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ETHIOPIAN INSTITUTE OF ARCHITECTURE, BUILDING CONSTRUCTION AND CITY DEVELOPMENT (EIABC)

Assessment of Challenges of Construction Claims Handling Process: The Case of Federal Road projects

By

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DECLARATION

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Kasahun Worku

Name of Researcher

Signature …….

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ABSTRACT

One of the issues a construction project might encounter is claim. Construction claim is essentially a demand made by one party to another. Claims will arise whenever a party alleges either an event has occurred or a right is denied or an obligation has not been performed that entitle a remedy to be requested. They may be classified by the related parties, rights claimed, legal basis, or characteristics of claims. Whatever the claim, the ultimate goal is to be qualified for an extension of time or/and additional payment. Studies show that public infrastructure projects have major claims and challenges. Accordingly, this paper analyses the current practice of claim handling process in federal road construction projects, challenges faced claim handling processes & the way it can be improved. The perception & experience of claim professionals involved in road construction projects was assessed via questionnaire & interview surveys and case studies were also used. Accordingly, the result showed that claim handling process in federal road projects has mainly four steps, which are identification, notification, substantiation and assessment and evaluation. There are also three main participants in a typical claim handling process involved in federal road projects; employer, contractor, and claims certifier/engineer/employer representative. Additionally, the result also revealed that many challenges faced during handling of claims. Inaccessibility of documents used to identify a claim, delay in notification claims timely were critical challenges of identification and notification process respectively. Incomplete records/report submission, unsatisfactory evidence to convince other party, poorly submission by contractor/lack of details and particulars were the top ranked challenges of substantiation and assessment process correspondingly. Developing good record keeping system, having good knowledge on terms and condition of contract document, take proactive claim management measure are ranked high by the respondents for improving the claim handling process. Furthermore, to support the survey result the research used some selected case studies and conduct in depth investigation and analysis. The finding expected to provide an important study results for client, contractor and consultant as well as professionals within the area of the study by easily identifying the core and sub-problematic areas.

Key words**: **Construction claim, Claim handling, Federal Road Project, Contract document

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List of abbreviations

AARRP	Addis Ababa Ring Road Projects
AC	Asphalt Concrete
CPM	Critical Path Methods
CPM ,DDG	Construction Project Management, Deputy Director General
DBST	Double Bituminous Surface Treatment
DRM	Dispute Resolution Methods
DS	Design Standard
EOT	Extension of Times
ERA	Ethiopian Road Administration
FIDIC	International Federation of Design and Consulting
GAR	Global Arbitration Review
GCOC	General condition of contract
ICB	International Competitive Bidding
MoWUD	Minster of Work and Urban Development
NCB	National Competitive Bidding
PMI	Project Management Institute
PPA	Public Procurement Authority
SBD	Standard Bid Document
USD	United States Dollar
VO	Variation Order

Chapter One

Introduction

1.1Background of the Study

The construction industry is a very competitive, complex where people with various skills, perspectives, and levels of construction process knowledge interact. Participants from a wide range of professions participate in this complicated environment with their own aims and expectations for maximizing their individual advantages (Asseged, 2016). According to Girmay (2003), the site-specificity and custom-built nature of civil engineering projects makes them unique. Every project is planned and carried out in a particular location and under a particular set of circumstances. Because of this, it is challenging to predict in advance how a project will end out. Therefore, it is frequently challenging to estimate precisely in advance what the total cost of a project will be.

Civil engineering projects tend to be claim sensitive because of their special characteristics and the uncertainty of their nature. A construction claim is essentially a demand made by one party to another. It is a request for additional compensation due to any modification to the original contract (khekale & Futane, 2015). For the purposes of this study, "construction claims" refers to any request by main contractors to the engineer made in accordance with any applicable contract provision for payment, extension of time, or damages due to any alleged duty breach by the employer (Client), the engineer, or neutral risk events (Aibinu , 2007).

Claims can be categorized according to the parties involved, the rights asserted, the legal foundation, and other factors. Whatever the claim, the ultimate goal is to be qualified for an Extension of Time or/and additional payment.

