance					Total( $\Sigma W$ )	RII	Rank
		1	2	3	4	5			
1	Skill and experience Contractor’s staff	0	2	12	12	26	218	0.84	1
2	Skill and experience of Supervision staff	0	5	9	14	24	213	0.82	2
3	Understanding of contract administration by Supervision	4	11	7	10	20	187	0.72	4
4	Cooperation between Supervision and Contractor’s staff	0	7	10	13	22	206	0.79	3

**\*Note that those problems are ranked according to the importance they have on quality of building construction projects.**

#### 4.2.4.5 The effect of materials on quality of building construction projects

The construction industry needs a lot of materials both in type and amount so using this resources effectively are very essential. According to literature review part of this thesis all material purchased should satisfy the standards or building control authority requirements. Here are materials related factors are ranked according to their level of importance for quality as shown in Table 4.16 below:

**Table 4.16 Materials related problems on quality practices**

Item No.	Sub problems effect on Quality	Degree of importance					Total( $\Sigma W$ )	RII	Rank
		1	2	3	4	5			
1	Applying material management system	0	7	8	15	22	208	0.80	2
2	Cooperation between contractor and material suppliers	1	9	11	13	18	194	0.75	4
3	Construction materials quality	0	7	7	14	24	211	0.81	1
4	Storage and handling system	0	13	5	14	20	197	0.76	3

**\*Note that those problems are ranked according to the importance they have on quality of building construction projects.**

Table 4.16 shows availability of good quality construction materials are very essential and ranked first with relative important index of 0.81. According to the contractor, the materials purchased itself very decisive on the quality of the construction projects. Purchasing good quality materials are very important because construction materials have direct effect on the quality of building construction project. The second important issue is using a complete material management system with the relative important index of 0.80. The third ranked by the contractors are using storage and handling system with RII =0.76. The fourth is cooperation between contractor and material suppliers with RII=0.75.

#### 4.2.4.6 The effect of Equipment on quality of building construction projects

The construction sites are characterized by a high level of activity as men and equipment move materials, tools and design information one place to another. Certain degrees of inefficiency are normal, depending on the size and complexity of project, the constraints of procedure, and the degree and effectiveness of detail planning and scheduling. As the use of modular and prefabricated construction method increases using construction equipment are must in construction process. The use of equipment will reduce cost, improve safety and yield higher quality of the construction project so; using equipment in construction project gives us success. Here are equipment related problems were ranked as shown in Table 4.17 below:

**Table 4.17 Equipment related problems on quality practices**

Item No.	Sub problems effect on Quality	Degree of importance					Total( $\Sigma W$ )	RII	Rank
		1	2	3	4	5			
1	Availability of Equipment	0	2	13	20	17	208	0.80	1
2	Equipment management system	0	9	12	21	10	188	0.72	3
3	Measurement of equipment Productivity	3	9	15	12	13	179	0.69	5
4	utilization of equipment	0	13	10	16	13	185	0.71	4
5	Equipment maintenance	0	6	12	23	11	195	0.75	2

There are a lot of activities performed by equipment on building project like excavation, compaction, lifting, moving, mixing, spreading, crashing, and cutting etc. All those work are very important for good quality construction work. In construction project the rate of quality are calculated by using different formula which helps us to know the loss of the works.

The results in Table 4.17 shows the effect of availability of Equipment were rated first with RII=0.80. The lacks of construction equipment by the contractors reduce the quality of project, because construction equipment performs better than human on the activity mentioned above. The construction equipment fasten construction of the building this gives benefit for the contractors to work the project without time stress. The second is using an Equipment

maintenance system with the relative important index of 0.75. The third ranked by the contractors are equipment management system with RII =0.72. The fourth is utilization of equipment were ranked with RII=0.71. The last is measurement of equipment productivity with relative important index of 0.69.

