Addis Ababa institute of technology
School of civil and Environmental Engineering

Review of Time Extension Delay Analysis Techniques and Trend with Selected Construction and Consulting Firms in Addis Ababa

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(Construction Technology and Management)

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DECLARATION

I the undersigned declare that this thesis work is my original work and has not been presented for a degree in any other university. All sources of materials used for the thesis have been duly acknowledged.

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DATE *2nd JUNE 2016*

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ABSTRACT

The complexity of the construction industry due to different stakeholders' involvement makes it differ from other industry. This complexity gives rise mostly to unwanted situation like Delay and time Extension with their attached effects. The aim of every construction project is to meet the objectives of time, cost and quality. If the project is not completed on its time, and/or on its budget cost and/or on specified quality unsatisfactorily, claim or dispute may raise between stakeholders.Delay claims are extremely complex and difficult to resolve, for this reason projects requires an effective and reliable method to minimize the cause and effect of construction delay.That is why this research is focused on assessment of delay and time extension analysis techniques and trend with selected consulting firms in Addis Ababa.

To achieve the study objectives, a critical review of relevant literature was done coupled with questionnaire. Case studies also carried out to show the gap between delay and time extension analysis techniques recommended in literatures and trends with selected consulting firms. The research surveyedSix (6) samples Grade one consulting firms around Addis Ababa to assess the techniques that how time extension delay analysis are prepared and evaluatedcompared with literature and as per the standards stipulated in contract provisions.

The findings of this research indicate that, the consultants surveyed and the contractors worked with themhavelack of experience in preparing and evaluating time extension delay analysis in acceptable, procedural and scientific ways as per the standards stipulated in contract provisions. Some concepts which are familiar in developed countries, like Time at large and No damage for delay provision are not familiar in Ethiopian construction industry. Concurrent delays are not also exercised in most of the consulting firms.

According to the research (34.78%) of the clients agree projects are completed with 200-300% time extension of the original contract time. Thus, Project delays are the major cause of claims of time extension and associated cost overrun.

Finally, this thesis addressed the need of standard guide manuals how time extension claim to be prepared and settled in accepted and consistent ways in all construction and consulting firms in Addis Ababa, and forward recommendations on how to improve the existing prevailing situations.

Key Words: Claims, Conditions of Contract, Construction Industry, Delay, Concurrent, Time at large, Construction Contracts, Excusable, Compensable, Time Extension and No damage provision

ABBREVIATIONS/ACRONYMS

DAT……..... Delay Analysis Techniques

EOT……..…. Extension of Time

EEA……..…. Ethiopian Economic Association

FIDIC…….. FédérationInternationale des Ingénieurs-Conseils

GDP……... Gross Domestic Product

ISIC……..... International Standards Industrial Classification

PPA .....…...Public procurement agency

LADs .....…...liquidated and ascertained damages

GLOSSARY

Conditions of Contract: general terms and clauses of the contract concerning the duties,obligations, liabilities etc. of both parties where it describes the guidelines to be employed incontract administration.

Construction Industry: a sector involved in the planning, execution and evaluation of all types ofcivil works.

Contract: a construction contract that comprise the letter of acceptance, contract agreement,conditions of contract (general and particular), specification, drawings, BOQ and any furtherdocuments (if any).

Engineer: a consulting firm or a person representing this firm appointed by the employer for thepurpose of the contract i.e. contract administration, construction supervision etc.

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CHAPTER ONE

1.1 Introduction

In order to discuss one of the problems of the construction industry, Delays, which are the major cause of claims, we need to have a clear definition of the industry itself and its role in country's economy. According to UN (1996) International Standards Industrial Classification (ISIC), Rev. 3, construction is defined generally as an economic activity directed to the creation, renovation, repair or extension of fixed assets in the form of buildings, land improvements of an engineering nature, and other such engineering constructions as roads, bridges, dams, etc.

Construction industry makes significant contributions to the socio-economic development process of a country. It contributes to the national output and stimulates the growth of other sectors through a complex system of linkages. It contributes to employment and creates income for the population and has multiplier effects on the economy. The construction industry employs large unskilled labor.

The construction industry has also important contributions to the Ethiopian economy, as demonstrated by its share in the GDP. For instance, the share of the sector in the total GDP averaged at about 5.2 percent in the period 2002/03 - 2006/07.)

However, with all the above advantages, the industry is complex due to different stakeholders' involvement. This complexity gives rise mostly to unwanted situation like project delay, project termination and disputes. It is almost becoming a rare thing for a project not to have delay, thus becoming a normal occurrence in all construction projects.

It has been understood that the construction industry has special features that are not usually encountered in other industries (Antil and woodhead ,1990) Therefore it requires unique management. The project management starts at project development and ends at project completion. Improper management leads the project to claims mostly caused by delay of projects [Ismael Ibrahim 1996]. Construction projects are time bounded. Each project has predetermined duration with defined beginning and completion time.

But, Construction projects may not go smoothly as planned due to uncertainties about events in the future. Delays, which are the major cause of claims, may occur due to unforeseen site condition; increase in scope of work and others. These delays which raise during construction leads the parties in the construction to conflict (dispute) [Ismael Ibrahim 1996].

AbdoAbatemam (July 2006) describe in his thesis that, the actual completion time ranges from 110% to 467% of initial contract time for individual projects. Forty nine out of fifty two public building projects suffered delays in their execution. The average time for fifty two building project under his analysis is found to be 189.9% of the initial contract time.

Project delays are the major cause of claims of time extension and associated cost overrun. The consequence of delay may be increased construction cost; time extension (if caused by owner) liquidated damage if caused by the contractor). A lot of researches have done about the fundamental cause of delay in construction and sufficient literatures are written in related with. But so far adequate researches are not done about the deviation between the evaluation methods for time extension requests applied by Ethiopian consulting firms and internationally accepted time extension analysis techniques. I have been involved in the construction industry for over 17 years, as a resident Engineer in consulting offices and both at project level and at head office in different managerial positions in Construction Companies. During this time, I have never seen a project completed within the contract time set on the contract and many of them suffered extreme delays and some of them are in dispute. So since I got a chance to involve in time-related disputes and claims both as consultant and contractor, I have observed that most of the construction claims prepared by contractors are not logical and excusable. In addition those defective claims are not submitted on the specified time on the contract. Consulting offices also carried out the time extension delay analysis subjectively with personal judgment of the professional and not in procedural and scientific ways as per the standards stipulated in contract provisions. There is no consistency on the assessment of extensions of time and prolongation claims even in same company professionals. The engineer, or the consultant, or employer many times fails to grant an EOT, with in the period contemplated by the contract. That is why this research is to be focused on assessment of delay and time extension analysis techniques and trend with selected consulting firms in Addis Ababa.

Failure to complete the construction works according to its prescribed schedule became the reason for the existence of extension of time clause in the contract. Extension of time (EOT) is the additional time granted to the contractor to relieve it from liability for liquidated and ascertained damages(LADs) and to prove an extended contractual time period or date by which the works are to be, or should have been completed.

It is generally understood that claims are an inevitable fact of the civil engineering profession. They are unavoidable at least up to the present. The best that practicing engineers can do is, therefore, to minimize the impact of such claims, attempt to keep project cost within budget and in some cases mitigate the damage that may result. Girmay Kahsay (2003)

Claims for EOT must be based on delays that are caused by the owner or the owner's agents, or on delay due to acts of God or based on the provision clauses in the form of contract. Under the study in construction time overrun in Florida have identified two kinds of causes of time overruns of construction projects. These are external and internal causes.

An EOT provision is inserted in a construction contract for the benefit of both the employer and the contractor, its insertion is primarily for the advantage of the employer. If there was no EOT provision, once the employer had caused delay to completion of the works, it would no longer be able to reply on the liquidated damages provision in the contract. In such circumstances, the contractor's obligation would be to complete within a reasonable time in all of the circumstances. (James. R. Knowles, 2005).

Further, even if there is an EOT provision, if the engineer, or the consultant, or employer fails to grant an EOT, with in the period contemplated by the contract, the employer may lose its rights to grant an EOT, and the result would be the same as if there had been no EOT provision, i.e. time would be set at large and the employer could no longer rely on the liquidated and ascertained damages provision on the contract.

Most contractors have had experience of their EOT submissions being assessed through a 'wet finger in the air' and/or a quick guess at what 'they can get away with' technique, rather than the application of a logical and analytical method involving the programmed and a critical path analysis-based technique.

In October 2002, the Society of Construction Law (SCL) published its 'Delay and Disruption Protocol'. This protocol provides guidance to people dealing with submissions for extension of time and delay claims, both during a contract and after completion of the works. The protocol envisages that decision-takers (e.g. contract administrators, adjudicators, dispute review boards, arbitrators, judges) may find it helpful in dealing with time-related issues. Therefore, effectively managing EOT will be vital to help contractor to escape from liquidated damages and saves the client from suffering delay in completion time.

1.2 Significance of the Study

The research could have the advantage of pointing out the deviation of EOT request and assessment techniques between the trend with selected construction and consulting firms in Addis Ababa and Mostly recognized techniques,. More specifically, this research has the following major significance.

1. It helps the parties involved in construction industry how to submit application of time extension delay analysis in a logical and analytical method and evaluating delay analysis with the recognized and acceptable techniques.
2. It could also serve as springboard for further studies in the area about the need of standard guide manuals how time extension claim to be prepared and evaluated in logical acceptable and consistent ways in all construction and consulting firms.

1.3 Research Questions

The study focuses on the following research questions to achieve the aforementioned objectives.

1. What are the fundamental causes of claims and degree of fairness of time extension requests which are submitted by the local contractors engaged in building project?
2. Do contractors give notice for intent of time claim?
3. What are the techniques used by the consulting firms to assess the time extension delay analysis?
4. Do consultants or clients give Time claim response as per the standard stipulated in the contract?
5. Do Contractors and Consultants in this research apply “Time At Large” concept?
6. Do Consultants in this research apply “Concurrent Delay?
7. What are the procedures and scientifically accepted time extension delay analysis techniques.

1.4 Statement of the Problem

Past researches shows that delays are endemic to construction projects in Ethiopia and the delays encountered in most of the projects range between 100% and 460% of the original contract time. Thus, Project delays are the major cause of claims of time extension and associated cost overrun.

Construction projects are time bounded. Each project has predetermined duration with defined beginning and completion time.

But, Construction projects may not go smoothly as planned due to uncertainties about events in the future. Delays, which are the major cause of claims, may occur due to unforeseen site condition; increase in scope of work and others. These delays which rise during construction lead the parties in the construction to conflict (dispute). Delay claims are extremely complex and difficult to resolve.

In addition, even though, some of the delays submitted by contractors are non excusable, most of the consultants and clients grant extensions of time for contractors fearing the prolonged justice process in the country. Thus contactors take this as an advantage to cover their fault on attaining the project completion time and they don't request financial claims since they know they are not entitled. All parties provide unconvincing reasons for the non performance of the contract that leads the users to extreme cost overrun and excessive project completion time delay.

1.5 Scope of the research

The study is encircled to assess the causes of delay provide by contractors and the time extension delay analysis assessment techniques applied by randomly selected construction and consulting firms in Addis Ababa and limited for buildings constructed from 2000 – 2008 G.C under their supervision .

1.6 Objective of the study

The main objective of this research is to carry out a survey on submitted cause of delay by the contractors and review of time extension delay analysis techniques and trend with selected consulting firms in Addis Ababa to handle for buildings constructed from (2000 – 2008 G.C). The specific objectives of this study are:

1. To evaluate the fairness of time claim request by the contractors which are working with those selected consulting firms.
2. Evaluate the fairness of approval of time extension in selected consulting firms in Addis Ababa
3. To show the gap between delay and time extension analysis techniques recommended in literatures and trends with selected consulting firms.
4. Forward applicable time extension delay analysis techniques
5. Address the need of standard guide manuals how time extension claim to be settled in accepted and consistent ways in all consulting firms and indicate further areas of study.

1.7 Ethical Considerations

This study will be conducted in a manner that is consistent with ethical issues that need to be considered in conducting a research. Hence, most individuals, which I will visit for informal interview and questioner, hopefully will accept and cooperate with me. A prior consent of the participants will be requested before conducting the interview and administering questionnaire. Informants who do not want to be their names to appear in the research will be named as anonymous informants. The name of institutions and professionals participated will be recorded confidentially. The result of this survey is intended to serve only for academic purpose.

1.8 Organization of the Study

The paper is organized into four chapters. The discussion of the problem, objectives and method of the study is followed by literature and conceptual issues that inform the subsequent part of the study. The paper discusses the major causes of delays submitted by Ethiopian contractors and method of evaluating of those time extension delays by consulting firms in Addis Ababa. Assessment had been undertaken to come close, to logical and acceptable time extension request and its evaluation. On the fourth chapter, there will be discussion based on the data collected from the different sources. Finally, the paper ends up with some concluding remarks and recommendations.

CHAPTER TWO

Literature Review

2.1 Definition of Delay

Definition of delay: - A 'real' delay may be defined as a period during which a contractor cannot employ his men or machines or staff at their normal intended output, having regard to the nature and amount of work which is available under the agreed program of working or under practicable rearrangement of the program. [ACT. WORT 1966]

Delay in general could be defined as **"to act slower than desired/planned".**(Dr. Khaled Ahmed Al-Naas Dec.2014

On the other hand delay also defined as the principal dimension measured by schedules McGraw-Hill (1998). According to the writer delay to the private owner mean, a loss of revenues through the resulting lack of production facilities and rentable space, as well as through continuing dependence on present facilities. To the public owner, it can mean that a building or facility is not available for use at the planned time. Finally, to the contractor, delay means higher overhead costs that result from the longer construction period, higher prices for materials resulting from inflation, and escalation costs that are due to labor cost increases. Further, working capital and bonding capacity are so tied up that other projects cannot be under taken.AbrhamAregawiet.al B.Sc Thesis.

2.2Types of Delay in Construction

1. Excusable Delay–Employer's delay.
2. Non-Excusable Delay–Contractor's Delay
3. Compensable Delay–Employer's delay.
4. Non-Compensable DeLay–Contractor's Delay or otherwise stated in the Contract.
5. ConcurrentDelay-whentheownerandcontractorareconcurrentlydelaythework

(Dr. Khaled Ahmed Al-Naas Dec.2014)

2.2.1 Excusable Delays

Excusable delays are delays that occurred due to causes which are beyond the control of project doer. If delays are caused by project owners, the contractor or the consultant or the supplier is directly justified for the effects on delay of the project. Force Majeure will also be one of the causes for justifiable delay. (Wubishet Jekale 2006)

Delays resulting from the following events would be considered excusable:

a. General labor strikes

b. Fires

c. Floods

d. Acts of God

e. Owner-directed changes

f. Errors and omissions in the plans and specifications

g. Differing site conditions or concealed conditions

h. Unusually severe weather

i. Intervention by outside agencies

j. Lack of action by government bodies, such as building inspection

They are broken down further into compensable or non-compensable Excusable delays.