Claims may go through a life cycle (from the time of occurrence or inception to the time of engineer determination). During this time, there may also be a number of disputes, discussions, and counterclaims because this is not a very simple process (Aibinu, 2007). There may be repeated back and forth movements between the parties. To achieve proper resolutions and avoid claims growing into disputes claims handling and administration must follow a comprehensive step-by-step process (Tochaiwat, 2006).

Claim handling is the process which starts from identification of claim, followed by notification of the claim, substantiation of the claim and end with claim assessment. Once an event occurs a contractor shall identify and recognize the event before it becomes controversy.

Construction claim notice entails notifying the opposite party of a potential problem in a non-adversarial manner. The majority of contracts stipulate that claim must be notified within 28 days of the contractor becoming aware of, or should have become aware of, a circumstance. It is crucial to notify owners of possible claims within a reasonable amount of time, as stipulated under the contract.

Once a contractor notifies the claim, he needs to substantiate with supportive evidence that helps to convince the engineer and employer within the stated time. After the contractor submit the detailed claim, then, the engineer assesses and gives his recommendation within the stipulated time frame. As previously stated the contactor has the option of accepting or rejecting the engineer's response and proceed to the next dispute resolution system. It may not be a really straightforward process, and a number of challenges or problems will be encountered during the process.

Contractors must have solid, organized policies and procedures in place for the handling of claim and change order scenarios in order to protect themselves and increase the likelihood of an appropriate and profitable recovery in the event of claims and change orders. It is crucial that contractors must submit claims in accordance with the procedures outlined in the contract conditions, it shall explicitly state the additional costs and time, and provides sufficient justification. Furthermore, clients must implement a comprehensive strategy for tracking and handling contractor claims (Zaneldin, 2006).

Numerous studies are conducted globally to examine challenges with claim handling processes, including lack of claim awareness, lack of contract knowledge, and lack of experienced staff. The challenges also include an inadequate recording system, a lack of evidence, disagreements between parties, delay in notification and assessments, among others (Hai, 2019).

A country like Ethiopia cannot be free to these issues; studies show that public infrastructure projects have major claims and challenges in the process. Research conducted by Tsige (2020), supports this argument. The study revealed that an increased number of claims of contractors have shown in contracts with alleged extension of time and its subsequent additional cost for different reasons in federal road projects. However, most contractors present their claims after long time of the occurrence. This remains to sort out evidence and knowledge of the objectives of the conditions at the time of the event. Despite the cause and management method of claims there are challenges and difficulties faced during the application of the handling process.

Hence, the aim of this study is to assess the challenges of claim handling process and assessing improvement to overcome the problems.

1.2 Statement of the Problem

Different factors made claims an inevitable burden of implementing today's construction projects. Some of them were, the increased complexity of construction processes, documents, and conditions of contracts has been contributing to higher possibilities of disputes, conflicting interpretations, and adversarial attitudes.

Claims may lead to significant financial harm. The cost and duration of construction projects are significantly impacted by construction claims. According to ARCADIS (2016) study, claims and disputes cost the world an average of USD 40 to 60 million and 10 to 15 months for settlement from 2011 to 2016 GC. Asian, Middle East and Africa contributed the highest value.

Along with the growth in claims, there is a growing challenge in finding a reasonable deal in a fast, efficient, and cost-effective manner (Kululanga, 2011). SMEC (2018) also revealed that, public infrastructure projects have the greatest claims and challenges in their claim handling and administration process.

Country like Ethiopia cannot be immune to these problems. According to Abdisa (2003) problems with claim management were prevalent in the research of local contractors. The study further stated that majority of local construction organizations manage their construction projects by employing engineers who have little or no training on construction project management. This results in improper claim administration.

Delayed response to contractor's claim, or related technical issues has been one factor observed in the analysis of claim. Further, Ethiopian construction industry seriously lacks qualified engineering professionals with an appropriate level of training in construction management, international contract administration and claims handling. As a result, claims that could have been minimized and settled at an earlier stage goes unresolved, costing the country millions of dollars (Girmay, 2003).

Challenges in claim settlement specially delays in claim approval that come from claims not being resolved by Ethiopian Road Administration on time are causing disputes/conflict/ between the owner and the project partners and having a significant impact on the performance of both local and international contractors (Azeb, 2016). Therefore, the research aims to assess the practice and challenges of claim handling process in federal road projects and gives valuable recommendation and suggestion based on the finding.