**4.2.4.7 The effect of finance on quality of building construction projects**

Financial issue is the main factors affecting construction success especially when there is no proper financial control and management. Cash flow problem may cause inefficiency of construction Company (contractors). Inefficiency contractors may also affect quality construction. This indicates that with a good cash flows management, companies could be kept efficient and financially healthy. Cash flow in construction is the money that is moving (flowing) in and out of company with some time. Finance related problems are ranked as shown in Table 4.18 below:

**Table 4.18 Finance related problems on quality practices**

Item No.	Sub problems effect on Quality	Degree of importance					Total( $\Sigma W$ )	RII	Rank
		1	2	3	4	5			
1	The amount of contractors cash flow	7	10	10	15	10	167	0.64	1
2	The non-delay of interim payments	7	18	10	10	7	148	0.57	2

The results in Table 4.18 shows the amount of contractors cash flow are ranked first compared with the non-delay of interim payments with relative important index of 0.64. But these two problems affect indirectly the quality of the building construction. Interim payments can be agreed in advance and paid at particular milestone, but they are more commonly regular payments the value of which is based on the value of work that has been completed (this is the actual value of the work completed, taking into account variation etc.). The interim certificate provides the mechanism for the client to make payments to contractor. So, the delay of these payments may cause the construction to stop and lagging of the work because of this the material on the site is affected the time problem is also happened. Therefore, the qualities of constructions are in question.

#### 4.2.4.8 The effect of subcontractors on quality of building construction projects

The main problems of contractors are doesn't give emphasis on subcontractors because contractors are busy with own works they don't give time to assess the works of subcontractors. According to the informal interview of professionals the selection system of contractors has problems in the beginning because they select subcontractors by friends or by knowing each other not by the capacity of subcontractors. This is the main cause for poor quality management practices in building construction projects. Sub-contractors related problems are ranked as shown in Table 4.19 below:

**Table 4.19 Subcontractors related problems on quality practices**

Item No.	Sub problems effect on Quality	Degree of importance					Total( $\Sigma W$ )	RII	Rank
		1	2	3	4	5			
1	Company's methods and procedures of selecting subcontractors	0	7	9	16	18	195	0.75	2
2	Cooperation between subcontractors and contractor	0	7	13	20	12	193	0.74	3
3	System to evaluate subcontractors performance	0	12	10	16	14	188	0.72	4
4	Subcontract conditions	0	6	10	21	15	201	0.77	1

Table 4.19 shows subcontract conditions have great impact on the success of construction quality according to the ranking of contractors with RII=0.77. The second and the third problems are company's methods and procedures of selecting subcontractors and cooperation between subcontractors and contractors were ranked with RII=0.75 and RII=0.74 respectively. The final ranking were given to using a system to evaluate subcontractors performance with RII=0.72.

#### 4.2.4.9 The effect of site layout on quality of building construction projects

Site layout of the project is very necessary for the success of the project. Issues related with the site layout are: Site layout is large and suitable for movement of labors and equipment, site layout is organized well, site layout has storage areas for materials and site is clean. Those problems are identified and modified as shown in Table 4.20 below:

**Table 4.20 Site layout related problems on quality practices**

Item No.	Sub problems effect on Quality	Degree of importance					Total( $\Sigma W$ )	RII	Rank
		1	2	3	4	5			
1	Site layout is large and suitable for movement of labors and equipment	3	11	10	13	15	182	0.70	2
2	Site layout is organized	0	10	17	12	13	184	0.71	1
3	Site layout has storage areas for materials	1	15	14	14	8	169	0.65	3
4	Site is clean	3	14	14	12	9	166	0.64	4

Table 4.20 shows the site layout organized well were ranked first with RII=0.71. The Site organizations of the projects are very necessary for the project success both for quality and safety of the project and also important to handle materials, equipment and other things which need care on the site. The site layout should be large and suitable for movement of labors and equipment were ranked second with RII=0.70. Third and the fourth issues are site layout has storage areas for materials and site is clean with RII=0.65 and RII=0.64 respectively ranked. The cleanness of the site layout were very important especially for materials stockpiled on the site otherwise the quality of materials are affected and also the reason for poor QMP.

#### 4.2.4.10 The effect of contract on quality of building construction projects

Contract documents consists so many things like for example quality control prices. These prices are for obtaining samples; performing contractor quality control testing; performing tests for contractor quality control testing; performing tests for contractor process control; providing inspection; exercising management control; submitting a written control quality Plan,



maintaining control charts; submitting the records and certifications; and furnishing labor, materials, tools, equipment, and incidentals necessary to complete the work. So, these costs help the contractors to keep the quality of construction. Contract related problems are ranked as shown in Table 4.21.