2.2.2 Non Excusable Delays

Non - Justifiable or Non - Excusable Delays are delays that occurred due to negligence to fulfill contractual obligation and are within the control of the contracting parties. Contractors or Consultants or Suppliers will be liable for Non - Justified delays.

Non excusable delays are delays, which the contractor either causes or assumes for the risk. These delays might be the result of inadequate scheduling, mismanagement, construction mistakes, equipment break down problem, staffing problem etc. such types of delays are inherently the contractors responsibility in which he is subjected to contractually imposed Liquidated and Ascertained Damages.

2.2.3 Compensable excusable delays: -these are delays for which the contractor is entitled not only to an extension of time but also to adjustment for any increase in cost caused by the delay.

Excusable, compensable delays are classified as “Owner Responsible Delays”. An excusable, compensable delay, in addition to granting time extension, warrant monetary compensation to the contractor for extra costs incurred – commonly referred to as delay damages. Generally, compensable delays constitute a delaying event that is within the control of, is the fault of, or is due to the negligence of the owner. A compensable delay occurs when

(1) The delay is caused by the owner or someone within the owner’s control,

(2) The delays results in actual monetary damages to the contractor, and

(3) The contractor has not assumed risk to delay through a "No Damages for Delay" clause. If such a clause should exist in a contract, the contractor is entitled to seek time extension for owner-caused delays, but not compensation.

On projects with contracts that do not contain a "No Damages for Delay" clause, the following is a list of possible compensable delays:

• Owner's failure to furnish the site to the contractor by an agreed date
• Faulty design
• Incomplete drawings and specifications
• Changes in scope
• Suspension of work
• Differing site conditions
• Late delivery of owner-supplied materials

When drafting the contract, the contractor may wish to include a clause specifically related to compensable delays (also referred to as owner-caused delays), which reinforce the contractor's right to recover damages under and express warranty. However, not doing so will not prevent the contractor from making future delay damages claims for compensable delays. Abrham Aregawi et.al (June 2008),

2.2.4 Non compensable excusable delays: -.Non-compensable excusable delays entitle a contractor to an extension of time only. In such type of excusable delay the contractor will not receive compensation for the cost of delay, but he/she will be entitled for an additional time to complete his work and is relived form any contractually imposed liquidated damages for the period of delay. Typically, this type of delay is caused by something beyond the control of either the contractor or the owner. For example, acts of God, unusual weather and labor disputes will entitle a contractor to additional time to complete the work, and is usually the contractor's only remedy.

Contractors may agree to make a compensable delay a non-compensable one by waiving their right to delay damages in exchange for an extension of time, and generally such waivers are valid. If a contractor specifies that a particular delay shall not be compensable, or has a valid No Damage for Delay provision, the delay is non-compensable for all practical purposes.

Many construction contracts include a No Damage for Delay provision, which purports to excuse an owner from contractual liability for any damages due to delay caused by the owner, its agents, or other contractors under its supervision. Contractors who face No Damage for Delay provisions

in the general or prime contract may often include a No Damage for Delay provision in their contracts with subcontractors as well, and may even do so by a specific incorporation by reference of the prime contract's delay provisions. Furthermore, No Damage for Delay provisions in a subcontract is held to the same standards as a provision in a prime contract.

Advocates for the No Damage for Delay provision believe that the clause is necessary and a positive aspect for a construction contract that such provisions help achieve fiscal stability and integrity; such provisions attempt to deflect troublesome litigation; such provisions intend to protect the public bidding process by ensuring that the lowest bid is actually the lowest bid; and that if contractors know that they alone will bear the cost of delay regardless of fault, the contractor will be less inclined to delay and attempt to extract delay claim money from the owner. Those against the No Damage for Delay provision believe that where a contract is competitively bid, the contractor is forced to increase the contingency factor for such foreseeable contingencies as inclement weather, increased costs, etc. It is argued that if the contract contains a No Damage for Delays provision, contractors will bid even higher in order to account for any unforeseen contingencies. Furthermore, some contractors will not engage in the competition under such terms because the risk of contractor default is significantly increased if delays for which compensation is barred are actually experienced.

No Damage for Delay provisions is enforceable in New York, as long as the basic requirements for a valid contract are met. Kushnick Pallaci (2010)

2.2.5 Concurrent, Classic and Serial Delays

2.2.5.1 Concurrent Delay

If only one factor is delaying construction, it is usually fairly easy to calculate both the time and money resulting from that single issue. A more complicated – but also more typical – situation is one in which more than one factor delays the project at the same time or in overlapping periods of time. These are called concurrent delays.

Concurrent delays occur when both owner and the contractor are responsible for the delay. Generally, if the delays are inextricably intertwined, neither the contractor can be held responsible for the delay (forced to accelerate, or be liable for liquidated damages) nor can he recover the delay damages from the owner. Until the development of CPM schedule analysis, there was no reliable method to differentiate the impact of contractor caused delays from owner-caused delays. With the sophisticated computerized techniques now available, however, it has become possible to segregate the impacts of apparently concurrent owner and contractor delays.

Concurrent delays are delays that occur simultaneously when they were carried out parallel. Their effect for the project can be assessed using that part of the work which causes longest delay and its consideration are made as such. For instance, if a project owner agreed to supply material and irrespective of its delay, if the project faced adverse weather condition; the project cannot be executed. Therefore, both delays could not be counted as serial delay but concurrent and the one that causes longer delay is considered for time delay computations. (Abebe Dinku etal.2000)

2.2.5.2 Classic Delay

These types of delay occur when a period of idealness and/or uselessness is imposed on the contracted work. These types of delays are excusable compensable delays. And they are called also owner caused delays. The contractor is entitled not only an extension of time but also monetary compensation caused by the delay.

The owner is responsible for both the time and cost effects of the delay. Moreover, the outer states that the contractor may claim the owner interfered with the work, did not deliver owner purchased equipment or supplies on site as promised, or that the owner's actions or inactions caused other delays.

2.2.5.3 Serial Delay

This is linkage of delays (or some times of different cases of a delay). Thus the effects of one delay might be amplified by a later delay. For instance, if an owner's representative delays review of shop drawings and the delay causes the project to drift into a strike or a period of severe weather, resulting in further delays, a court might find the owner liable for the total serial delay. Abrham Aregawi et.al (June 2008)

2.3Causes of Delay

There are many factors that contributed to causes of delays in construction projects. These range from factors inherent in the technology and its management, to those resulting from the physical, social, and financial environment. There are in total of seven groups of causes for delay in construction project

1: Causes of delay by client

2: Causes of delay by contractor

3: Causes of delay by Consultant

4: Causes of delay by materials

5: Causes of delay by equipment

6: Causes of delay by labors

7: Causes of delay by external factors

2.4 Identification of delay

Usually causes are categorized as contractor risk events, or employer risk events. Until any of these events are confirmed as having caused actual delay or intended to cause expected delay, they are only risk events. The type of the contract is a factor in defining the risk events and its allocation. For example, lump sum price and EPC contracts have the highest risks to the contractor and lowest to the employer while the re-measured contracts has the lowest risks to the contractor and the highest to the employer. Contractor's risk events in general are limited to the following:

1. Wrong assumptions;
2. Poor planning;
3. Unrealistic activity duration or interrelationships;
4. Low productivity of resources;
5. Lack of manpower and machinery resources;
6. Poor quality of work; (extensive remedies)
7. Commitment to HSE requirement;
8. Financial issues; and
9. Late delivery of the required materials.

Any delays that can occur due to any such events are non excusable and non compensable delays and the contractor is responsible to recover such delays at its own cost otherwise the contractor will be subjected to the application of penalties or liquidated damage clauses as stated in the contract.

Employer's risk events in general are the following:

1. Delay in handing over the job site;
2. Use or occupation by the employer of any part of the permanent works, except as may be specified in the Contract;
3. Different physical conditions from those provided during the tender stage;
4. Changes to the original contract scope;
5. Late engineering deliverable;
6. Late procurement deliverables;
7. Frequent revisions for engineering deliverable;

8. Delay in approval above the contractual allowance;

9. Delay in payment,

10. Out of sequence for engineering and procurement deliverables;

11. Suspension of the work;

12. Adverse weather conditions;

13. Changes to project specifications;

14. Force Majeure (War, hostilities, invasion, act of foreign enemies' revolution, terrorism, sabotage by persons other than the contractor's personnel, or civil war within the country, etc.); and

15. Existing underground utilities which are not shown in the as-built drawing received by the contractor during the tender stage.

Any delays occurring due to such events are excusable and compensable delays but the contractor at the same time is responsible to mitigate totally or partially the impact of such delays.

2.5 Requirements for Time Claims

Zewdu (May 2012) stated that the requirements for a valid Construction claim are three. These are: procedural requirement, substantive (also called legitimacy) requirement; and proof requirement.

2.5.1 Procedural Requirement: Notice

By procedural requirement, it means the contractor's obligation to give a notice of claim to the Engineer with a copy to the employer .The purpose of such notice is to show the contractor's intention to claim under the contract. And from the employer side also to be aware of the existence of some claim by the contractor and to take, whatever measures (like in relation to keeping of records) under the contract by the Engineer with respect to that claim.

The time period within which to provide notice shall be 28 days after the event giving rise to the claim first arisen. The notice provision is related to claims for additional payment. How about claims related to time?

Some standard conditions of contract (like the PPA Conditions of Contract for Works) contain an early warning system. This system has the effect of preventing or minimizing the effect of the claim. This is done before the claim event arises.

2.5.2 Substantive Requirement: Contract and /or Law

By substantive requirement it means supporting or giving justification for the claim by specifically citing or invoking the provisions of the construction contract under consideration; and/or of the applicable law;

The provisions of contract mean the relevant clause or clauses in the contract, which has been signed between the employer & the contractor. The provisions of the applicable law mean the relevant article or article of the law, which is applicable to the contract and to the claim.

2.5.3 Proof Requirement: Records & Evidences

By proof requirement we mean the submission of the relevant documentation, which supports and substantiates the claims under consideration. This is done in construction project through (contemporary) records. They form part of the appendix of the claim submission.

The contemporary records relating to any claim start from the actual timing of the event rather than to the giving of notice, thus indicating that the contractor needs to keep proper and suitable cost records available from the beginning of the Contract to be able to identify items which support the claims.

The possible records/proofs could be the following (John G. Sawyer & C. Arthur Gillot, 1990):

- site records;
- photographs;
- site diaries;
- daily weather reports;
- charts and maps;
- instructions;
- quality control documents;
- programs;
- drawings(dated when received);
- correspondences;
- tender analysis;
- analysis of appropriate unit rates;
- invoices;
- wage sheets;
- plant;

- fuel and labour records;
- minute of meetings;
- visitors, if any; and
- any other item supporting the claim;

2.5.4 Other Legal Requirements

This may include the obligation of the claimant (for example, the contractor) not to cause the claim event & the obligation of the claimant to minimize damages.

2.6 Process of Claims

The claims process generally classified in to the following three phases: (Wubishet 2009):

Claim Submittal; Claim Processing; and Claim Enforcement;

2.6.1 Claim Submittal

This is a process by which the claimant is obliged to claim within a reasonable period of time (28-30 days in most contracts) followed by the claimant's preparation for all substantial documents & legal aspects supporting its entitlements for an official submittal.

This constituted that a claim has been filed for its consideration if all the three sub processes called Claim Notification, Claim Preparation & Claim Submittal are fully undertaken by the claimant.

2.6.2 Claim Processing

This phase is classified further in to the following three sub-processes: Claim Handling;

Dispute Resolution; and Claim Approval;

The Claim Handling: This sub-process initiates checking of the claim whether, it is legally or contractually supported or not, documents provided are valid and reliable to substantiate the claim for consideration or not, and overall procedural requirements have been followed or not. After verifying the validity of the claim proper computations & evaluations will be carried out to present the proposed compensation for the contractual parties.

Claim Approval: Once the contractual parties agree on the final outcome of the claim process, then they have reached in to a stage where the claim is approved.

2.6.3 Claim Enforcement

This phase is sub-divided in to the following two sub-processes: Claim Enforcement; and Claim Closure.

Claim Enforcement: The claim enforcement sub-process will entertain the inclusion of the approved claim in to payment certificates where their enforcement is due.

Claim Closure: Once this compensation or entitlement is due in accordance with the approved claim and its enforcement requirements, then it is concluded for its closure.

In order to account for such an administration process contracts provide claim clauses within their provisions in their conditions of contract.

2.7Extension of Time

Extension of time (EOT) is the additional time granted to the contractor to relieve it from liability for liquidated and ascertained damages(LADs) and to prove an extended contractual time period or date by which the works are to be, or should have been completed.

Hamid and Torrance (2006) identified extension of time (EOT) as an excusable delay that occurs when the contractor is delayed by occurrences beyond his control.

2.7.1. Basis of Extension of Time

(James. R. Knowles, 2005). Stated failure to complete the construction works according to its prescribed schedule became the reason for the existence of extension of time clause in the contract. Many disputes could be avoided if employers and their agents (Engineer, Consultant) give due consideration to the reasons for having an EOT provision, and if contracts recognize the need for giving sufficient notice and particulars to enable extensions of time to be granted promptly.

An EOT provision is inserted in a construction contract for the benefit of both the employer and the contractor, its insertion is primarily for the advantage of the employer. If there was no EOT provision, once the employer had caused delay to completion of the works, it would no longer be able to reply on the liquidated damages provision in the contract. In such circumstances, the contractor's obligation would be to complete within a reasonable time in all of the circumstances. (James. R. Knowles, 2005).

Further, even if there is an EOT provision, if the engineer, or the consultant, or employer fails to grant an EOT, with in the period contemplated by the contract, the employer may lose its rights to grant an EOT, and the result would be the same as if there had been no EOT provision, i.e. time would be set at large and the employer could no longer rely on the liquidated and ascertained damages provision on the contract.

2.7.2 Extension of time submissions

Major obstacles to prompt settlement of submissions for extensions of time include:

1. The erroneous assumption that an extension of time automatically grants entitlement to monetary compensation.

2. Late, insufficient or total lack of notice of delay or likely delay on the part of the contractor.

3. Failure to maintain contemporary records.

4. Failure to regularly update the program so that the effects of delay can be monitored.

5. Poor presentation of the claim to show how the progress of the work has been, or is likely to be, impacted.

6. The probability that the cause of delay will reflect on the performance, or lack of it, on the part of the employer's professional team.

7. Pressure, on the part of the employer, to complete the project by the original completion date, irrespective of delays which occur.

2.7.3 Guideline for preparing comprehensive extension of time (EoT) claim

A practical approach that is recommended to be followed to enable the contractor to prove the delays and build a well-supported approach was based on a combination between the theoretical information and practical experience. Khaled Ahmed Al-Naas, Dec.2014.

This approach consists of;

(1) Preparing the baseline program (planning stage),

(2) Proper program updates,

(3) Accurate program revisions,

(4) Defining and introducing the delays to the program updates,

(5) Identifying the concurrent delays and splitting between the contractor and employer delays,

(6) Defining the contractual basis for the entitlement, and finally

(7) Preparing the evidences of delay.