1.3 Research Objective

1.3.1 General Objective

The general objective of the study is to assess challenges of construction claims handling Process by taking federal road project as case study.

1.3.2 Specific Objective

In the road to hit the above mentioned main objective, this study simultaneously embraces the following specific objective

- To assess challenges of claim identification process the case of federal road projects.
- To assess challenges of claim notification process the case of federal road projects.
- To assess challenges of claim substantiation process the case of federal road projects.
- To assess challenges of claim assessment and evaluation process the case of federal road projects.
- To assess claim handling improvement mechanisms the case of federal road projects.

1.4 Research Questions

- What are challenges of claim identification process the case of federal road project?
- What are challenges of claim notification process the case of federal road project?
- What are challenges of claim substantiation process the case of federal road project?
- What are challenges of claim assessment and evaluation process the case of federal road project?
- How to improve claim handling process the case of federal road projects?

1.5 Significance of the Study

This study is expected to provide an important study results for client, contractor and consultant as well as professionals within the area of the study. Thus, the result initiate policy makers in the area of the subject matter and serve as an input in the policy making process by easily identifying the core and sub-problematic areas. At the same time, the study is believed to promote transfer of best practice knowledge of claim and claim related issue management practice, challenge and problem associated with claim. This research will be very useful for contractors, consultants and clients to find out the problems that exist in each stage of construction claim management. By understanding these problems, stakeholders will be able to make anticipatory efforts and increase the success rate of their claim management. Moreover, stakeholders like client, contractors,

consultants and professionals could use the document as an input for further discussion, application and investigation.

1.6 Scope and limitation

1.6.1 Scope of the Study

This study focuses on assessment of challenges of construction claims handling Process the Case of federal road projects. The reason the research focus on the above sector is roads are taking large portion of national budget and resources, besides that, the development of the nation is highly dependent on provision of roads. In addition road sector is highly exposed to the dispute due to its nature. The need of effective and timely handling of claims and disputes are important. Different scholars classify claim into, claim related to the contract, claim out of the contract, extra garcia claim and tort claims are common .However, the research mainly focused on contractual related contractor's claim handling process which is submitted by a main contractor to the party responsible for administering the contract.

1.6.2 Limitation of the study

The study is limited to address the road construction projects handle by regional state road authorities. Due to time and financial constrain, the study would not address all categories of claims and building sector. Another limitation is the lack of willingness of the respondents to questionnaires. Getting some cost related cases for the analysis was also difficult.

1.7 Organization of the Paper

The research has organized in chapters as briefly described below. The major processes of the research, and how each process links with these chapters, are presented.

Chapter one: introduction

This introductory chapter presents a general outline of the research, statement of the problem, the research objectives, research questions, scope & limitation, significance, and paper organization.

Chapter two: Literature Review

This chapter provides detailed reviews on the construction claim types, handling process of the claim and factor that affect the claiming and handling process of mainly contractual claim. This part also tries to extensively asses the procedure followed by the contractor to settle the claims and condition of contracts used for the cases. Finally improvement mechanisms also clearly assessed.

Chapter three: Research Methodology

This chapter further elaborates the methodology applied in carrying out the research which is a crucial component in achieving the research objectives. It presents the different methodological approaches employed with its justification, the processes involved and the types of instruments used in the research. The major activities include; how to determine research population, how to select data sources, data collection instruments and procedures adopted and the way how to analyze & discuss collected data. Finally, the way to conclude the result will discuss in detail.

Chapter Four: Finding and Discussion

This part of the research elaborate the finding of the paper which is collected from the respondent, case and other source via different data collection methods and discussed through logical and systematical ways.

Chapter Five: Conclusion and Recommendation

Finally the paper presents the conclusion and the recommendation as well as the reference.

Chapter Two

Literature Review

2.1 Introduction

This chapter presents a general review on claims and claim handling process and procedures followed by contracting parties. It reviews the setting and context in which this study is conducted, the process for handling mainly contractor's claims. It also describes the nature and origin of construction claims and a typical process for handling claims. It identifies the main actors and the primary objectives of the claims handling process and some condition of contract specially (FIDIC) in which claim based on. The chapter also discusses the difficulties associated with handling of claims by contractors, and assessment of improvement mechanisms of claim handling process.