**Table 4.21 Contract related problems on quality practices**

Item No.	Sub problems effect on Quality	Degree of importance					Total( $\Sigma W$ )	RII	Rank
		1	2	3	4	5			
1	Cooperation between parties involved in contract	5	3	17	14	13	183	0.70	1
2	Previous relations between parties (good or bad)	7	11	8	14	12	169	0.65	3
3	A written contract with conditions clear and fair and responsibilities distribution is clear	7	9	12	10	14	171	0.66	2
4	Using a standard contract	10	13	10	8	11	153	0.59	4

Table 4.21 shows the cooperation between parties involved in contract were ranked first with RII=0.70. The construction works needs the cooperation and works of different bodies as stated on the contract of project. The second ranking is given to written contract with conditions clear and fair and responsibilities distribution is clear with RII=0.66. The other actors comes after the two problems are previous relations between parties and using a standard contract were ranked with RII=0.65 and RII=0.59 respectively.

#### **4.2.4.11 The effect of projects on quality of building construction projects**

The unique character of construction industries are each projects has different from one another. This is the main reason that makes quality management difficult to manage. According to literature review the scope of the project; location of the project; site access and period of the project are the sub factors that affect quality under main factors of projects. The effects of each sub problems of the projects are ranked by the contractors as shown in Table 4.22 below:

**Table 4.22 Project related problems on quality practices**

Item No.	Sub problems effect on Quality	Degree of importance					Total( $\Sigma W$ )	RII	Rank
		1	2	3	4	5			
1	Scope of the project (type and nature of the project)	2	8	7	20	15	194	0.75	1
2	Location of the project	4	8	19	10	11	172	0.66	2
3	Site access	10	10	12	13	7	153	0.59	4
4	Period of the project	5	17	11	9	10	158	0.61	3

Table 4.22 shows the scope of the project (type and nature of the project) are ranked first with RII=0.75 the importance this factor is high according to contractors. The other are location of the project, period of the project and site access with RII=0.66, RII=0.61 and RII=0.59 respectively ranked by the respondent. The type and nature of the project affects the quality as understand from literature review especially when the project is different or complex. The experiences of human resource are very important to solve this problem. In our country there is no that much complex work according to the interview made by informal method. So, the projects don't have that much effect in Ethiopia that is why contractors ranked project on the last position.

#### **4.2.4.12 The effect of owners on quality of building construction projects**

The owner should set the direction for the upcoming construction project. Past experience of highly successful construction project has clearly demonstrate that early and active involvement of the owner has major impact on safety and quality performance of all contractors on the job. The slight additional cost required at the beginning of construction project to implement an effective quality program will provide a high rate of return at project completion. The method of selection of contractors by the owner is very important for the success of construction project. Especially emphasis for quality is very important during selection of contractors. Past job experiences by the contractors are important including quality performances and system of the contractor on managing quality is necessary for the owner to select the contractor as criteria. Owners related problems are ranked as shown in Table 4.23 below:

**Table 4.23 Owners related problems on quality practices**

Item No.	Sub problems effect on Quality	Degree of importance					Total ( $\Sigma W$ )	RII	Rank
		1	2	3	4	5			
1	Owner organization nature (Public or Private)	9	12	16	6	9	150	0.58	4
2	The Owner is not delaying to make Decisions	2	10	15	19	10	193	0.74	2
3	Owner's contribution to design	5	14	17	10	6	154	0.59	3
4	Owner's emphasis on quality	0	3	16	20	13	199	0.77	1

Table 4.23 shows owners emphasis (active owners) on quality is ranked first with RII=0.77. The second factor ranked by owners is not delaying to make decisions that mean owner should decide on things on time before things goes wrong (RII=0.74). The third and the fourth issue are: owner's contribution to design and owner organization nature (Public or Private) with RII=0.59 and RII=0.58 respectively.

The owner's contribution to design doesn't have that much effect on quality but if the contractors participated it is good for quality according the interview with professional. The other issue ranked fourth is owner organization nature (public or private) now a day weather public or private doesn't have that much effect because both clients are try to keep quality in their own way. In the past government projects doesn't have that much control especially in terms of quality but now according the interview of professionals the situation is improved in government projects.