Normally, preparation of the baseline program starts with the identification of the activities required to execute the work in accordance with the project work breakdown structure and contract plan and specification.

The next step in producing the baseline program is to calculate the durations required to execute each activity on the network.

After time estimation and loading the resources, the mathematical calculation using CPM will be conducted to determine the chain of interrelated activities through the network from the project start to its completion date. The early dates and critical path will be defined during forward calculation while the late dates and floats will be calculated during the backward calculation.

The Employer's Personnel shall be entitled to rely upon the program when planning their activities''. The initial delays occurring during the baseline program approval period have no proper basis to measure and are debatable. Hence the recommendation is that the delays that occurred during this period should be properly recorded and monitored by giving advance notices to the employer for the requirement of any urgent information by referring to the first submittal of the program.

2.7.4 Proper program updates

Construction projects by their nature are very dynamic and subjected to changes compared with the original plans and assumptions. A construction project could face many changes when it comes to the construction phase such as but not limited to unforeseen soil conditions, delay to engineering and procurement deliverables, adverse weather conditions, political issues, changes to scope of work. Therefore, all parties involved in any construction project such as employer, contractor, supervision consultant and any relevant stakeholders are always keen to have accurate status reports of the project performance and to be updated to envisage changes or delays to the original plan.

Accordingly, the project program should be continually updated or revised whenever required, in accordance with the frequency stated in the contract documents, to reflect the current site conditions and constraints. Delays to the engineering and procurement deliverables including any changes and there must be included otherwise the project program will be outdated and misleading to all stakeholders. Failure by the contractor to provide proper program updates can result in any delay and disruption claim being easily declined by the employer.

The purposes of program updates are;

(1) To determine the actual physical progress achieved compared to planned,

(2) provide a complete and accurate report to the actual progress compared with original plan,

(3) It is often a contract requirement and may be required for payment purposes (in case of lump-sum price contracts), (4) it identifies the changes to the critical path and identifies out-of-sequence activities, which may require an adjustment to the plan for completing the remaining work and

(5) Predict a more accurate completion date as of the date the project status is measured.

A reliable program update will give the project management the opportunity to assess the impact of changes or unforeseen events and implement timely remedial measures if required in order to mitigate/avoid the impact of such changes or unforeseen events. When documenting a project's

history, a delay analysis could be easily performed to identify the causes of delays, measure the contribution of each party to such delay and accordingly the impacts can be calculated.

2.7.5 Program revisions

Taking into consideration the span of construction projects, the frequent scope changes and the delays which can occur during the execution phase, the approved baseline program becomes misleading and needs to be revised from time to time to incorporate the changes, revise logic and sequence of work and to incorporate the mitigation measures. The interval of the program revision depends mainly on the volume of change received during the period and validity of the construction sequence of work along with the current site conditions and constraints.

The approved revised program will replace the approved baseline program and will be the new benchmark which will be the base for any future claims for extension of time and/or disruption. It will also be used for the progress updates, monitoring delays and any other scope changes, etc.

However if the project completion date extends beyond the contractual completion date, the revised program will not be approved by the engineer/employer until the related extension of time claim is approved. The engineer could give conditional approval only for progress monitoring purpose or sometimes delay the approval requesting additional information and substantiations. In general, the approval of extension of time claim by the employer is a very time consuming process and normally takes four to six months and sometimes the extension of time will be granted only at the time of expiry of the original contractual completion date. During this time, there is no approved revised program to monitor the delays although the revised program is being updated only to monitor the progress. Hence any analysis of delays in the extension of time submittals becomes debatable and may lead to arbitration. The contractor will face problems in obtaining the extension of time in this process.

Thus in order to avoid or minimize the conflicts in measuring delay, we recommend to update the baseline programs simultaneously in the case that revised programs are approved for progress monitoring purpose only. The contractor should submit the baseline and revised program updates to the employer or his representative to see exactly how the delays are affecting the project execution. Although it is difficult to measure the delays on the baseline program updates (when there is revised program in force with current logic and sequence of work), this will help the contractor to ease out some of the problems until the revised programs are approved.

2.7.6 Defining and introducing the delays to the program updates

After completion of the program update, it is necessary to calculate the delays occurred or expected to be occurred, due to the various risk events, especially those which are attributable to the employer, throughout the project life cycle. Determining the impact of the various risk events can be carried out through a process called ‘‘time impact analysis’’.

The contractor has the sole responsibility to prove that the delays occurred are excusable and compensable by referring to reliable critical path analysis. In order for the delay to be excusable and compensable, the contractor has to prove the following:

1. Delay is not attributable to events within its control and is fully attributable to the employer risk events,
2. None of its own delay was ongoing concurrently with the delay events being relied upon.

In case of occurrence of any of the employer risk events, the contractor should take necessary actions to record the delay impact due to such events.

2.7.7 Understanding concurrent delays

Frequently there are different causes of delay which overlap, and there is a problem in assessing the different delays and costs attributable to each cause. A fundamental principle is that if a job is totally stopped by one cause it cannot be any more stopped by another cause-unless and until the original cause is removed or overcome.

Table 2.1 shows the position for concurrent delay and weather a claim for extension in time and /or extra costs would be allowable .It is to be noted that under different circumstances, time and cost claims assessment can have alternative possibilities. The schematic concurrent delays shown in table 2.1 however, describe cases under normal hypothetical conditions.(AbebeDinku, et.al July 2007**)**

Table 2.1 Schematic concurrent delays

	Initial Delay Caused by contractor
a)	C
	E
	I
	Time :- No Extension of time claim
	Cost:- No claim for extra costs incurred
b)	C
	E
	I
	Time :-
	Cost:- No claim for extra costs incurred
c)	C
	E
	I
	Time :-
	Cost:- No claim for extra costs incurred
d)	C
	E
	I
	Time :-
	Cost:-
	Initial Delay Caused by Employer
e)	C
	E
	I
	Time :-
	Cost:-
f)	C
	E
	I
	Time :-
	Cost:-
g)	C
	E
	I
	Time :-
	Cost:-
	E

h)	I
	Time :-
	Cost:-
	Initial Delay Caused by Independent
i)	C
	E
	I
	Time :-
	Cost:- No claim for extra costs incurred
j)	C
	E
	I
	Time :-
	Cost:- No claim for extra costs incurred
k)	C
	E
	I
	Time :-
	Cost:-
l)	C
	E
	I
	Time :-
	Cost:-

In the table above:-

C- Stands for the contractor

E- Stands for the Employer

I- Stands for Independent

2.8Contractual basis of the entitlement

The contractor should define in a separate section of the claim document the contractual basis of his entitlement for EoT and should state clearly the contract clauses he has referred to in his request such as the different clauses defined by FIDIC or PPA.

2.8.1 Extension of Intended Completion Date as per PPA 2011 (Clause 73)

73.1 The Contractor may request an extension of the Intended Completion Date if he is or will be delayed in completing the contract by any of the following causes:

(a) Exceptional weather conditions in the Federal Democratic Republic of Ethiopia;

(b) Artificial obstructions or physical conditions which could not reasonably have been foreseen by an experienced Contractor;

(c) Compensation Event occurs or a change order for modification is issued which makes it impossible for completion to be achieved by the Intended Completion Date;

(d) Administrative orders affecting the date of completion other than those arising from the Contractor's default;

(e) Failure of the Public Body to fulfill his obligations under the Contract;

(f) Any suspension of the works which is not due to the Contractor's default;

(g) Force majeure;

(h) Any other causes referred to in these GCC which are not due to the Contractor's default.

2.8.2Compensation Events for Allowing Time Extension (PPA2011 Clause 74)

74.1 The following shall be Compensation Events allowing for time extension:

a) The Public Body does not give access to a part of the Site by the Site Possession Date stated in the Contractor's approved work program;

b)The Public Body modifies the Schedule of other Contractors in a way that affects the work of the Contractor under the Contract;

c) The Engineer orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time;

d)The Engineer instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects;

e)The Engineer unreasonably does not approve a subcontract to be let;

f)The Engineer gives an instruction for dealing with an unforeseen condition, caused by the Public Body, or additional work required for safety or other reasons.

g)Other Contractors, public authorities, utilities, or the Public Body do not work within the dates and other constraints stated in the Contract, and they cause delay;

h) The advance payment is delayed;

I) The Engineer unreasonably delays issuing Interim Payment Certificates; Other Compensation Events described in the SCC or determined by the Public Body and force majeure.

74.2 If a Compensation Event would prevent the work being completed before the Intended Completion Date, the Intended Completion Date shall be extended. The Engineer shall decide whether and by how much the Intended Completion Date shall be extended.

74.3 The Contractor shall not be entitled to compensation to the extent that the Public Body's interests are adversely affected by the Contractor not having given early warning.

2.9Preparing evidences of delay

When change orders, delays, or relevant issues occur, a time impact analysis/delay analysis should be prepared to document and record the facts and circumstances pertaining to each delay event qualifying the delay and the impact on the project completion date. The time impact analysis usually includes the current updated schedule, excusable delays for which time extensions may still be pending, job conditions encountered, the progress achieved up to the point in time when the present delay occurs and the mitigation action taken by the contractor. The analysis should also include the pertinent facts associated with the proof required to support the delay issue. The following procedure is proposed to be followed to illustrate a mechanism for preparation of a time impact analysis and documenting the impacts.

2.10Proposed Checklist for Time Impact Analysis

1. Study the scope of the change/risk event, and the extent of the delay encountered.

2. Issue a notice of delay to the employer once the contractor comes to know about the change/risk event. Submittal of such notice/s should be within the allowed period stipulated in the contract clauses.

3. Review all reference materials, such as appropriate contract clauses, construction drawings, sketches, specifications, vendor data, regulatory and administrative codes, field directives, correspondence, and cost estimates.

4. Prepare an accurate description of the changed condition or the delay encountered.

5. Identify the contracting parties who are responsible for such change/risk event.

6. Identify all contracting parties who are affected by the direct or indirect delay and request any participation or documentation assistance that may be necessary.

7. All verbal instructions or instructions received vide emails should be recorded and confirmed by the employer in writing

.

8. Determine which activity or activities on the project program is or are potentially impacted by the added, delayed, changed work or any other risk event.

9. Review the program and determine the scheduled start and finish dates for all affected activities.

10. Establish the record-keeping systems and form contacts with key project staff, identify and document the facts associated with the change and/or delay issue.

11. Update the project program, as of the date just before the change or the risk event. In case of any delay exercised due to contractor's risk events, the contractor is obliged to recover such delay totally or partially if possible. The contractor should describe in detail the action taken to mitigate or recover its delays.

Ian Wishart (2012) advised that the contractors are advised to establish and maintain a good document control procedure in order to enable for the planning team and contract administrator the huge quantities of both electronic and hard-copy records.

Also, the contractor has to submit all documents and records that support its claim for time and/or money. The documents and records required to develop a properly substantiated claim are shown herein below in Table 2.2:

Table 2.2List of required records to establish properly substantiated claim.

Item No	Record description	Frequency
1	Baseline schedule	Once in the project life cycle. Should be submitted within certain Period from the project effective date.
2	Method of construction identifies the works that are intended to be executed by subcontractors.	To be submitted with the baseline schedule. Also, should be updated and submitted with any new schedule revision
3	Planned manpower and machinery resources	To be submitted with the Baseline schedule and its revisions.
4	Program updates	Could be weekly or monthly based on the contract requirements(*)
5	Notices for delay	Once the contractor knows about the event and within certain period as stipulated in the contract documents. Should be prepared for each event.
6	Program revisions indicating changes and its required resources and the impact on the contract completion date.	In case of major changes or the current program becomes out dated or misleading
7	Delay analysis	With each program update. It is recommended to be done
8	Time impact analysis showing the potential impact of the changes prior to carrying out the changes.	Once the contractor knows about the event. Should be done for each delay event.
9	Cause and effect analysis for each delay/disruption event	Once the contractor knows about the event. Should be done for each delay event.
10	Productivity analysis reports	Weekly
11	Minutes of the daily, weekly, and meetings.	Upon request
12	Minutes of any special meeting.	Upon request
13	Change of work notices	Within certain period, as defined in the contract, from the date that contractor came to know about the change
14	Daily progress reports	Daily
15	Weekly progress reports	Weekly
13	Monthly progress reports	Monthly
17	Claim register	Monthly
18	Delay events log	Monthly

It is recommended for the contractor to perform the schedule updates on a weekly basis even when the contract requires monthly updates. This will allow the contractor to keep a highly accurate history that would enable the contractor to prepare a well-supported claim and the issue whether or not there has been breach of contract by failure to complete

2.11 Recording delays

Khaled Ahmed & et.al (2014) stated that on any complex/mega scale project, there are frequent multiple potential causes of delay to be investigated which can number in the hundreds and occasionally thousands. For each potential delay event a 'delay notice' should be prepared and submitted to the employer within the time stipulated in the contract documents. The delay notice should provide all relevant information related to each delay event which are:

1. Employer request for change if any;
2. Detailed description of the change and the quantities related to such change;
3. Related drawings and specification;
4. All correspondence (letters, transmittals, technical queries . . .)
5. Relevant contract clauses; and
6. Time impact analysis performed to quantify the impact of such delay.
7. Estimated cost impact if any

2.11.1 Notice for Extension of time submissions

The contractor is always required, under the contract clauses, to notify the employer of its intention to make a claim for time and/or money within certain period defined in the contract. Failure by the contractor to abide with the contract requirements for notification makes the entitlement for the claim declined. KhaledAhmed & et.al (2014)

2.11.2As per Standard Conditions of Contract (PPA 2011)

The Contractor shall, within 15 days of becoming aware that delay may occur, notify the Engineer of his intention to make a request for extension of the Intended Completion Date to which he may consider himself entitled, and shall, unless otherwise agreed between the Contractor and the Engineer, within 21 days from the notification deliver to the Engineer full and detailed particulars of the request, in order that such request may be investigated at the time. **(PPA, 2011 Clause 73.2)**If the Contractor has failed to give early notification of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

2.11.3As per civil code of the Empire of Ethiopia (1960)

(1) The debtor shall forthwith inform the other party of the reason which prevents him from performing his obligations.

(2) He shall be liable as though non-performance were attributable to him for any damage caused to the other party which could have been avoided, had notice been given.**(Civil Code Art. 1797)**

2.12Time at Large (Completion of the work within a reasonable Time)

Time at large is a very important concept and often missed by the contractors despite that it could help them to avoid the application of liquidated damages or penalties in case of the approval delay by the engineer/employer for the extension of time claims and allows the contractor to complete the work within reasonable time. Daniel Atkinson (April 2007)

An EOT provision is inserted in a construction contract for the benefit of both the employer and the contractor, its insertion is primarily for the advantage of the employer. If there was no EOT provision, once the employer had caused delay to completion of the works, it would no longer be able to reply on the liquidated damages provision in the contract. In such circumstances, the contractor's obligation would be to complete within a reasonable time in all of the circumstances. (J. R. Knowles, 2005).