2.2 Construction Claims

Construction claim can be simply defined as a demand from one party to another. It is a request for additional compensation on account of any change to the original agreement (Khekale and Futane, 2015; Girmay, 2003; Abdisa, 2003). For the purpose of this study, construction claims refer to any application by the main contractor to the Engineer pursuant to any relevant clause of the contract for any additional payment, extension of time and or damages for any alleged breach of duty by the Employer (Client), the Engineer or neutral risk events (Force Majeure or Excepted or Special Risks, Government act including Changes in legislations, adverse Climatic Conditions, local Community initiated changes or disruptions or suspensions and so on).

Construction claims can be in the form of money and time claims by the contractor against the employer for extension of time and additional payment arising from a specified event in the contract, and variation claims arising from changes (Andy,2011; Aibinu , 2007).

Claims will arise whenever a party alleges either an event has occurred or a right is denied or an obligation has not been performed that entitle a remedy to be requested. Disputes will also arise if a claim was not accepted or a remedial right was not respected leading to conflicts that entitle a request for a remedy or compensation to be pursued through the dispute resolution mechanisms.

The basic difference between claims and disputes are, claims are such remedial rights that are administered and certified by the employer representatives and / or approved by the employer; whereas disputes are such remedial rights administered and resolved by either the parties

themselves or third parties using different level of dispute resolution methods; namely amicable and judgmental dispute resolution methods (DRMs) (SMEC, 2018).

The number of construction claims and disputes has been increasing and has become a burden to construction industry (Levin, 1998). Even with the most expert understanding of construction contract and the most reasonable risk-allocation system, claims will continue to present problems if they are poorly managed in practice (Zaneldin, 2006).

It is very important for contractors to submit claims according to the steps specified in the contract conditions, provide a detail of the additional costs and time, and present satisfactory evidence. On top of that, project owners must follow a comprehensive procedure for tracking and managing the claims submitted by contractors.

Claims management is the process of employing and co-coordinating resources to progress a claim from identification and analysis through preparation, and presentation, before it proceeds to dispute (Kululanga, 2011). The key objective of the claim management process is to resolve certain problems in an effective and efficient manner. Avoiding litigation and arbitration in claim settlement is one good practice that successful contractors must keep in mind.

2.3 Construction Claim Types

There are different classifications of claims. They may be classified by the related parties, rights claimed, legal basis, and characteristics of claims. By determining their relevant legal bases, construction claims can be divided as following:

Contractual claim

A Claim for which both the event and the remedy are specified explicitly in the Contract and a Breach of Contract for which the remedy is specified in the Contract fall under this classification (SMEC, 2018). Claims made under the expressed provisions of a contract fall under this category arise and are dealt with under the provisions of the contract. These kinds of claims are the majority of claims, and the contract's terms specify the circumstances under which and how to address them. For instance, the employer might implement a design change. If such an unexpected occurrence occurs, the contract specifies a mechanism through which the contractor may request compensation by submitting a simple contractual claim (Harvey, 2002) as referenced in (Girmay, 2003).

Extra-contractual claims

This type of claim has no specific grounds within contract but is a result of breach of contract, which may be expressed or implied (Tochaiwat and Chovichien, 2014).ERA modernization-

Claim and dispute management manual also support the above definition. It is Breach of Contract for which a remedy is not specified in the Contract and a Claim rather it may has chance of falling under applicable law. This claim arises when the contractor takes their case to the courts of law unless there was a clause that directed that any dispute arising in the contract should first be taken to arbitration. This type of claim is mostly occurs between contractor and a public entity such as a parastatal or a county government or even the central government.

Ex-gratia claims

Ex-gratia claims are the claims that there is no ground existing in the contract or the law, but the contractor believes that he has moral grounds (Tochaiwat and Chovichien, 2014; Girmay, 2003; SMEC, 2018). These are claims that an Employer is under no contractual obligation to meet and therefore this means that they are discretional. The Employer has no legal obligation to honor such claims however much the contractor considers that they have a moral right for compensation. Whatever the moral rights may be, the contractor's chances with the claim will usually depend on the benefit(s) accruing to the Employer.