### 4.3 Summary of results and findings

The quality management practices of contractors are assessed in section 4.2 and 4.3 of this thesis both by interview and questionnaires. The first emphases are to differentiate the contractor's works that are public, private and cooperative. According to the result majority of contractors clients are public sectors then private sectors. So, this indicates our (Ethiopia) public sectors are more influenced by contractor's quality management activities.

The contractors priorities are also assessed in this section the most important and highly prioritized factors by the contractors are project cost budget this shows most of contractors are

focused on how to be profitable but only focusing on cost doesn't bring profit because the other factors like quality work and time are highly important for more profitability of contractors.

The perception of contractors on quality are different the majority of contractors perceived quality works gives competitive advantage for the contractors by creating another work to get in the future. The next perceptions of the contractors are elimination of defects by doing quality works they can increase profit. In general contractors have different perception about quality there is no common understanding about quality this makes it the company direction on quality to manage difficult .

The other issues in this chapter are quality improvement program of the companies also analyzed. Types of quality improvement program are also included in this chapter like ISO 9001, Total quality management, quality control/quality assurance. From these types of quality improvement program quality control/quality assurance is mostly used type in Ethiopia but above half of Ethiopian contractors did not answer what types they use.

The major objectives of the contractors using quality improvement programs are assessed and the result shows compliance with statutory, environmental and safety requirements were the major objective of around 29% contractors. The second objective selected by contractors is increase productivity (around 19% contractors). The third objective selected by contractors is cost reduction (around 13% contractors). (38%) of the contractors didn't state their objectives.

The main factors affecting quality of building construction projects are analyzed in this chapter. The number of the main factors are 12 here is their list project, design, contract, materials, labors, equipment, subcontractors, site layout, systems, site staffs, financial and owner. The above main factors have their own sub factors which are 48 in numbers. All the main factors and sub factors are ranked by the contractors which are helpful for the contractors in order to concentrate on the factors that influence highly the quality of the project. The labor force and Design related issues have high degree of effect on quality in Ethiopia The labor force has an effect on the project according to the contractors the labor don't have enough skill, miscommunication because of different language they used and they come directly from rural area of Ethiopia. Design related issues happened mainly because of reliability of all information used as basis of the products for projects. The other is reliability of design solution and detailed specification.

## CHAPTER FIVE

### CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Conclusions

The following conclusions are made based on the finding of the result:

- 1) The contractors involved in building construction projects are aware of the concept of quality and quality management but its application was relatively low, (50%). The contractor's main focuses are more on finishing the work on time and with profit than practicing quality.
- 2) The majority of the contractors, (40%) don't implement quality management system in their company. The contractors which implement QMS like: ISO 9001 and quality control/quality assurance have better quality understanding and practice than the contractors who doesn't implement quality management system as it understood from the analysis of the study. And also the contractors that implement quality management system have their own objectives about their quality management system this helps them to achieve quality and other related issues like for example success in finance and bidding.
- 3) Building construction projects in Ethiopia are suffering quality problems and this study identified that, Labors related issues are the most common among the twelve different problems examined in this study and very important for the success of quality practices. Labors with experiences, training, communication skill, income level and wage of labors, and motivation system are very important sub-factors in order to get high quality.
- 4) Design related issues are the second most important problem to reduce the quality problem issues in Ethiopia building construction projects. Design related issues like completeness and consistency of design document is very important for success of quality.

## **5.2 Recommendations**

The following points are recommended to contractors in order to improve their quality management system.

- 1) The management of contractors should effectively use quality management system to develop or grow the potentials of their employees to increase the quality of construction work and the efficiency of their company.
- 2) Ethiopian contractors should have to give training at different level of the company about quality management techniques.
- 3) The Government bodies should encourage contractors to get ISO 9001 system certificate in their company. For example, by asking contractors about details information about their company quality management system during bidding of public building construction projects and considering ISO 9001 certification as bidding requirement during tender.
- 4) The contractors should give great attention on the factors affect quality like: labor related factors; design related factors; systems related factors; site staff (cooperation, understanding, experience); materials related issues; financial Issues; subcontractors related issues; contract related issues; site layout related issues; owner related issues; and project related issues. The above factors should have to get emphasis according to the importance they have on quality. So, these factors are essential for the contractors to solve quality problem on the construction projects.
- 5) The present study is a first step towards highlighting the major issues that need attention to improve the quality of building construction projects in Addis Ababa. More efforts are still needed to investigate ways to formulate management systems (policies and procedures) to handle each factor individually.