Further, even if there is an EOT provision, if the engineer, or the consultant, or employer fails to grant an EOT, with in the period contemplated by the contract, the employer may lose its rights to grant an EOT, and the result would be the same as if there had been no EOT provision, i.e. time would be set at large and the employer could no longer rely on the liquidated and ascertained damages provision on the contract.

Daniel Atkinson (2007) stated that time is made at large in four situations:

1. No time or date is fixed by the terms of the contract by which performance must take place or to be completed.
2. The time for performance has been fixed under the contract, but has been ceased to apply either by agreement or by the act of prevention, which includes instructed additional works, or breach of contract by the employer with no corresponding entitlement to extension of time.
3. The employer has waived the obligation to complete by the specific time of date. An alternative solution is that the employer is faced with a breach of contract by the contractor which would entitle the employer to terminate the employment of the contractor and/or to bring to an end the primary obligations of the parties to perform, but instead elects to continue with the performance of the contract.
4. The employer has interfered in the certification process to prevent proper administration of the contract

2.12.1 As per Standard Conditions of Contract (PPA 2011)

Within 21 days from receipt of the Contractor's detailed particulars of the request, the Engineer shall, by written notice to the Contractor after due consultation with the Public Body and, where

appropriate, the Contractor, grant such extension of the Intended Completion Date as may be justified, either prospectively or retrospectively, or inform the Contractor that he is not entitled to an extension.**(PPA, 2011 Clause 73.3)**

2.12.2 As per civil code of the Empire of Ethiopia (1960)

Time: 1. Principle.

(I) Each contracting party shall perform his obligations within the time fixed by the contract.

(2) Failing a specific provision in the contract, each contracting party shall perform his obligations within a reasonable time. **(Civil Code Art. 3174.)**

2.13Assessment of claim by the Engineer

The engineer decides on the validity of claims. He may accept the claim in full or part or reject it totally. If the contractor does not accept the engineer's ruling on claim, then he is always able to take the matter to arbitration if contractual or to litigation if extra contractual. Once claim is settled it ceases to be a claim. There are two distinct stages in the assessment of claims.

i) Is the claim valid in principle?

If yes, then

ii) Is the evaluation and quantification correct?

Contractual claims must be based on contract document .It is important to see what the contract says-not what one thinks it ought to say or what one would have liked it to say, or even what one thinks is fair. The contract was agreed between both parties to the contract and it is taken to be a statement of the terms of the contract. if the contract states that the contractor is to be responsible for something, then the contractor is responsible however unfair it may seem later.

Claims are usually requested for:

i) An extension of time for completion of the work or,

ii) Extra payment, or

iii) An extension in time and extra payment

The majority of claims involve delay of some form. Time is particularly important since a contractor is bound by the contract to construct the works in a specified time and is liable to pay liquidated damages for late completion. Acceptance by the engineer of the validity of a claim for extension of time means that the contract completion date is extended. (Abebe Dinku,et.al July 2000)

2.13.1Delays for which the client is responsible

If delay occurs for which the client is responsible, then the contractor will be entitled to an extension of time. If as a consequence, the contractor incurs extra costs then he will be entitled, in general, to reimbursement of those extra costs.

2.13.2Delays for which the client is not responsible

If delay occurs for which the client is not responsible, then the contractor will not be entitled to compensation although he may be entitled to an extension of time. He may be entitled to an extension of time in cases of strikes, bad weather, etc. He would not be entitled to an extension of time because of his own incompetence, or break down of his plant since these are supposed to be within his control.

2.14Evaluating claim for delay

Delay may be caused by the client(e.g. changing his requirement, late delivery of drawings ,etc)or by the contractor(e.g. inadequate resources, use of unsuitable methods, etc)or be partially or totally outside the control of either party.(e.g. political change, weather, national strike, etc)The contract as previously stated ,classifies them in to those for which the client is responsible and those for which he is not.

If a single cause makes a whole project stop, then it is reasonably to assess all the costs unavoidably incurred. But if a single operation stops only some operations then it is more difficult to assess the cost and or delay attributable. Was the operation on the critical path or did it come on to it? There is not only the actual period of delay but there may well be some allowance for regaining the tempo of the work. If an operation is slowed down rather than stopped, t may be convenient to assess an equivalent delay (Abebe Dinku,et.al July 2000)

2.15 Delay Analysis Techniques

The objective of delay analysis is to calculate the project delay and work backwards to try to identify how much of it is attributable to each party (contractor, owner, or neither) so that time and/or cost compensation can be decided. Questions that need to be answered here often include

- What was supposed to happen?
- What did actually happen?
- What were the variances?
- How did they affect the project schedule?

The various DATs have varying capabilities in providing sound answers to these questions.

In the English and Commonwealth jurisdictions there are very few cases setting out guidelines for methodology or techniques that should be adopted when preparing or considering an extension of time submission or claim.

Roger Gibson, (2007) stated that Most of the recognized extensions of time (EOT) assessment techniques are:

A. impressionistic;

B. simplistic;

C .prospective analysis;

D. Retrospective analysis.

Only the latter two groups, prospective and retrospective analysis, are considered to be dynamic analysis techniques.

2.15.1 Impressionistic

This group includes the following techniques.

2.15.1.1. Global impact

The global impact technique is a simplistic way to show the impact of employer-responsible events. All such delays are plotted on a bar chart. The delay start and finish dates are determined for each event. The total delay to the project is calculated to be the sum total of all durations of all the individual delaying events.

The 'global impact' technique shows on a bar chart the as-planned and as-built programs in summary format, with an additional summary bar representing the total of the delay for which the employer is responsible. The contractor will probably argue that the difference between the entitlement to an extension of time and the actual project overrun of was due to his acceleration.

Observations

The 'global impact' technique uses the as-planned program and therefore assumes the critical path(s) on this program were constant throughout the project. This leads to delays potentially being deemed as critical when in fact they were not.

There are many other problems with this technique, but the main issues that this technique ignores or disregards, are that

it assumes every delay has an impact on the project's date for completion;

It does not take into account the effect of concurrent delays.

The above shortcomings can and do lead to a gross overstatement of entitlement due to employer-responsible delays. As in the example, in many cases the entitlement due can exceed the project's actual completion date; the rationale being that the difference between the entitlement completion date and the actual completion date is the amount of time saved by the contractor through his acceleration measures.

2.15.1.2 Net impact

This technique only depicts the net effect of all employer-responsible delays by plotting these on a bar chart. The net effect of all delays is calculated and the overall time extension is taken to be the difference between the contract completion date and the 'net impact' program completion date.

All delaying activities were considered but only the net effect, taking into account the concurrency of the delays, was used. The as-planned and as-built programs appear in summary format as a single bar, and the 'net impact' bar of all the employer-responsible delays is shown.

The difference between the as-planned and as-built completion dates was eight days; and the 'net impact' bar is showing an extension of time entitlement of nine days.

Observations

As with the 'global impact' method, the 'net impact' technique uses the as planned program and therefore assumes the critical path(s) on this program were constant throughout the project. This leads to delays potentially being deemed as critical when in fact they were not.

Although this method attempts to deal with the issue of concurrent delays, it does not show how concurrency has been established and scrutinized.

As a result, the amount of delays having an effect on the project's completion date can be overstated. The 'net impact' technique is neither accurate nor realistic in apportioning liability for critical delays, but maybe suitable for quick approximate estimates, perhaps at the outset. The absence of a CPM-based analysis camouflages the true effect of a delay on the overall project completion date.

2.15.2 Scatter diagram

This technique indicates the timing of employer-responsible delaying events during the project. The basis of the diagram is the as-planned bar chart, which is annotated with the incidence of employer-responsible events affecting the project, such as variations, instructions and information issues, etc. By supporting the scatter diagram with a narrative and detailed breakdown for each of

the events notified, the contractor is able to supply comprehensive information on each event and argues its impact on the progress of the works and the date for completion.

Observations

Although a scatter diagram has little evidential value, it has a powerful visual impact in negotiations.

However, with this technique it is impossible to investigate the impact of a single event or combination of events within the overall period of the project.

2.15.3 Simplistic

This group includes the following techniques.

2.15.3.1 As-planned impacted (aka baseline adding impacts)

This technique requires the identification and insertion of employer responsible delays into the original as-planned program. A schedule of employer-responsible delaying events is produced and each of these is added to the as-planned program. The resultant scheme is the 'as planned impacted' program.

Both programs should be in network format, i.e. a 'CPM', with the same logic links between activities. A program time analysis is performed on the 'as-planned impacted' program and the 'new' date for completion is established.

The difference between the as-planned completion date and the 'new' completion date as shown on the 'as-planned impacted' program is said to be the EOT entitlement as a result of the employer-responsible delays.

Good practice

The methodology of this technique is as follows:

1. Make a copy of the as-planned program, and name this the 'as planned impacted' program.

2. For each of the employer-responsible delay events, identify the period of time which they would be expected to take on site to carry out, e.g. the addition of suspended ceilings is estimated to take two weeks.

3. Add the new work activity or activities to the 'as-planned impacted' program, allowing for any off-site time constraints, e.g. procurement of suspended ceilings at four weeks.

4. Make the appropriate relationship logic links from the new activity or activities to the other program activities, e.g. suspended ceilings to start four weeks after wall plastering commences.

5. Perform a time analysis (recalculate) on the 'as-planned impacted' program to establish the 'new' date for completion.

The employer-responsible delay events are then added to the as-planned program, the CPM re-analyzed and the resulting 'as-planned impacted' program is then constructed.

2.15.3.2 As-built bar chart

A bar chart is produced showing the actual start, finish and duration of the work activities for the project. It is common for the chart to be an overlay of the as-planned bar chart as at the start of the project. In this way it is easy to identify which work activities deviated from the original plan.

Although the 'as-built bar chart' technique provides a simple visual statement of the difference between what was expected to happen and what actually occurred, it suffers from the absence of explicit logic.

In addition, it does not identify actual events that took place and the delays to the program and date for completion that resulted.

Observations

The 'as-built bar chart' method can be carried out without the need for computerized planning software, although such software is often used to present the results.

The method assumes that the as-built situation arises by reason of changes, late information, etc. for which the contractor is entitled to an extension of time; and not due to its own culpability.

This method also assumes that the planned program was realistic and that the work was appropriately resourced to enable the plan to be achieved. However, this method is well suited for relatively simple projects where the main delays can be easily identified.

2.15 .4 -built adjusted

This technique uses the CPM format to develop an as-built schedule.

Employer-responsible delaying events are included as activities and linked to specific work activities on the 'as-built adjusted' program. The difference in time between the contract completion date and that shown on the 'as-built adjusted' program is the extension of time the contractor contends it is entitled to.

Linking all the delay activities to their respective work activities, the program is then updated. The adjusted completion date and project duration is computed. As the original contract period for the project was known, the difference between the contract completion date and the 'as-built adjusted' program completion date will be the extension of time claimed by the contractor.

Observations

The main problem with the 'as-built adjusted' technique is that, although it utilizes the CPM format, which affords an insight into the interrelationships between activities and delay events, it gives very little supporting detail or analysis. It is not much better than the 'net impact' technique, except that the CPM format creates a more sophisticated impression of an analysis.

Another problem is that contractors invariably tie the employer responsible delaying events to the critical path. Conversely, contractor responsible delaying events may be shown, but are more likely to be linked to work activities not on the critical path.

2.15.5 Prospective analysis

This group includes the following techniques.

2.15.5.1 Time impact

This technique examines employer-responsible delaying events and their effects at different times during the progress of the project, i.e. events are analyzed contemporaneously with each event being judged on its own merits and information available at that time.

This method takes the contractor's planned program as the starting point for the analysis. The likely impact of each specific delaying event on the program is determined at different construction stages, the intention being to obtain a 'stop action picture' of the project before a delay impact.

The expected impact of the delay event is then inserted into the program.

The difference between the two project completion dates, i.e. the 'stop action picture' before the delay event is inserted and the one after it has been inserted is the likely delay to the project and the EOT entitlement as a consequence of the delay event alone. Each delay event is analyzed chronologically.

Good practice

The methodology of this technique is that, for each employer-responsible delay event, the following should be done:

1. Update the as-planned program to show what had actually been achieved by the time of the employer-responsible delay event.
2. Analyze the updated program that represents the position of the project at the time of the event. The analyzed updated program will forecast whether the project is likely to be completed ahead of, on or behind schedule.

3. Create an impacted program demonstrating, with supporting descriptions, the duration of new activities flowing from the 'delay event', and their logical interface with the remaining contract works. It is recommended that a subnet be created for this.

4. Add the subnet into the impacted program and link this to the existing program activities. Re-analyze the impacted program.

5. If the project completion date is later than the project completion date on the current updated program, then there is entitlement to an extension of time.

6. The extent of the EOT is the slippage between either the contract completion date or the completion date shown on the current updated program and that shown on the impacted program.

Observations

This prospective method analyses the expected, or likely, effect of the delay event on the completion of the project, and therefore shows a contractor's entitlement to an extension of time.

The main criteria for this technique are a good as-planned program and reliable progress and as-built data. However, care must be taken to ensure that the planned program to complete is reasonable and any apparent errors in activity durations and logic are corrected.

2.15.6 Retrospective analysis

This group includes the following techniques:

2.15.6.1 Collapsed as-built (aka 'as-built but for')

This technique applies the 'but for' logic. In simple terms the approach of the 'collapsed as-built' method is to establish the as-built program, incorporating the planned activities together with activities representing the delaying events by the relevant party, e.g. variations, instructions, issue of information. The consequence of the delaying events is shown by additional work activities.

The activity duration will be the actual duration and the logic links will be so constructed, if technically correct, as to produce the actual start and finish dates for the activities.

The delaying events are then removed, i.e. the program is collapsed, to produce a program which in theory shows when the project would have been completed 'but for' the identified delaying events. The difference in project completion dates between that stipulated in the contract and that in the 'collapsed as-built' program, is the time for which that party is eligible to claim/grant an extension of time from/to the other party. The conclusion thus drawn is that the difference between these dates is the result of delays that were the employer's responsibility.

Observations

On the face of it the 'collapsed as-built' technique appears accurate and difficult to refute. It uses as-built information and is easy to understand.

The production of an as-built network demands considerable time and effort to show a model where both the durations and the logic reflect what actually occurred.

However, supporters of the 'collapsed as-built' technique would argue that the data used is factual and that the analyst interprets the data impartially.

This is simply not possible; as with the formulation of the as-built program, the other stages of the 'collapsed as-built' technique require the analyst to make decisions and form opinions. For example, the analyst must decide matters such as the effect upon productivity of having to move resources more frequently from one activity to another, and that of using inappropriate plant and labour teams on an activity because of resource constraints. These decisions are necessarily subjective and, due to the retrospective nature of the technique, are both theoretical and speculative.

A further important matter is the linking, or relationship, between activities in formulating the as-built program. These relationships are vitally important because in many cases they will determine the criticality and length of delays. This calls for technical knowledge and experience of the construction process.