Quantum Merit

A Claim based on quantum merit arises if there is no specified sum to be paid for work under the Contract or work is done through instruction made beyond authority to issue variation or under Voidable Contract, or in the expectation of a contract conclusion but failed to do so, or where the Employer wrongly terminates the Contract (SMEC,2018).

Claims in Tort

In general, the law of torts imposes a court delay, and a violation of that obligation may result in a claim for damages. In this case, the contractor is claiming a breach of a common law duty that isn't related to a contract. The most significant tort in terms of civil engineering practice is negligence, which has grown dramatically in recent years even though recent cases have tended to reduce the range of negligence liability. Any contractor who has a claim will typically, if not always, make a tort claim against the engineer and not the employer. Under this category, a claim for misrepresentation is also included (SMEC, 2018).

2.4 Classification of Claim Based on Entitlement

SMEC (2018) also classify claims based on the entitlement as follow;

Extension of Time Claims

Extensions of time claims are delays in completion of the project that are justified and, in some cases, entitle to cost compensation in the form of prolongation costs. Justifiability takes into

account causes and / or effects such as criticality of and non-critical activities but goes beyond floats, concurrency and / or successive delays. An important purpose for having an extension of time clause is to guarantee that the employer compensates losses and keeps the ability to deduct liquidated damages. If the contractor's activities or lack of actions hinder him from attaining completion of the project by the contract's timetable, time might be set "at large," entitling the contractor to complete the project within Reasonable Time and exempting him from delay penalties.

Disruption Claims

A contractor's job is hampered if he is prevented to complete the task in line with an established schedule. A disruption prevents the contractor from performing in an efficient or logical order as specified in the approved construction schedule.

If the prevention is caused by one or more of the contract's specified events, the contractor is entitled to a time extension, additional expenses, or both, and such compensable events are managed under the disruption claims. For acceptable EoT determinations, disruption claims shall examine the fulfillment of agreed-upon resource deployment and the highest among the presumed and actual productivities.

Acceleration Claims

When the contractors is required to deploy additional resources to accomplish the works before or within the current time of completion, and the delays are not due to his fault, acceleration claims occur. Extra and additional working hours of labor and equipment, as well as the costs of getting products to the site, may be included in acceleration claims.

Prolongation Claims

Prolongation is defined as a delay in a critical activity that prolong the time for completion of all EOT eligible works, or a delay in a non-critical activity that consumes costs of idle resources even when EOT entitlements are not available.

extensions of time that cause delays in completion or activities may lead to higher costs to the contractor due to the extension of the contract duration or costs for idle resources as a result of disturbed or suspended activity.

Upkeep of the contractor's site facilities; providing facilities for the engineer; extra and extended use of labor and equipment, which may be required for another project; off-site and head office costs; finance and insurance costs; and many other potential related claims could all result in additional costs.

Variations Related Claims

Variations associated claims relate to the status of the variation itself and its entitlements connected to EOT and / or additional costs / payments through valuations of alterations either depending on the agreement or basic prices of the agreement or new prices. Andy (2011) states some examples of such types of claims .this may consist of additional or less work, a change in the specification of part of the work or, in some situations, a modification to the project's contractual base, such as the price or duration of the agreement.

Termination Related Claims

Termination-related claims occur as a consequence of the employers or contractors breach of contract, or special or excepted risks, or unforeseen circumstances, or circumstances leading to performance release, or the employer's convenience.

Contract Securities related Claims

Bonds, guarantees, retentions, insurances, and warranties are examples of contract securities that the employer is entitled to call on or set off to compensate losses incurred as a result of contract securities related claims when the respective contractor's contractual obligations are not met.

2.5 Construction Claim Handling Process for Contractor's Claim

A claim's life cycle could arise (from the occurrence or inception stage to the engineer determination stage). Due to the complexity of this process, there may be several disputes, negotiations, and counterclaims during the claim life cycle (Aibinu, 2007). Between parties, there may be repeated back and forth movement. To achieve effective resolutions and avoid claims turning into disputes, claims analysis and administration must follow a comprehensive, step-by-step process (Tochaiwat, 2006).