### **5.3 Limitation of the Study**

While the findings of the current study shed light on the quality management practices among Grades 1 building contractors of the results have to be seen in light of some limitations. The research only considered Grades 1 building construction companies in Addis Ababa.

Since the concept of quality management system is somewhat sensitive to the company in consideration there was a sense of limitation on the degree of willingness of responses. Seeking for approval to gather the required data has made it difficult to collect the questionnaires on time. Hectic work schedule and unavailability upon request of respondents was also another factor on the punctual collection of responses.

### **5.4 Future Studies**

The findings of the study make a valuable contribution in raising the awareness and further stressing on the importance of quality management system in building construction companies. In addition, it has extended existing knowledge by comparing the quality management systems among Grade 1 of building contractors in Addis Ababa. Furthermore, it was suggested on how lower grade contractors can better firm competing advantages by aiming to implement quality management system.

Future researches can be conducted in detail and incorporating various project based organizations to compare their quality management practice and contribute to growth of the discipline. As the context of this research aimed at the building construction sector future studies could be conducted on different schemes of construction as road, bridge or water works construction. Another shift in context could be to change the location of the study and compare quality management practices of building constructions in Addis Ababa with other cities in Ethiopia.

## REFERENCES

- Abdul-Rahman, H. (2011). *Study of Quality Management in Construction Projects*. University of Malaya, Kuala Lumpur, Malaysia
- AbebeDinku, 2016, “*construction overhaul overdue*”, Addis fortune Newspapers online available at: <http://addisfortune.net/interviews/construction-overhaul-overdue/> (Accessed on 27th October, 2020).
- Agbenyega, I. (2014). *Quality Management Practices of Building Construction Firms in Ghana*. Unpublished Manuscript, University of Kwame Nkrumah, Ghana.
- Aida, T. (2015). *Assessment of Quality Management practice on Organizational Performance in three selected Engineering Consulting Companies in Addis Ababa, Ethiopia* (Unpublished).
- American Society for Quality, what is quality? Available at: <http://www.asq.org>, (accessed October 25, 2020).
- Anane M., 2017, *Assessment of Quality management Practice of Hospital Construction Project*. MBA Thesis, ST.Mary’s University, Masters of Business Administration in Project Management.
- Asefa, B. (2018). *Assessment of Quality Management Practices of Ethiopian Contractors Focused on building construction projects*. (Master’s Thesis). Addis Ababa University, Ethiopia.
- Ashokkumar, D. (2014). Study of Quality Management in Construction Industry. *International Journal of Innovative Research in Science, Engineering and Technology*. 3(1), 36-43.
- Ayalew, T., Dakhli, Z. and Lafhaj, Z. (2016). Assessment on Performance and Challenges of Ethiopian Construction Industry. *Quest Journals* 2(11).01-11.
- Behzad Abbasnejad, 2013, *Poor Quality Cost in Construction: Literature Review* Master of Science Thesis in the Master Degree Programme, Design and Construction Project Management Department of Civil and Environmental Engineering Division of Construction Management Chalmers University of Technology Gothenburg, Sweden.