A major drawback with this technique is that of 'pacing'. It is not uncommon for a contractor, knowing that he is being delayed by the employer, to take longer on a non-critical activity than he would have done had the delay not occurred. In such a situation, when the employer's delay is collapsed out of the program, it appears as if the contractor is in default for his late and slow completion of the non-critical activity.

Above all, the 'collapsed as-built' technique requires good and detailed as-built records and contemporaneous information.

Good practice

The following guidelines are recommended:

1. An audit trail should be maintained as to how as-built progress information was determined in formulating the as-built program.
2. All significant delays should be identified regardless of fault or liability.

3. Where possible, the analyst should identify and model delay activities as discretely identifiable delay periods during the as-built modeling process.
4. The matter of 'pacing' must be addressed by the analyst, by hint of background information and reasoned opinion.
5. For all subjective decisions and opinions, the analyst should record his source information and detail his reasoning.

2.15.6.2 Windows (aka 'time slice', or 'snapshot') analysis

This technique functions to determine the amount of delay that has occurred on a project and when the delay(s) occurred. By identifying the activities that were critically delayed, a more focused investigation as to the causes and responsibility for the delays can take place. The technique is based on as-planned, as-built and revised programs that have been used during the execution of the project. The basis of the 'windows' technique is that the total life of the project is divided into a number of consecutive time periods, or windows. It is based on the analysis of the effects of delays within each window sequentially. Normally, this is the method adopted in the process of an update of the as-planned program at monthly project meetings.

The project is updated at the end of each window, i.e. the current progress is recorded against each activity and a time analysis carried out.

The 'new' forecast completion date for the project is compared with the forecast completion date for the project as at the start of the window and any slippage between the dates is the delay to the project as a result of delaying events during the window. This procedure is repeated for all windows.

The amount of total delay represents the total extended duration of the project, which should then be investigated for responsibility apportionment between the employer and the contractor.

The 'windows' technique is a systematic and objective method of quantifying the amount of delay incurred in a project on a progressive basis.

The accuracy of this technique is a function of the size and number of windows used. It takes into account concurrent delays and considers the effect of delays in the context of time.

Observations

An important aspect of this technique is that it recognizes that the critical path of the as-planned program may, and often does, change during the life of a project. The 'windows' method tracks the actual critical path and the impact on the date for completion. This technique also identifies any contractor mitigation and/or acceleration during the construction of the project.

Only events that affect activities on or near the actual critical path will have an effect on the project completion date. The effect of events is assessed against the critical path of the project at the time the event occurred. This technique also recognizes and identifies concurrent delays.

With the project being divided into manageable parts for analysis, i.e. consecutive 'windows' usually of one-month duration, then the causes and responsibility for the delays highlighted can be reviewed and researched more purposefully.

Good practice

The following guidelines are recommended:

1. The windows should be consecutive commencing at the project start date and ending at date of practical completion of the project.

2. The windows can be weekly, fortnightly or monthly and will generally be defined by the frequency of reports of actual site progress. For example, if progress on a project was recorded monthly as of the last day of each month, then a 'window' would cover the period between 1 January and 31 January, and the next window would cover the period between 1 February and 28 February, and so on up to project completion.

3. It is recommended that the 'baseline program' established at the start of the project be used for analysis of the first window. However, the program should be subject to a rigorous 'reliability exercise', and any necessary modifications made, before being used for analysis.

4. If the 'baseline' program underwent a complete revision, was issued to the contract administrator, and subsequent progress reports were related to the 'revised program', then this revised program should replace the original baseline program for the windows analysis, as and when it became the working program.

5. If further revised programs were issued during the life of the project, and became the working program, then these also should be incorporated into the analysis, replacing the previous program, again, as and when they became the working programs.

6. It is recommended that the project's contemporaneous progress reports should be used, where possible, as the basis for the 'progress data' for the analysis.

7. Progress data consist of actual start and finish dates and, where an activity's actual duration spans more than a single window, the percentage progress achieved as at the end of a window.

8. The collected progress data should be reviewed for apparent anomalies, e.g. an activity's reported actual progress achieved reduces in the subsequent window(s); an activity's actual start and finish dates are not consistent with the progress being reported.

2.16 Gap Identification

1. No Damage for Delay provisions is enforceable in New York, as long as the basic requirements for a valid contract are met such provisions intend to protect the public bidding process by ensuring that the lowest bid is actually the lowest bid; and that if contractors know that they alone will bear the cost of delay regardless of fault, the contractor will be less inclined to delay and attempt to extract delay claim money from the owner. But, here in Ethiopia a lot of contractors fix unrealistic rate which is much less than to cover even the direct costs in order to win the bid and get advance money .Then the projects are suffered extreme delay due to cash shortage. The contractor provides unrealistic and unfair time extension request to the consultant for approval. The consultant and the employer accepted his request due to different reasons including fearing the prolonged justice process in the country. This makes our contractors reluctant on keeping project completion date.

2. All conditions of contracts and literatures stated that within 21 days from receipt of the Contractor's detailed particulars of the request, the Engineer shall, by written notice to the Contractor after due consultation with the Public Body and, where appropriate, the Contractor, grant such extension of the Intended Completion Date as may be justified, either prospectively or retrospectively, or inform the Contractor that he is not entitled to an extension. However, what if the consultant or the employer didn't respond on time? Literatures argued that this will take as there is no provision for time extension and the contractor will have a right to complete the work within a reasonable time. But most of the contractors and consultants didn't exercise it in time claims. The consultant/Employer delays the response for more than six months. Even this concept is supported by civil code of the Empire of Ethiopia (1960) which states:-

(a) Each contracting party shall perform his obligations within the time fixed by the contract.

(b) Failing a specific provision in the contract, each contracting party shall perform his obligations within a reasonable time. (Civil Code Art. 3174.)

None of the contractors in this research request it.

3. In England and most of developed countries have delay and disruption protocols and literatures provide time extension analysis preparation and evaluation techniques. However, here in Ethiopia, some of the schedules prepared by contractors don't show activity relationships and some of them don't have a concept about concurrent delays. Since No special guide document has prepared for time extension delay analysis preparation and evaluation. Conditions of contract state that the

contractor shall within 15 days of becoming aware that delay may occur, notify the engineer of his intention to make a request for extension of the Intended Completion Date to which he may consider himself entitled, and shall, unless otherwise agreed between the Contractor and the Engineer, within 21 days from the notification deliver to the Engineer full and detailed particulars of the request, in order that such request may be investigated at the time. **(PPA, 2011 Clause 73.2)**However**,** if the Contractor has failed to give early notification of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date. Despite of this, some contractors provide their time claim after the project completion date expired.

4. It is known that there is a provision in general conditions of contract the causes that may lead the contractor to request time extension.(PPA 2011 Clause 73 and 74) However some of them are subjective and not clear. For instance:-

a). Exceptional weather conditions in federal democratic republic of Ethiopia. What is the method to say it is exceptional or us usual? Most of the consultants approve time claim for weather even with less intensity than usual.

b). The public body does not give access to a part of the site by the site possession date stated in the contractors approved work program. What if 5% of the site has right of way problem or obstruction? Does it mean the contractor didn't hand over the site? Most of the contractors take this provision as they are entitled not only for time but money compensation.

Thus, this clearly shows the construction industry in Ethiopia needs further detail studies to resolve the problems in the industry.

5. Literatures forward most of the recognized time extension assessment techniques Like:-

A. impressionistic;

B. simplistic;

C .prospective analysis;

D. Retrospective analysis

However, most of the consultants in this research didn't familiar with the techniques and most of them evaluate the time extension requests in subjective and unrealistic way. They don't have good reason/justification for approval and rejection of the time claim.

Due to this, there is no consistency even in a single firm and this may lead the professionals in consultant's office for corruption. Some of the consultants evaluate the contractors request based

on the date that the contractor requests. There is also lack of special trained staff in the industry for using, interpreting and communicating the scheduling techniques.

Most of the consultants grant time claim for variation and additional works based on project amount and as it is clearly demonstrate on the case study in not logical and leads to dispute.

CHAPTER THREE

3.1 Methodology and Methods of the Research

This research started with unstructured literature review during proposal preparation: to get an in depth knowledge of the subject area attributed to preparation and evaluation of time extension delay analysis. Systematic literature search will be carried out using a range of databases / search engines (the main ones being text books, lecture notes and scientific journals, and Google with a focus to identify relevant evidences.

Further material will be identified by searching related company/ industry and national government websites and cross referencing cited reports. Bibliographies and conference extracts and examined to identify additional evidence.

Titles and abstracts were reviewed for relevance. Potentially relevant studies / evidence will be assessed to identify which ones included relevant evidence appertaining to the research goals. Key data extracted from these studies, evaluated and summarized and analyzed, where appropriate.

The study employs a qualitative and quantitative approach. This strategy is chosen owing to the fact that it gives us good judgment to decide on the issue of priority and enables to use theoretical frameworks that we need to rely on. Hence, the approach is worthy of being adopted for this research. The research grounds on qualitative data gathered through interview and questionnaire and other sources coupled with the quantitative statistical approved time extension samples from either of the consultant or contractor offices.

3.2 Sampling Techniques

The research area will be on both governmental and private Grade one consulting firms which have better experiences in building supervision. There are about 60 grade one consulting firms registered in Addis Ababa. However, due to time constraint this research will consider only those firms which had mostly engaged on contract administration services for buildings from 2000-2008E.C.To decide on how large the sample size to be there are different factors to be considered such as the level of confidence intended to be used, how accurate the answer is needed to be…etc .. Accordingly from 60 consultants I have randomly select five consulting firms using **Excel random sampling Technique** which is demonstrated below. Then I took two approved time claim analysis document from each firm which is analyzed, and have got approval both by consultants and employers. The contractor (EOT) request and the consultant evaluation techniques had been analyzed from those documents.

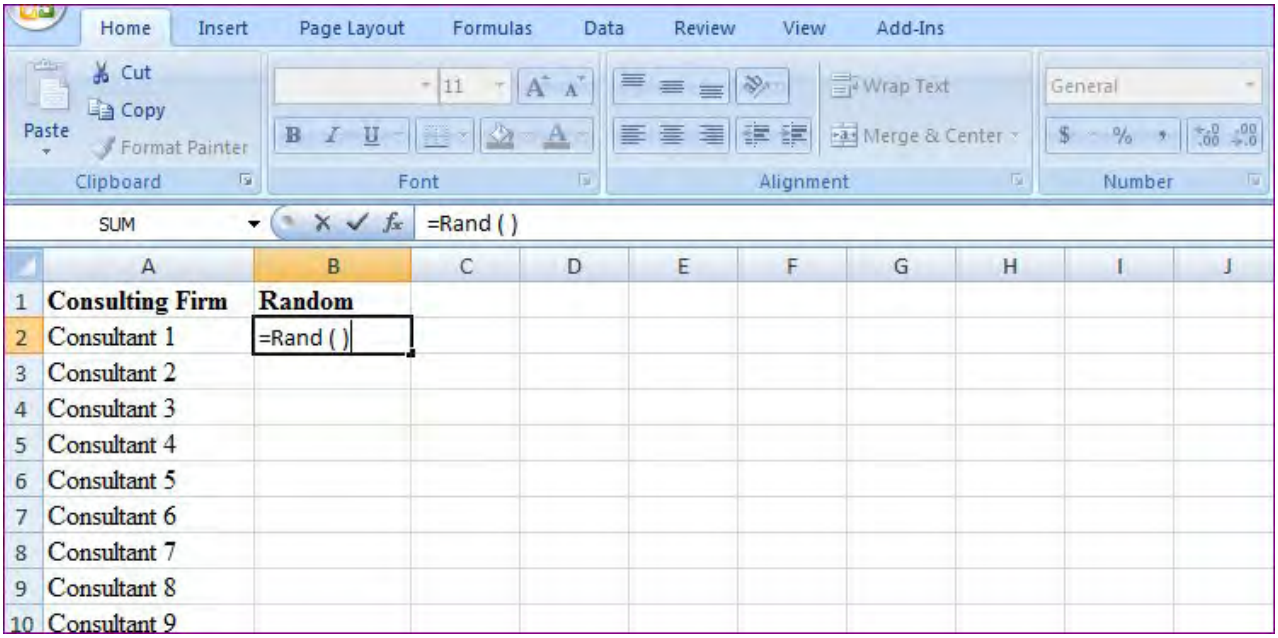
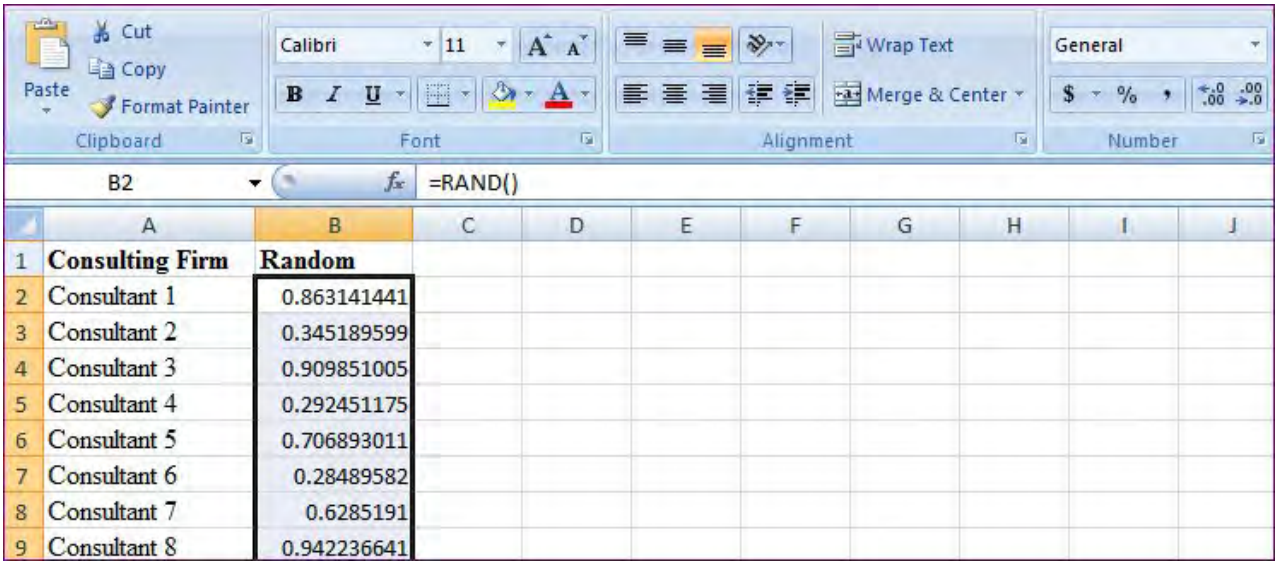
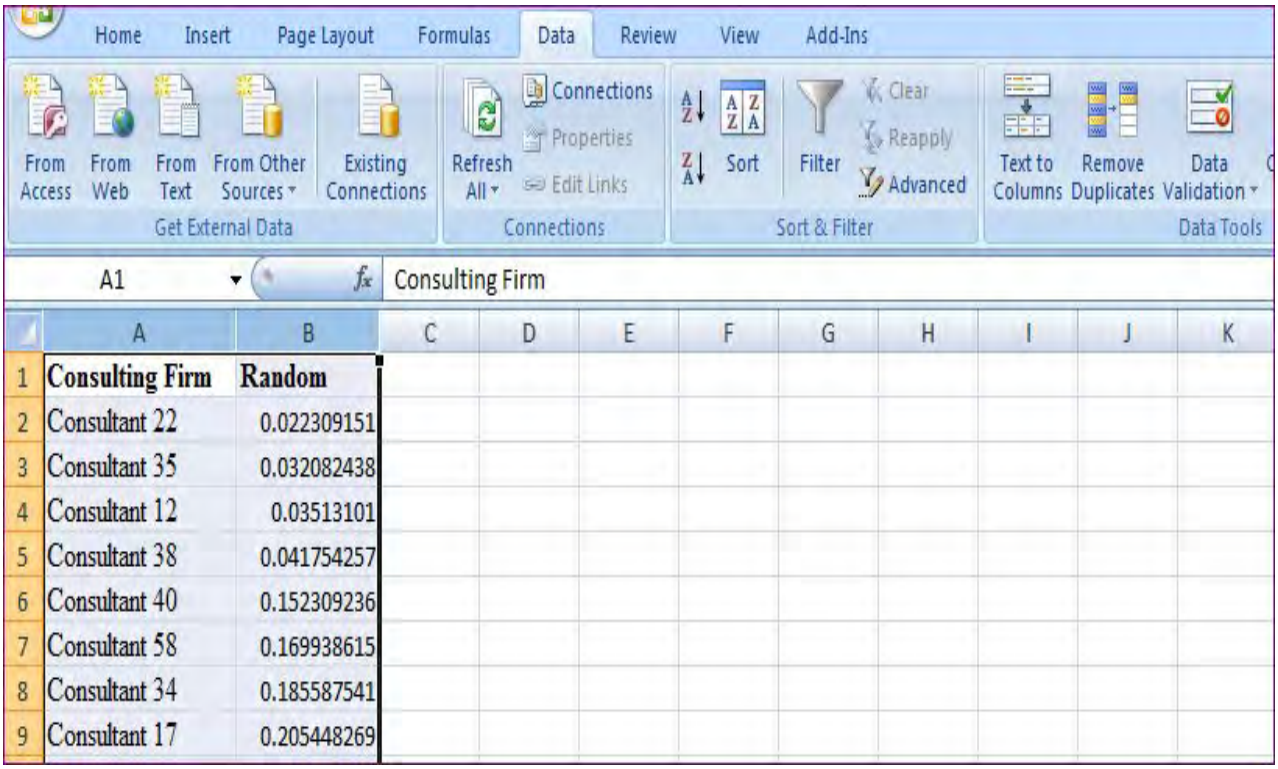