Following are the three main participants in a typical claim handling process: Employer, contractor, and claims certifier/engineer/employer representative are listed in that order. The project's funder or investor is the Employer, in our case the Ethiopian Road Administration (ERA). The contractor is entitled to make a claim for an extension of time (EoT) and/or loss and expense in the event that the Employer's actions, those of those for whom the Employer is responsible, such as the Employer's representative's acts, servants, or agents, or relevant events specified in the Contract Agreement, change the Contract or cause the Project to be delayed. In a connection between an employer and a contractor, the contractor is often the claimant as they are also entitled to compensation for the additional cost of variations. The engineer is the other key

participant in the claim process. In accordance with the terms of the contract, the engineer is obligated to respond to claims made by the contractor (Aibinu, 2007).

2.5.1 Claims Identification Process

Identification of subjects is the first and most important activity claimants must perform before filing possible claims (Hai, 2019). The contractor must be able to detect and identify a claim scenario as it emerges, not after it has turned into a controversial subject. The owner can only be informed of adverse or potentially unfavorable job conditions through an active program of claims and change order detection and notification. An active claims strategy can also assist the owner in identifying the possible extent of cost and timing impacts early enough to acquire sufficient funding and make the necessary and timely adjustments.

The following factors make early identification crucial as well.

1. It gives the client the chance to check, confirm, and maybe fix the problem immediately.
2. In his work, Levin (2016) explains in detail the advantages of early claim identification. The study added, Sometimes a changed circumstance may look at new designs, new materials or equipment, or alternative building techniques. All parties benefit from early detection and resolution of time-consuming and expensive issues. Even when fair adjustments are eventually made, the contractor benefits from finishing up the job and leaving as soon as possible. To do this, they must make every effort to hasten the settlement of any adjustments or claims problems. Early detection gives the contractor enough time to investigate the issues, evaluate various proposal and notification strategies, and best prepare him for claims that might become difficult.

There are two fundamental prerequisites for claim identification. These include understanding of contract documents as well as legal concept and rights.

a) Knowledge of contract documents

The first prerequisite for identifying a claim is familiarity with the contract document. The personnel working on the construction project must be quite familiar with the contract agreements.

To understand their rights and obligations under the contract, project workers must be familiar with all relevant general and technical terms. These key individuals will be in the greatest position to identify claim problems as soon as possible if they have a complete and full understanding of the whole work (Abdissa, 2003).

b) Knowledge of legal concepts and rights

Understanding legal terms and rights is the second need for claim identification. The project staff is required to have a working knowledge of legal rights and ideas since they might influence how possible claim scenarios resolve out. The following are potential obstacles in the claim identification process.

Table2. 1 Potential challenges in claim identification process

Challenges /problems	/Sources/Authors
Insufficient construction contract knowledge by project site staff	(Rostiyanti *et al*,2019;Bakhary,2015; ;Hai,2019;Abel,2017)
Difficulties in detecting any problem on site which potentially becomes a claim	(Rostiyanti et al,2019 ;Bakhary,2015)
Insufficient skilled personnel for detecting a claim	(Bakhary,2015;Hai,2019; Kemala Hayati *et al*, 2019;Abel,2017)
Poor communication between site and head office	(Bakhary,2015; Kemala Hayati *et al*, 2019)
Inaccessibility of documents used to identify a claim	(Bakhary,2015;Hai,2019;Kemala Hayati et al., 2019)

2.5.2 Claim Notification

Construction claim notice entails notifying the other party of a potential issue in a non-adversarial way. Time constraints are extremely important and vital. An initial letter of claim notification to the other should be succinct, straightforward, uncomplicated, conciliatory, and cooperative. It must identify the issue and notify the other party of any potential time or financial implications. The Claimant [often the Contractor] is required to provide Notification of Intent to Claim within the specified time period, which is typically 28 calendar days in order:

1. To prevent the claimant from delaying his or her desire to cooperate and to let the claimant to bring up dropped claims at any moment in the future.