- Beshah, B. and Kitaw, D. (2014).Quality Management Practice in Ethiopia.*Academic Journals*.8(17).689-699.
- Biniyam A., 2018, *Assessment of Quality management Practice of Ethiopian Contractors focused on building construction project*. MSc Thesis, Addis Ababa University, School of Construction Technology and Management.
- Birhanu, B, and Daniel, K. (2014).*Quality Management Practice in Ethiopia*, African Journal of Business Management.
- Birhanu, B. (2011), *Quality Management and Engineering Practices and challenges in Ethiopia*, Addis Ababa Institute of Technology.
- Chung H.W., 1999, *Understanding Quality Assurance in Construction a Practical Guide to ISO 9000 for Contractors*, E & FN Spon published in the Taylor & Francis e-library, 2002.
- Crawford, J. (2002). *Project Management Maturity Model Providing a Proven Path to Project Management Excellence*, Project Management Solutions, Inc.Havertown, Pennsylvania, New work.
- Deming, W.E. 1990, *Out of the crisis*, Center for Advanced Engineering Study, MIT Cambridge Mass.
- Harold, K. (2003). *Project Management a Systems Approach to Planning, Scheduling, and Controlling*, 8th, Division of Business Administration Baldwin- Wallace College Berea, Ohio published by John Wiley and Sons.Inc, Hoboken,New Jersey.
- Harris, F. and McCaffer, R. (2001).*Modern Construction Management*. 5th ed. London: Blackwell Publishing.
- Harris, F., McCaffer, R., and Edum, F. (2006).*Modern Construction Management*, London Blackwell Publishing.
- Juran, J. M. and Godfrey, B. A. (1999).*Juran's Quality Handbook (5th ed)*. New York, NY: McGraw Hill.
- Kerzner, H. (2017). *Project Management – A Systems Approach to Planning, Scheduling and Controlling*.Hoboken, New Jersey: John Wiley and Sons, Inc.
- Kitaw, D and Bete, F. (2003). Quality Management: Efforts and Problems in EthiopianManufacturing Industries. *Journal of EEA*. 20. 1-20.

- Lakshmi R., 2015, “Quality Control and Quality Assurance in Building Construction” available at: [http:// www.internationaljournals.org](http://www.internationaljournals.org) (Accessed on 1st September, 2020)
- PMI (2008). *A Guide to the Project Management Body of Knowledge (PMBK Guide)*. Pennsylvania, USA: Project Management Institute Inc.
- PMI (2013). *A Guide to the Project Management Body of Knowledge (PMBK Guide)*. Pennsylvania, USA: Project Management Institute Inc.
- Rumane, D. A. (2011). *Quality Management in Construction Projects*. CRC Press Taylor and Francis Group.
- Shen, Y. (2000), *An integrated approach to innovative product development using Kano’s model and qfe*, European Journal of Innovation Management.
- Tan, chin-keng and Abdul-Rahman, 2005. *Study of quality management in construction project*. University of Malaya, Kuala Lumpur, Malaysia
- Teklebrhan K., 2014, *Assessment of the Impact of ISO 9001 Certification on Ethiopian Construction Companies*. MSc Thesis, Addis Ababa Institute of Technology, School of Civil and Environmental Engineering.
- Vincent, O. & Joel, R. 1995, *Principles of total quality*. Kogan Page, CRC press, London.
- Wysocki, R. (2014). *Effective Project Management*. (7th, Ed.) John Wiley & Sons Inc.
- YimamAbadir H., 2011, *Project Management Maturity in the Construction Industry of Developing Countries (the case of Ethiopian contractors)*. MSc Thesis, University of Maryland, available at: <http://gradworks.umi.com/14/96/1496393.html>, (Accessed on 2nd September, 2020).
- Yohannes K., 2020, *Quality Management Practice in Building Construction Companies in Ethiopian in the city of Addis Ababa*. MSc Thesis, Addis Ababa University, College of Business and Economics.

# APPENDICES

**APPENDIX-A  
QUESTIONNAIRE**

**St. Mary's University**

**Project Management Department**

**M.A thesis on Assessment of Quality management practice of Grade one Building  
contractors in Addis Ababa.**

**Dear Respondent,**

I am kindly requesting your willingness to participate in this research “**Assessment of Quality management practice of Grade one Building contractors in Addis Ababa.**” The questionnaire is designed for partial fulfillment of MA in project management.

It is believed that your participation in this research will contribute in achieving objective of the research. Thus the quality of your response towards the question item determines the quality of the research result. Therefore please answer the question as objectively and honestly as possible and according to the instruction contained in body of the questionnaire. Finally, I want to assure you that all information provided in this survey will be treated with strict confidentiality and allowed to serve for the purpose of the research under consideration. If you have any question please feel free to contact me through the provided addresses.

Thank you in advance for your cooperation!!