Fig.1 Random Sampling with Excel Technique



	A	B
1	**Consulting Firm**	**Random**
2	Consultant 1	0.863141441
3	Consultant 2	0.345189599
4	Consultant 3	0.909851005
5	Consultant 4	0.292451175
6	Consultant 5	0.706893011
7	Consultant 6	0.28489582
8	Consultant 7	0.6285191
9	Consultant 8	0.942236641

Fig.2 Random Sampling with Excel Technique



	A	B
1	**Consulting Firm**	**Random**
2	Consultant 22	0.022309151
3	Consultant 35	0.032082438
4	Consultant 12	0.03513101
5	Consultant 38	0.041754257
6	Consultant 40	0.152309236
7	Consultant 58	0.169938615
8	Consultant 34	0.185587541
9	Consultant 17	0.205448269

Fig.3 Random Sampling with Excel Technique

3.3 Data Collection Techniques

The required data had been gathered from primary and secondary sources. Thus, the different sources of data had collected through the following instruments.

3.3.1Approved time extension document Finding

Those representative sample documents which had already collected from consulting firms in Addis Ababa analyzed based on the knowledge developed from literature review.

3.3.2Questionnaire

In addition to in-depth interviews, I will utilize questionnaire for the sake of obtaining, giving the opportunity for respondents to vent and explain their thoughts towards the subject of inquiry. Finally, same questionnaires will be distributed to respondents. Secondary sources will be collected from clients. For the purpose of analyzing and buttressing what is gathered through primary sources and in an effort of making it reliable, reviews of relevant books, journals, articles, conditions of contracts will be conducted. The secondary sources will then be integrated with the primary sources so that the research will be comprehensive enough to capture elements of the phenomenon under study.

3.4Data Analysis

The data gathered from different sources analyzed using mixed approach. The data gathered from the documents and questionnaire has transcribed into themes and analyzed from the perspective of contract provisions and literatures. Tables and charts are used to clarify and substantiate explanations. The data gained from differing sources will be put together or compared for the purpose of critical examination of the various claims.

CHAPTERFOUR

ANALYSIS OF FINDINGS

The results from the desk study and questionnaire survey will be presented, interpreted and analyzed in detail in this part. Finally discussions will be made on the basis of the findings and conclusion and recommendation will be forwarded.

4.1Desk Study

Desk study No. 1

a) Description of cause of delay & Justification presented by the contractor

There were two electric poles which cross the site and the contractor requests the client to remove the obstacles with a letter on 17/08/06 and the poles are removed after 33 days on 19/09/06.

b) Evidence provide by the contractor: - letters from contractor office

- Request for obstruction removal
- Informing the date for obstruction removal

c) Claimed amount in time: 33days

d) Granted extension of time: 32

e) How the claim was treated: Here the contractor didn't disclose which works are affected due to the electric poles. Do the poles fully stop the work or partially? Does the interrupted works were on the critical path? As I have understood from the interview the poles were affect the works partially footing pads on a single Axis. The contractor submitted master schedule prepared by Ms Project at starting of the project. However the consultant ordered him to provide the schedule which is prepared by Excel. This schedule doesn't show an ordinary, time related sequence of events relationship. Here, he consultant didn't talk about concurrent delays.

Desk study No. 2

a) Description of cause of delay & Justification presented by the contractor

Due to absence of structural drawing

b) Evidence provide by the contractor: - letters from contractor office

- Request for structural drawing for elevated water tank

Letters from consulting office

- Structural drawing received date

c) Claimed amount in time: 365 days (Full project time)

d) Granted extension of time: 16

e) How the claim was treated: It is a one year project and the reinforced concrete elevated water tank is designed for 100m3 and it includes 34 m high circular reinforced concrete shaft. The structural drawing is given at the end of original project completion time. The contractor requests full project time due to the following two reasons:-

1. The elevated water tank is scheduled to be carried out in parallel with other blocks from the commencement date to completion date.

2. Full structural drawings were delivered to the contractor after expiry of completion date.

Analysis done by the consultant

$$\left[\frac{\text{Amount for the claimed structure X Total project completion time}}{\text{Total project cost}}100\right]$$

Here, the respond of the consultant is much delayed i.e. more than project completion time.

The consultant's approved the master schedule prepared by the contractor and the contractor scheduled this structure up to end of project time.

Therefore, it is not logical and viable to enforce the contractor to complete the work, which has nearly 11 story building height, within 16 days. On the other hand , though it is clear that this structure needs extra one year time as per the approved schedule, the contractor's request is not also fair, because the contractor do not perform other structures as per the schedule and he demands a one year extension for total project. But no evidence is provided for the effect of absence of structural drawing for elevated water tank on the performance of other blocks. The schedule for elevated water tank had prepared independently .Therefore both the contractor request and the consultant evaluation method is not logical.

Desk study No. 3

a) Description of cause of delay & Justification presented by the contractor

Due to bad weather condition

b) Evidence provide by the contractor: -

- Site diary prepared by the contractor and approved by the resident engineer

- Meteorological data for 5 months.

c) Claimed amount in time: 90 days

d) Granted extension of time: 25

e) How the claim was treated:

First of all the contractor didn't explain which activities were affected by the rain, the site diary's also do not explain the activities interrupted due to the rain ,for how long and so on. The choices on the site diary formats are also subjective Weather condition: - Sunny, Rainy, good, bad fair

They do not tell us which activities are affected during the rain time and the sequential effect

The consultant didn't worry about the schedule which activities were planned on the rainy season and which activities can be affecting by the rain. Was the rain exceptional or as usual? Did the intensity is higher than the average of last five or ten years? All the above questions shall be answered in order to have proper time extension delay analysis. Conditions of contract (PPA 2011) clearly states that the ground for extension of time due to weather is, if the contractor is delayed in completing the contract by Exceptional weather conditions in the Federal Democratic Republic of Ethiopia.

However, the consultant had evaluated the request by taking those days which has registered 10mm and above rainfall. Other professional working in same consulting office takes 5mm and above rainfall exhibit dates for time extension. Do they are Exceptional weathers in Ethiopia as stipulated on the contract? This shows no consistency and guide for time extension evaluation.

Desk study No. 4

a) Description of cause of delay & Justification presented by the contractor

Variation works.

b) Evidence provide by the contractor: -

- Variation order from consulting office
- Schedule prepared by sub contractor

c) Claimed amount in time: 60 days

d) Granted extension of time: 4

e) How the claim was treated: The variation work order given to the contractor is Aluminium sun breaker which is to be installed with Aluminium windows. The total completion time given for this project is 14 months. The contractor has got time extension for 116 days in previous claim.

The project completion time including the extended period had been expired. However, the status of the work is:-

External and Internal two coats of plastering completed, Aluminium frames are delivered on site for door and window production. This shows that this delay is concurrent. The contractor requests 60 extra days based on the subcontractor schedule for execution of both Aluminium windows and the sun breakers. His justification was:-

Since the sun breakers are to be installed in parallel with the window frame works, it requires same time which needed to carry out the frame works. In addition, the project completion time has expired. On the other hand the consultant explains that even though this variation had been ordered lately, the contractor didn't start the Aluminium works till the variation issue date, besides the time needed to mount the sun breakers with the frame is insignificant compared with the frame works. Therefore based on project amount 4 days are granted.

Here, both the contractor request and the consultant evaluation techniques are not fair. The reasonable technique to analyze the extra time demanding for this item of work is:-

Prepare a schedule for Aluminium windows as per the original design then again prepare a schedule including the sun breakers. The difference between those schedules will be the extra time required for the variation works.

Desk study No. 5

a) Description of cause of delay: -Payment delay.

b) Evidence provide by the contractor: -

- Approved Payment cover letter
- Invoice for the employer at payment effected date

c) Claimed amount in time: 94 days

d) Granted extension of time: 64 days

e) Contractor's justification: The payment had been effected after 94 days and the contractor requests time extension from payment approved date to payment effective date. He also explain that though he has a right to terminate the project as per clause 59:2 (d) of the standard conditions of contract PPA 2006,he prefers to keep the working relationship good for future and continue the work by requesting the time extension.

How the claim was treated by the consultant: - The consultant deducted the permissible payment delay (30 days) from the contractor's request as per the standard conditions of contract PPA 2006, clause 43:1 "The Employer shall pay the Contractor the amounts certified by the Engineer within 30 days of the date of each certificate". Accordingly the consultant approved time extension for 64 days.

Assessment In view of contracts and acceptable evaluation techniques

The applicable low in the contract is Standard conditions of contract PPA 2011.As per this contract: - "The Employer shall pay the Contractor the amounts certified by the Engineer within 30 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the prevailing rate of interest for commercial borrowing for each of the currencies in which payments are made." In addition payment delay can be taken as fundamental breach of contracts if the approved payment is not paid by employer. According to clause 59:2 (d) "A payment certified by the Engineer is not paid by the Employer to the Contractor within 90 days of the date of the Engineer's certificate" is stated as one of the fundamental breach of contract.

Thus ,though there is no ground to request time extension and allow this, the contractor had a right:- to terminate the contract, since the approved payment delayed for more than 90 days and he had also the right to request interest on the late payments. But he give up both and request time extension.. Therefore, taking in to account the mess which had been occurs if the contractor terminates the project, the time extension granted for the contractor can be taken as fair.

Desk study No. 6

a) Description of cause of delay & Justification presented by the contractor

Due to bad weather condition

b) Evidence provide by the contractor: -

- Site diary prepared by the contractor and approved by the resident engineer
- Meteorological data for 3 months.

c) Claimed amount in time: 90 days

d) Granted extension of time: 45

e) How the claim was treated:

The contractor stated that site hand over was made on April 17/2006.However he was forced to keep the site plan and other drawings till 07/12/06. At this time the rainy season already begun and he couldn't perform excavation works as per the schedule since the nature of the compound is swampy. Thus, as per his justification, even though the prolonged effect is gone up to five months, he claimed only 90 days.

The consultant accepts that the drawings had been late delivered to the contractor and the rain had already begun. But he believes that from the three rainy seasons 50% of the time is enough to compensate the wasted time. So the contractor had granted 45 days.

However, the delay occurred here is serial delay. The project was delayed due to absence of drawings till the rainy season. Then no work had been executed on the rainy season. Therefore the contractor request should be start from site hand over date (April 17/2006) then extend up to rainy season if the rain is the only cause not to start the excavation. The effect of the rain might be not removed just the rain stopped. But if the area is swampy as it is described by the contractor it has prolonged effect. This shows that the techniques used by the contractor to justify the problem are very poor and his request didn't include the actual time waste due to these serial delays. The consultant hadn't showed any justification while he deducts the contractor's request. This shows that professionals in consulting office, uses personal judgment for time extension evaluation.

Desk study No. 7

a) Description of cause of delay & Justification presented by the contractor

Due to absence of metal Truss drawing

b) Evidence provide by the contractor: - letters from contractor office

- Request for metal truss drawing for roof

Letters from consulting office

- Drawing received date

c) Claimed amount in time: 275days (The project duration is 540 days)

d) Granted extension of time: 35

e) How the claim was treated: The project is Basement +ground+12 floor building. The contractor requests the metal truss drawing when he was doing at fourth floor. Then the consultant responds after 9 months when the contractor becomes ready to cast the top tie beam concrete. Therefore, even though the contractor requests 275 days, the consultant granted 35 days as a gift. Here, the contractor didn't perform the work as per the schedule. At project completion time he was doing

concrete works at 8th floor. But, the contractor requests extension of time from the design request to design received date by taking as an advantage for the consultant's delayed respond. Here the consultants well know that these drawings didn't delay the contractor. He gave a lot of warnings to the contractor in order to overcome his problems and speed up the progress otherwise he will advise the client to terminate the project. However, he granted 35 days without any justification.

Therefore both the contractor request and the consultant evaluation method is not logical

Desk study No. 8

a) Description of cause of delay & Justification presented by the contractor

Additional works.

b) Evidence provide by the contractor: -

- Work order from consulting office
- Schedule for the additional work

c) Claimed amount in time: 180 days

d) Granted extension of time: 90

e) How the claim was treated: The total project time was 420 calendar days. The additional work order had given to the contractor after 143 days elapsed from the main contract. The contractor provides a schedule for the additional work and he scheduled this work for 180 days and he requests 180 days extension of time due to the additional work.