**Contact Address**

AzebFisseha

E-mail: [azebfisseha2468@gmail.com](mailto:azebfisseha2468@gmail.com)

Phone

No:

0913728232

## SECTION I: Demographic profile of the company

Please put a tick mark “√” the one that represents you most appropriately.

1. Name of company (Optional) \_\_\_\_\_

2. How many years of firms experience in the construction industry?

[1] 1-5 years  [3] 11-15 years

[2] 6-10 years  [4] >15 years

3. How many number of projects executed in the last five years?

[1] Less than 10  [3] 16-20

[2] 11-15  [4] >20

4. Major Clients of the firms are?

[1] Public

[2] Private

[3] Cooperatives

[4] Others (please specify): \_\_\_\_\_

5. Priorities given to Some Factors in the company?

Please put a **tick mark** “√” in the appropriate column according to the degree of Priority

Factors	Degree of Priority		
	Low[1]	Moderate[2]	High[3]
Achieving Success during tender			
Meeting Project Cost Budget			
Meeting Quality Standards			
Meeting Project Time / Deadline			
Satisfying Client’s brief			
Meeting Health and Safety Standard			

## SECTION II: Basic Information Regarding to Quality and Quality Management System

Please put a tick mark “√” the one that represents you most appropriately.

6. In your perspective, which one of the following words can define Quality?

- [1] Conformance to specifications
- [2] Conformance to requirements
- [3] Meeting customer expectation
- [4] Meeting specified requirements

7. What is your organization’s perception of quality?

- [1] Elimination of defects
- [2] A tool to increase profits
- [3] A competitive advantage
- [4] Others (please specify): \_\_\_\_\_

8. Does your organization implement quality management system?

- [1] No (Please go to next section of question)
- [2] Such a plan is under consideration
- [3] A quality improvement plan has been a part of corporate policy
- [4] A quality improvement program has been implemented recently

9. If your organization implements quality management system, what type of quality management system mostly practices in your organization?

- [1] ISO 9001
- [2] Total Quality Management
- [3] Quality Control /Quality assurance
- [4] Others (please specify): \_\_\_\_\_

10. If your organization implements quality management system, what is the major objective of quality management system practice in your organization?

- [1] Involvement of employees in the quality building effort
- [2] Increase productivity
- [3] Cost reduction
- [4] Compliance with statutory, environment and safety requirement

**SECTIONIII: Main problems facing on the quality of building construction**

The following are main problems that effect on the quality of construction projects. Please indicate your level of agreement on the following statements regarding to your project

Please put a tick mark “√” the one that represents you most appropriately.

<b>Main problem effect on Quality</b>		<b>Very Low important (1)</b>	<b>Low important (2)</b>	<b>Medium important (3)</b>	<b>High important (4)</b>	<b>Very High important (5)</b>
1.	Project (type and complexity) related issues					
2.	Design related issues					
3.	Contract related issues					
4.	Materials related issues					
5.	Labors related issues					
6.	Equipment related issues					
7.	Subcontractors related issues					
8.	Site layout of the project					
9.	Systems (quality control, cost control, safety program )					
10.	Site staffs (cooperation, understanding, experience)					
11.	Financial Issues					
12.	Owners (public, private)					

**SECTIONIII: Sub- problems facing on the quality**

The following are Sub-problems that effect on quality in the construction projects. Please indicate your level of agreement on the following statements regarding to your project

Please put a tick mark “√” the one that represents you most appropriately.

<b>A. Labor related problems on quality practices</b>		<b>Very Low important (1)</b>	<b>Low important (2)</b>	<b>Medium important (3)</b>	<b>High important (4)</b>	<b>Very High important (5)</b>
1.	labors experience					
2.	Communication skills of labors					
3.	Motivation System					
4.	Training courses for labors					
5	Income level and wages of labors					
<b>B. Design related problems on quality practices</b>		<b>Very Low important (1)</b>	<b>Low important (2)</b>	<b>Medium important (3)</b>	<b>High important (4)</b>	<b>Very High important (5)</b>
1.	Drawings are prepared in details.					
2.	Bill of quantity is detailed and accurate.					
3.	Completeness and consistency of design documents.					
4.	Conformance to codes and standards.					