The consultant granted 90 days to the contractor. Here the additional work could be carried out independently from the main contract works. Even the consultant accept the contractor's schedule for the additional work which is 180 days, since the total project time is 420 days and the order was given after 143 days from the commencement date the remaining period will be 277 calendar days. Therefore both the contractors and the consultants didn't show how the additional work affects the progress of the main contract works. But the contractor's representative assures me that the additional work didn't have linkage with the main contract. Therefore, since the work could be done in parallel with the main contract works, no time extension should not be allowed for such kind of cases.

Desk study No. 9

a) Description of cause of delay & Justification presented by the contractor

Right of way problem

b) Evidence provide by the contractor: -

- Letter to the consultant and client requests to remove the grave yards and the community from the compound.

c) Claimed amount in time: 390 days

d) Granted extension of time: 105days

e) How the claim was treated: The total project time was 365 calendar days. The claimed area which is occupied by the community and by grave yards is affecting a small portion of the fence works which is about 4% of the total project cost. The time elapsed was 22 months at the time when the contractors submit the 3rd claim for the extension of time. The consultant approved 154 days in time extension one and two for different reasons including the right of way problem. The project is extremely delayed and the progress is 17.33%. The consultant and the client gave the contractor final warning for termination. Then the contractor submits time claim for 390 days and his justification was the client didn't handover the site fully on the site hand over date. Therefore the client is responsible for the delay and it is also one of the compensation events as per PPA 2011.

Desk study No. 10

a) Description of cause of delay & Justification presented by the contractor

Right of way problem, discrepancy between architectural and structural drawings and bad weather condition.

b) Evidence provide by the contractor: -

- Letter to the consultant
- Site Diary
- Meteorological data

c) Claimed amount in time: 340 days

d) Granted extension of time: 66 days

e) How the claim was treated: Here I will not go through the time extension evaluation techniques. But, the approved time had given to the contractor after 7 months. Then after seeing the approved time ,the contractor wrote a letter which explains his objection on the approved time and he also explains that since the consultant didn't respond the time claim within 21 days as per PPA 2011 clause 73:3 "Within 21 days from receipt of the Contractor's detailed particulars of the request, the Engineer shall, by written notice to the Contractor after due consultation with the Public Body and, where appropriate, the Contractor, grant such extension of the Intended Completion Date as may be justified, either prospectively or retrospectively, or inform the Contractor that he is not entitled to an extension."

It will be taken as the consultant's accepted all the time claimed. Otherwise he warns that he will terminate the contract. However, the consultant do not agree with the contractors idea and inform to the contractor that there will no extra time to be grant for the contractor and the contractor can take any action whichever he likes , but he will be liable for any damage occurred in related with.

f) What literature and Ethiopian civil code says?

Some literatures argue that, An EOT provision is inserted in a construction contract for the benefit of both the employer and the contractor, its insertion is primarily for the advantage of the employer. If there was no EOT provision, once the employer had caused delay to completion of the works, it would no longer be able to reply on the liquidated damages provision in the contract. In such circumstances, the contractor's obligation would be to complete within a reasonable time in all of the circumstances. (J. R. Knowles, 2005).

Further, even if there is an EOT provision, if the engineer, or the consultant, or employer fails to grant an EOT, with in the period stipulated by the contract, the employer may lose its rights to grant an EOT, and the result would be the same as if there had been no EOT provision, i.e. time would be set at large and the employer could no longer rely on the liquidated and ascertained damages provision on the contract.

But, here in Ethiopia time at large concept is not exercised both in contractors and consulting offices even if it is stated in Ethiopian civil code**(Civil Code Art. 3174.)"**

"Time: 1. Principle.

(I) Each contracting party shall perform his obligations within the time fixed by the contract.

(2) Failing a specific provision in the contract, each contracting party shall perform his obligations within a reasonable time."

Therefore, this case shall be treated accordingly.

4.2. Questionnaire Analysis

4.2.1. Questionnaire Response rate

A semi-structured questionnaire was prepared and distributed to the major parties that play dominant role in day-to-day construction activities. These are clients, consultants and contractors. A total of thirty Six questionnaires were distributed. Out of the 36 questionnaires: 6 were distributed for Employers, 15 for consultants, 15 for Contractors. The survey was conducted between 20March 2016 the survey which is 5(83%), 12(70%), 11(77%), from Employer, Consultants and Contractors respectively.

Before starting the analysis, the returned questionnaires were checked for their reliability. All questioners are responded well except two questions respond are rejected for the case of multiple respond for a single question; hence, all questionnaires were found to be suitable for data analysis.

The details of respondent responses and its rate are summarized in Table 4.1

Table 4.1 Questionnaire Response Rate

No.	Stakeholders (participants)	Distributed in numbers	Returned in number	Returned in percent %
1	Client	6	5	83.33
2	Consultants	15	12	80
3	Contractors	15	11	73.33
4	Total	36	28	77.78

It is evident from the table that employers (83.33% of returned) have the highest percentage followed by consultants (80%). Contractor have the least response rate (73.33%) compared to employers and consultants. The percentages of returned questionnaires were also shown in the figure below.

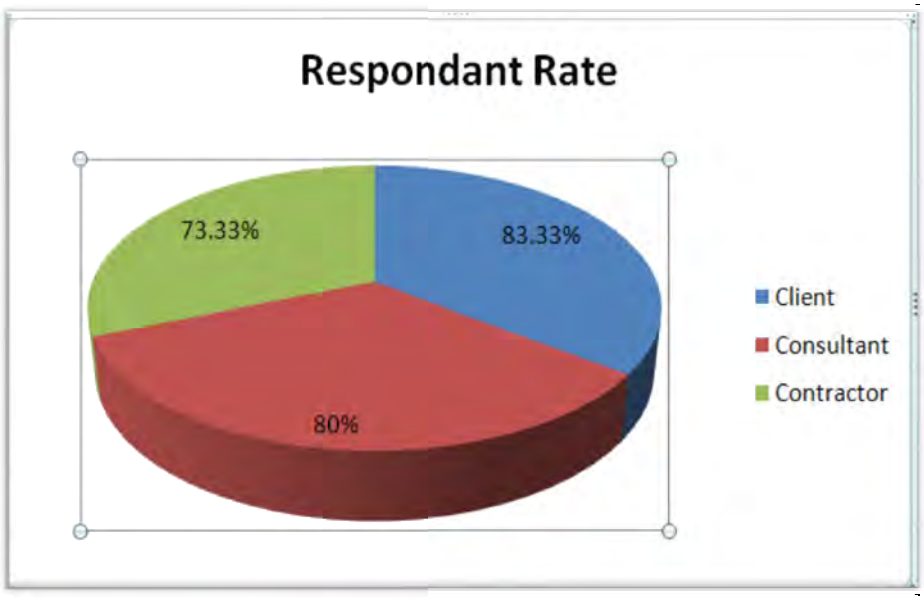


Figure 4-1: Returned questionnaire response

4.2.2. Quality of Respondents

Professionals directly involved in contract administration activities were considered for questionnaire survey. 54% of professionals are from organizations of more than 20 years of establishment while 23% and 21% of them are from organizations of more than 15 and 10 years of experience respectively. Accordingly 53.5% and 37.2% of them have more than ten years experience in construction projects and contract administration respectively. Tables 6.2 and 6.3 illustrate respondent experiences in construction projects and contract administration.

Table 4.2: Experience of respondents in construction projects

Experience (yrs)	Client		Consultant		Contractor	
	In No	In %	In No	In %	In No	In %
<5	3	60	3	25	1	9.09
5-10	2	40	7	58.33	4	36.36
>10			2	16.67	6	54.55

Table 4.3: Organization's Experience and year of establishment

Establishment(yrs)	Client	Consultant	Contractor	Total
<5				
5-10				
11-15	1	8	5	14
16-20	1	3	4	8
>20	3	1	2	6

Even though the majority of Employers organization have more than 20 years of establishment, a higher percentage (60%) of professionals directly involved in contract management have less than five years of experience compared to construction (9.09%) and consulting firms (15%). However, 46.43 % of professionals over all have five-ten years experience and 28.57% have greater than 10 years experience in contract administration and construction supervision.

Table 4.4: Projects completion period for the last Five year as per the respondent.

Projects Completed on the specified time	Client		Consultant		Contractor	
	In No	In %	In No	In %	In No	In %
<5 % of time Extension			2	3.39		
5 to20% time extension			5	8.48	2	6.25
20 to 50 % time extension	2	8.70	7	11.87	3	9.38
50 to 100% time extension	4	17.39	9	15.25	12	37.50
100 to 200% time extension	3	13.04	17	28.81	8	25
200 to 300% time extension	8	34.78	11	18.64	5	15.62
300 to 400% time extension	4	17.39	7	11.86	2	6.25
> 400% time extension	2	8.70	1	1.70		

From the above table:-

1. According to the research (34.78%) of the clients agree projects are completed with 200-300% time extension, (28.81%) of the consultants agree with 100-200% time extension and (37.50%) of the contractors agree with50-100 % time extension.

Table 4.5: Cause for completion of Projects on the contract time.

Project Completion time)	Client		Client		Client	
	In No	In %	In No	In %	In No	In %
Due to contractor's good performance						
Due to employer's good performance						
Due to employer's good performance						
Due to all parties good performance	4	80	12	100	11	100
Due to the relaxed completion time fixed in the contract	1	20				

Most of the respondents agree that on time completion of projects achieved by all parties' good performance**.**

Table 4.6: Fairness of time extension request

	Client			Consultant			Contractor		
	Yes	No	Partially	Yes	No	Partially	Yes	No	Partially
In No		3	2	3		9	7		3
In %		60	40	25		75	63.64		36.36

From the above table 60% of client's respondent agree the time extension request by contractor is not fair and 75 % of consultant's agree the request is partially fair.

Table 4.7: Causes for unfair time extension request

	Client		Consultant		Contractor	
	In No	In%	In No	In%	In No	In%
Lack of professional, Technical and managerial skill	2	40	3	33.33	3	100
Negligence to provide the service as per the specified condition	2	40	6	66.67		
Corruption	1	20				

Table 4.8: Evaluating the Fairness of resident engineer's salary in consulting office.

Client			Consultant			Contractor		
Yes/fair	No/unfair	Partially	Yes/fair	No/unfair	Partially	Yes/fair	No/unfair	Partially
	3	2	2	7	3		9	2
	60	40	16.67	58.33	25		81.82	18.18

Table 4.9: Causes for unfair resident engineer's salary in consulting office.

	Client		Consultant		Contractor	
	In No	In%	In No	In%	In No	In%
Due to less pay for supervision and contract administration	2	40	2	20	4	36
Negligence to provide the service as per the specified condition	2	40	8	80	3	28
Corruption	1	20			4	36

Table 4.10: Time extension claim respond by Consultant / engineer or the client, on the contract specified time

	Client		Consultant		Contractor	
	Yes	No	Yes	No	Yes	No
In No	1	4	8	4		11
In %	20	80	66.67	33.33		100

Table 4.11: Accountability of clients and consultants for the delay of the project

	Client		Consultant		Contractor	
	Yes	No	Yes	No	Yes	No
In No	5		11	1		11
In %	100		91.67	8.33		100

Table 4.12: Submission of intent to time claim on the time stipulated on the contract.

	Client		Consultant		Contractor	
	Yes	No	Yes	No	Yes	No
In No		5		12		11
In %		100		100		100

Table 4.13:Recording and Application of site diary and site book

	Consultant		Contractor	
	Yes	No	Yes	No
In No	12		11	
In %	100		100	

Table 4.14: Recording claims related issues progressively

	Client		Consultant		Contractor	
	Yes	No	Yes	No	Yes	No
In No		5	3	9	4	7
In %		100	25	75	36.36	63.64

From the above table recording claims related issues progressively is the problem of all stakeholders, 100% of the clients, 75% of the consultants and 63.64 % of the contractors do not registered claims on time.

Table 4.15: Extent for extension of time granted by employer and consultant due to their fault

Time Limits	Client		Consultant		Contractor	
	In No	In%	In No	In%	In No	In%
Up to 100% of the original contract time						
Up to 200% of the original contract time						
Up to 300% of the original contract time						
Up to 400% of the original contract time						
Haven't known limit	5	100	12	100	11	100

From the above table all stake holders agree that there is no limit for consultants and clients to grant time extension to the contractor due to their faults.

Table 4.16:-Fairness of time extension evaluation by consultants, when the causes are their office.

	Client		Consultant		Contractor	
	Yes	No	Yes	No	Yes	No
In No	3	2	10	2	3	8
In %	60	40	83.33	16.67	27.27	72.73

72.73% of the contractors blame that consultant do not evaluate time extension fairly when the causes are their office.

Table 4.17:- Fairness of absence of force measure for the Employer. Though, it is stated in PPA that he shall to respond time extension request from the contractor within 21 days.

	Client		Consultant		Contractor	
	Yes/fair	No/unfair	Yes/fair	No/unfair	Yes/fair	No/unfair
In No	2	3	4	8		11
In %	40	60	33.33	66.67		100

Table 4.18Type of planning tools and technique the contractor's uses

.

Planning Technique	Contractor	
	In No	In %
Bar Chart	3	27.27
LOB(Line of balance scheduling technique		
CPM	2	18.18
PERT		
Cash flow by Excel	6	54.55

54.55% of the contractors prepared schedule by excel, which doesn't show activity relationships.

Table 4.19 Paying over time fee for resident engineers at site.

Contractor			
Yes		No	
In No	In %	In No	In %
11	100		

Table 4.20: Fixing monthly over time fee for resident engineers at site.

Fixing Method	Contractor	
	In No	In %
As per the extra hour the resident engineer attend	1	9.09
Monthly constant fee by negotiation	7	63.64
As per the extra hour the contractor works even in the absence of the resident engineer	2	18.18
As per the resident engineer estimate.	1	9.09

Table 4.21 Tax Deduction from resident engineers over time fee.

Stake holders/Participants	Yes		No	
Contractor	In No	In %	In No	In %
	2	18.18	3	27.27

More than 50% of the respondent didn't give reply for this question.

Table 4.22: Disclosing the resident engineer over time fee for the consulting office.

Stake holders/Participants	Yes		No	
Contractor	In No	In %	In No	In %
	1	9.09	8	72.72

18.18% of the respondent didn't give reply for this question. However, most of the respondent's (72.72%) states that they didn't disclose the resident engineer over time fee for the consulting office and 9.09% of the respondents disclose it.

Table 4.23:Reason for hiding the resident engineer over time fee for the consulting office.

	Contractor	
	In No	In %
Because it is unreasonable	5	45.45
To keep it secret and demand a favor from the resident engineer	6	54.55

Table4.24:-Impact of paying unreasonable overtime fee for resident engineers, n time extension evaluation.

Stake holders/Participants	Yes/Affect		No/Doesn't affect	
Contractor	In No	In %	In No	In %
	7	63.64	4	36.36

More than 63% of the contractors agreed that the over time fee for resident engineer's affect time extension evaluation.

Table 4.25: The reason behind Expansion of foreign construction companies now days in Ethiopian building construction industry, especially in finance sector buildings.

Reasons for success	Client		Consultant		Contractor	
	In No	In %	In No	In %	In No	In %
Foreign companies' perform good quality	2	40	6	50	3	27.27
Foreign companies' perform with less cost						
Foreign companies complete on the agreed time	2	40	4	33.33	7	63.64
Quality cost and time	1	20	2	16.67	1	9.09

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

This chapter presents conclusions that conform to the research objectives stated in the introduction part. Recommendations will also be forwarded to improve current practices for the benefit of all stake holders in the industry and to point out and highlighting topics for future study.

5.1. Conclusions

The objective of the thesis, as clearly stated in section 1.5 of the introduction part, is to review the time extension analysis techniques and trends in selected construction and consulting firms in Addis Ababa. In light of this, the research is meant for to investigate the gap between the existing time extension request and evaluation practices and the logical and scientifically acceptable techniques. To achieve these objectives, the study use questionnaire survey, and desk study as a research instrument. The result obtained in this processes have been presented and discussed in the previous chapter. In this chapter the major findings of the research which have been discussed before will be briefly summarized in accordance with the objectives of the research.

1. Most of the consultants /employer do not respond time claim on the time stipulated on the contract. Besides no evidence is found that the consultant and the contractor have the concept about time at large and exercising it in contract administration.
2. Most of the contractor's in this research don't submit intent to time claim on the time stipulated in the contract. And 54.55% of the schedules prepared by the contractor didn't show the activity relationship. Thus, consultants evaluate their time claim in subjective and personal manner.
3. Most of the time extension claims provided by the contractor are not logical and fair.
4. Almost all consultants didn't give attention to concurrent delays. Most of them took the contractors request date as a base line and some of them approved time claim based on the contractor's claimed date.
5. Most of the consultants approve time claim for bad weather as a bonus. No justification is provided how much the weather affects the work. It is very clear that the Rain would come on the rainy season. But, it is mentioned as a cause for delay in all claims and the consultants treated it subjectively. According to PPA 2011 in order to take weather as a cause for project delay it should be exceptional than the usual.

6. Now days it is common to see foreign construction companies in Ethiopian building construction industry, especially in finance sector buildings. 55 % of the respondents agree that they serve good quality, with reasonable cost and completed the work on the agreed time.
7. The monthly resident engineer salary fee in consultant's office is not fair, according to the research, 60% of the clients, 58.33% of the consultants and 81.82% of the contractors agree that the fee is not fair and all contractors are paying unjustifiable over time fee for the resident engineer and 45.46 % of the contractors didn't deduct tax and the rest didn't want to answer this question.72.72 % didn't disclose the fee for the consulting office. Thus paying unreasonable and secret overtime fees to the resident engineer affects the time extension evaluation
8. According to the research most of the clients, consultants and contractors agree that projects are completed with 200-300% time extension, with 100-200% time extension and with 50-100 % time extension respectively.
9. Recording claims related issues progressively is the problem of all stake holders.100% of the clients, 75% of the consultants and 63.64% of the contractors do not registered claim on time.
10. All stake holders agree that there is no limit for consultants and clients to grant time extension for the contractor due to their faults and 72.73 % of the contractors blame that consultants do not have interest to give time extension due to their fault and agree that the time extension evaluation in consulting office is not consistent.

5.2. Recommendations

The objective of this research was to generate findings from the hypothesized problems addressed in the literature review through questionnaire survey, and desk study. In addition, one of the specific objectives of this thesis was to forward recommendations based on the finding of the study. Therefore the recommendation will focus in addressing the major problems identified through the research processes.

1. Conditions of contract should clearly state about enforcement for consultants/employers to respond time claim on the specified time on the contract.

2. Both consultants and contractors should be aware about concurrent delays and Time at large concepts and should exercise in time extension delay analysis as per applicable low.

3. Regulatory body and Educational institutions should provide continuous trainings for professionals working in contract administration offices of the stakeholders and Professional associations should prepare workshops to enable the professionals ethical and well mannered.

4. Consultants shall use modern management techniques to evaluate the time claims and they should evaluate time claims in impartial, genuine, consistent and professionally accepted manner. In addition they should have to pay reasonable fee for resident engineers in order to minimize corruption in time extension evaluation.

5. All stake holders shall record claims related issues progressively.

6. Employers/Consultants need to work to achieve timely response for issues forwarded from the Contractor and they should resolve unsettled right of way problem and design issues before construction bid floats besides they should experience granting time extension even the cause was their office.

6. Regulatory bodies with professional associations and educational institute shall investigate the cause of delay on extremely extended projects. Detail case studies shall be carried on to alleviate the current situation.

7. Contractors should submit intent for time claim on the time stipulated on the contract and the time extension request provide by the contractors shall be fair and logical in order to enable them to compete with international construction companies spreading in Ethiopian construction industry.

8. I believe a further work on the area is vital in order to investigate the core problems on Ethiopian construction industry about time extension delay analysis preparation and evaluation techniques and forwarding a standard guide manual to minimize the problems and guide the construction industry through the proper utilization of contracts, applicable lows and internationally accepted techniques.

9. Finally it is expected from the Regulatory bodies:-

a). Amend contract provisions after comprehensive discussions on Past researches about contract provision with all stakeholders in construction industry, Educational institutes, Governmental and nongovernmental offices which may have a contribution to resolve the problem on preparation and evaluation techniques for time extension delay analysis in Ethiopian construction Industry.

b). Support and lead professional associations and higher education institutes to contribute their roll for the industry to alleviate the current situation by collaborative research and development with all stake holders involve in the industry.

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Appendix A - Questionnaire

Dear Participant,

I am undertaking a research study entitled "Review of Time Extension Delay Analysis Submission and Evaluation Techniques and Trends with selected construction and consulting firms in Addis Ababa" as part of my MSc. Study in Construction Technology and Management at Addis Ababa University, Addis Ababa Institute of Technology.

As you well know there has been a remarkable construction boom in Ethiopia in the last decade especially in recent years, due to complex Problems related to contract administration and construction supervision, misunderstanding between stakeholders etc. the projects couldn't complete on the time specified in the contract. That is why most clients give building projects for foreign companies. For instance Wegagaen, bank head quarter, Hibret bank head quarter, Commercial bank of Ethiopia head quarter, Ethiopian Air Lines Hotel, e.tc This shows that unless the main Ethiopian contractors problem ,Delay have got solutions Ethiopian construction fall in foreign countries. The aim of this research is therefore to assess the practices causes of delays, Submission and evaluation techniques in time extension delay analysis and show the gap between internationally accepted techniques and in such a way to forward recommendations based on the findings.

The questionnaire is developed to assess the practice of major stakeholders in a construction project in using Time extension delay analysis preparation and evaluation methods. The name of institutions and professionals participated will be recorded confidentially. The result of this survey is intended to serve only of time constraints in such academic requirement researches; hence, I sincerely request you to complete and return the questionnaire in a week time to enable me finalize the research on time to meet the deadline.

Thank you for your invaluable time and cooperation.

Regards,

HabtemariamTesfaye/Researcher

The following survey questions are designed to assess Time extension delay analysis preparation and evaluation techniques in construction industry. Please consider each question in terms of your organization's experience and/or your personal knowledge. Please indicate your response by ticking (X or ✓) mark at the appropriate boxes or by filling the blank spaces provided, as appropriate. You may kindly use the back side of the paper if the blank space (s) is/are not sufficient.

1. Personal and Organization Profile

1.1. Name of Organization (Optional): _____

1.2. Type of Organization:

Client/Employer ☐ Consultant ☐ Contractor ☐ Professional Institution ☐

Other (Please specify) _____

1.3. Years since establishment:

<5 years ☐ 5-10 years ☐ 11-15 years ☐ 16-20years ☐ 20years ☐

1.4. Organization's area of specialization:

☐ Building ☐ Highway ☐ Water Works ☐ All infrastructure

Other (Please specify)_____

1.5. Your work experience in construction projects and construction project related works:

<5 years ☐ 5-10 years ☐ >10 years ☐

1.6. Your participation in contract administration, construction supervision and project Management:

<5 years ☐ 5-10 years ☐ >10 years ☐

1.7. Your Name, title and contact address:

Name (Optional): _____

Job Title: _____

Contacts address (Optional):

E-mail: _____

Tel: _____

2. General Questions

2.1. In general, how do you describe the performance of the Ethiopian Construction Industry?

Very Good ☐ Good ☐ Bad ☐ Very Bad ☐

Other (Please specify) _____

If your answer is bad, what challenges may have contributed in your opinion for the poor competence?(Please check all that apply in your point of view)

_____

_____

_____

2.2. D0 you think the time Extension delay Analysis request provide by contractors is fair and logical?

☐ Yes ☐ No ☐ Partially

If it is partial or no, what factor(s) do you believe behind the problem?

☐ Lack of professional, technical and managerial skill

☐ Negligence to provide the service as per the specified conditions

☐ Corruption

Other (Please specify) _____

2.3. D0 you think the time Extension delay Analysis evaluation technique by consultants is fair and logical?

☐ Yes ☐ No ☐ Partially

If it is partial or no, what factor(s) do you believe behind the problem?

☐ Lack of professional, technical and managerial skill

☐ Negligence to provide the service as per the specified conditions

☐ Corruption

Other (Please specify) _____

_____

2.4. One of the protective methods for corruption is pay reasonable fee for professionals.D0 you think consulting office's pay reasonable salary for resident engineers?

☐ Yes ☐ No ☐ Partially

If it is partial or no, what factor(s) do you believe behind the problem?

☐ Due to less pay for supervision and contract administration

☐ Assuming the contractor will add his share on it

☐ The duty and the responsibility is easier than the contractors project manager.

Other (Please specify) _____

_____

2.5. D0 your firm pays over time fee for resident engineers?

☐ Yes ☐ No

If it is yes, how do you fix the fee?

☐ Monthly constant fee

☐ As per the extra hour the resident engineer attend

☐ As per the extra hour the contractor works even in the absence of the resident engineer

☐ As per the resident engineer estimate

2.6. D0 your firm deducts income tax from over time fee for resident engineers?

☐ Yes ☐ No

2.7. D0 your firm disclose the resident engineer's over time fee for his main office?

☐ Yes ☐ No

If No, why?

☐ Because it is unreasonable

☐ To keep it secret and demand a favor from the resident engineer

2.8 Do you think the unregistered overtime fee for resident engineer will have an impact on time extension delay analysis?

☐ Yes ☐ No

2.9. Contract administration is critical for smooth progress to execute the project according to the planned schedule. Do you feel contract administration meet the acceptable standard?

☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree

If you are in disagreement, where do you think the problem arises?

☐ The contract/contract forms used

☐ Problems attributed to the Employer/Engineer

☐ Problems attributed to the Contractor

Other (Please specify) _____

2.10. Condition of contract is one of the main integral parts of contract document in construction contracts. Which contract form you/your firm use currently?

☐ Ministry of Works and Urban Development, MoWUD 1994 contract form

☐ Public Procurement Agency, PPA 2006, or 2011 contract form

☐ Fédération Internationale des Ingénieurs-Conseils, FIDIC Red Book contract form

FIDIC 1987 FIDIC 1999

Other (Please specify) _____

2.11. Do you think the time extension analysis made by the engineer is Impartial?

Yes ☐ No ☐

If No, what do you think the reason behind?

☐ Because consultants get their income from the employer

☐ Deliberately to bring the contractor to their interest

☐ Because many contracts express that the consultants are agents for the employer

Other (Please specify) _____

2.12. Do consultants treat all time extension causes equally like causes related to their office and to employer?

Yes ☐ No ☐

2.13. Do consultants and clients are accountable for the delay of the project?

Yes ☐ No ☐

If No, is it fair? What is your opinion to hold the Engineer and Employer accountable?

_____

_____

2.14. To what Extent employer and consultant extend project completion time due to their fault?

☐ Up to 100 % of the original contract time

☐ Up to 200 % of the original contract time

☐ Up to 300 % of the original contract time

☐ Up to 400 % of the original contract time

☐ Haven't known limit

2.15.Most of the time, Ethiopian Contractors abstain from requesting financial claims, though they got approved time extension for extremely prolonged time. What possible reasons might be behind?

☐ Lack of awareness

☐Even though they understand their rights, they reserved in fear of risk their future work relation with the Employer and consultants.

☐Fear the prolonged justice process

☐ They believe that as the consultant and the employer favored them while approving the time extension.

Other (Please specify) _____

2.16. The contractor is given limited time frame to initiate claims; otherwise he is not entitled for that claim.(PPA2011 and FIDIC1999 contract forms)Whereas even though it is stated that the Employer shall be respond within 21 days no force measure is stated if he doesn't reply accordingly.. Do you think that, it is fair?

Fair ☐ Unfair ☐

If it is unfair what do you suggest to make it balance?

_____

_____

2.17.It is known that good Construction management is become mandatory for completion of the project on the contract specified time. How is the performance of domestic construction management practices especially in light of contract administration?

Very Good ☐ Good ☐ Fair ☐ Poor ☐

If it is poor, what are the reasons behind?

☐ Lack of competent professionals in the field

☐ Lack of conducive environment for practicing

☐ Lack of awareness of stakeholders

Other (Please specify) _____

What measures shall be taken to improve the current state of local construction management Practices?

_____

_____

2.18. Did the consultant/Engineer or the client respond time claim on the time specified in the contract?

Yes ☐ No ☐

If no why_____

_____

2.19. Did the client accept your claims after approved by the consultant? ☐Yes ☐No

If no why_____

_____

_____

_____

2.20. Did you have site diary file or site book for records? Yes ☐ No ☐ some times

2.21Did you record issues related with claims progressively? Yes ☐ No ☐

2.22If yes did you use standard format to record these clams? Yes☐ No ☐

If no why_____

_____

2.23. Do you ever see a project completed within the contract time? ☐ Yes ☐ No

If Yes, how this attain?

☐Due to contractor's good performance

☐Due to consultant's good performance

☐Due to employer's good performance

☐Due to all parties good performance

☐Due to the relaxed completion time fixed in the contract

2.24. Most projects carried out by local contractors do not completed on the contract time.

Would you please Categorize projects which are completed by your company for the last Five years according the criteria listed below?

Of Projects with < 5% time extension_____

Of Projects with 5 to 20% time extension _____

Of Projects with 20 to 50 % time extension _____

Of Projects with 50 to 100% time extension _____

Of Projects with 100 to 200% time extension_____

Of Projects with 200 to 300% time extension _____

Of Projects with 300 to 400% time extension _____

Of Projects with > 400% time extension _____

of Projects not completed_____

2.25Now days it is common to see foreign construction companies in Ethiopian building construction industry, especially in finance sector buildings. What do you think the reason behind?

☐Foreign companies' perform good quality

☐ Foreign companies' perform with less cost

☐Foreign companies complete on the agreed time

☐Quality cost and time

Other (Please specify) _____

_____