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<b>C. Systems related problems on quality practices</b>		<b>Very Low important (1)</b>	<b>Low important (2)</b>	<b>Medium important (3)</b>	<b>High important (4)</b>	<b>Very High important (5)</b>
1.	Quality control and quality assurance system					
2.	Cost control system					
3.	Time Schedule					
4.	Safety program					
<b>D.Site staffs related problems on quality practices</b>		<b>Very Low important (1)</b>	<b>Low important (2)</b>	<b>Medium important (3)</b>	<b>High important (4)</b>	<b>Very High important (5)</b>
1.	Skill and experience Contractor's staff					
2.	Skill and experience of Supervision staff					
3.	Understanding of contract administration by Supervision					
4.	Cooperation between Supervision and Contractor's staff					

<b>E. Materials related problems on quality practices</b>		<b>Very Low important (1)</b>	<b>Low important (2)</b>	<b>Medium important (3)</b>	<b>High important (4)</b>	<b>Very High important (5)</b>
1.	Applying material management system					
2.	Cooperation between contractor and material suppliers					
3.	Construction materials quality					
4.	Storage and handling system					

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<b>F. Equipment related problems on quality practices</b>		<b>Very Low important (1)</b>	<b>Low important (2)</b>	<b>Medium important (3)</b>	<b>High important (4)</b>	<b>Very High important (5)</b>
1.	Availability of Equipment					
2.	Equipment management system					
3.	Measurement of equipment Productivity					
4.	utilization of equipment					
5.	Equipment maintenance					

<b>G. Finance related problems on quality practices</b>		<b>Very Low important (1)</b>	<b>Low important (2)</b>	<b>Medium important (3)</b>	<b>High important (4)</b>	<b>Very High important (5)</b>
1.	The amount of contractors cash flow					
2.	The non-delay of interim payments					
<b>H. Subcontractors related problems on quality practices</b>		<b>Very Low important (1)</b>	<b>Low important (2)</b>	<b>Medium important (3)</b>	<b>High important (4)</b>	<b>Very High important (5)</b>
1.	Company's methods and procedures of selecting subcontractors					
2.	Cooperation between subcontractors and contractor					
3.	System to evaluate subcontractors performance					
4.	Subcontract conditions					

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<b>I. Site layout related problems on quality practices</b>		<b>Very Low important (1)</b>	<b>Low important (2)</b>	<b>Medium important (3)</b>	<b>High important (4)</b>	<b>Very High important (5)</b>
1.	Site layout is large and suitable for movement of labors and equipment					
2.	Site layout is organized					
3.	Site layout has storage areas for materials					
4.	Site is clean					
<b>J. Contract related problems on quality practices</b>		<b>Very Low important (1)</b>	<b>Low important (2)</b>	<b>Medium important (3)</b>	<b>High important (4)</b>	<b>Very High important (5)</b>
1.	Cooperation between parties involved in contract					
2.	Previous relations between parties (good or bad)					
3.	A written contract with conditions clear and fair and responsibilities distribution is clear					
4.	Using a standard contract					

**Assessment of Quality management practice of Grade one Building contractors in Addis Ababa**

<b>K. Project related problems on quality practices</b>		<b>Very Low important (1)</b>	<b>Low important (2)</b>	<b>Medium important (3)</b>	<b>High important (4)</b>	<b>Very High important (5)</b>
1.	Scope of the project ( type and nature of the project)					
2.	Location of the project					
3.	Site access					
4.	Period of the project					
<b>L. Owners related problems on quality practices</b>		<b>Very Low important (1)</b>	<b>Low important (2)</b>	<b>Medium important (3)</b>	<b>High important (4)</b>	<b>Very High important (5)</b>
1.	Owner organization nature (Public or Private)					
2.	The Owner is not delaying to make Decisions					
3.	Owner's contribution to design					
4.	Owner's emphasis on quality					

## **APPENDIX- B**

### **Interview question**

1. Would you tell me your current position in your organization, level and type of your education and experience on construction project?
2. From your experience, in your organization how could quality expressed in building projects?
3. What do you think major objectives of quality management in the construction company?
4. Is there any quality management program your organization implements?
5. What are the problems that you think will affect the quality of construction projects during construction phase?