2. To provide the Party the chance to successfully reduce or avoid unneeded consequential effects.

The following specifically stated conditions must be met by notification, although they are not limited to them SMEC (2018):

a. Notification Letter as subject in the [Covering] Letter,

b. Contract Clause(s) and / or Applicable Laws Provision(s) entitling the Compensation Event,

c. Situation or event or deficiency happened to affect the Completion Time, and / or the Quality, and / or the Contract Price,

d. Experienced Contractor's Obligations as Conditions Precedents to clearly justify exhaustive effort to prevent or minimize impacts,

e. Indicating whether the situation or event or deficiency has a continuing effect or not shall be clearly indicated in the claim notice.

Notice timing

The notification's timing is crucial. The owner may not be able to control the level of its obligation for additional expenditures if the notification is issued too late to be in compliance with the notice requirement. Typically, contracts will provide a timeframe for submitting the notification. If the nature of the problem can't be determined without the passage of time, the passage of time could not imply anything. But occasionally, the passage of time makes some facts or cost-control measures less evident (Abdisa, 2003).

Form of notice

The contractor must demonstrate that the duty was waived if notice was not given and there is unclear evidence of constructive notice. In situations where the owners' activities have breached a provision in the contract, the owner cannot insist on its compliance. If a law requires written notification, such obligation cannot be waived. Only the owner or a representative of the owner may waive (Abdisa, 2003).

Typically, a formal letter is used as the method of communication. Notice can be found in letters, memoranda, and other papers that were written on the job site. If they are properly written, project meeting minutes that summarize conversations concerning project circumstances may be adequate. It is crucial to notify owners of potential claims within a reasonable period of time, as stipulated under the contract. Here are some typical difficulties with the procedure.

Table2. 2 construction claim notification challenges

Challenges	**/Sources/Authors**
The short time of notification period	(Hansen *et al.*,2019)
Ambiguous procedures in claim notification	(Bakhary,2015)

Inaccessibility of supporting documents needed for notice	(Kemala Hayati *et al*, 2019)
Poor communication/instruction to proceed with submitting the notice	(Kemala Hayati *et al*, 2019)
Delay in notification the claim timely	(Tochaiwat.K,2005)
Failure to give notice	(Tochaiwat.K,2005)
No standard format for preparing notice	(Kemala Hayati *et al*, 2019)
Giving notice informally/give notice in word	(Hai,2019;Tochaiwat.K,2005)
Contractors give/submit ambiguous and incomplete notice	(Tochaiwat.K,2005)

2.5.3Claim Substantiation Process

For the administration and determination of claims, substantive requirements are required criteria. The following four substantive conditions were specified in the current ERA Contract Conditions, namely:

- Contractual provisions and/or provisions of applicable law
- Detailed information presenting the facts or evidence.
- Appropriate or Normative Computations
- Mechanisms for resolving disputes

Whereas the first two are used to determine a claim's liability, the third is used to determine the amount or quantum of entitlements.

Following the conclusion of the effects resulting from the occurrence of the claim's cause, the claimant is required to submit the final amount of time and/or money claimed within the contractual period. The claim should be expressed logically and clearly, ideally incorporating the following: Abdul-Malak *et al*, (2002**)**

• A summary that includes the parties to the claim, their contact information, and any dates and other relevant material

• An explanation of the circumstances that led up to the claim and their results.

• A statement of the steps previously taken by the contractor, such as notices given; and

• An analysis of the facts demonstrating the grounds upon which the claim was founded, with reference to the pertinent provisions and clauses of the contract

• A determination of the alleged extension of time based on an examination of essential and non-critical delays; calculations of the cost effect based on a breakdown of the actual direct and indirect expenses spent; and so forth. Further (SMEC, 2018) discussed content of substantiated claims as follow:-

• Explicit indication of the fulfillment of all obligations including conditions precedent of the claimant, particularly the Contractor's experienced status obligations; to clearly indicate the entitlement(s) or compensation(s) requested,

• Clear indications of the most likely interventions required to minimize effects if the situations or events or deficiencies could have a continuing effect.

• Explicit indications of the fulfillment of the Procedural and Substantive Requirements of the specific Claim Types that is: explicit mapping of detail particulars proving

• Explicit indication of whether the situation or event or deficiency has a continuing effect or not

If the claim's subject has a continuing effect, it is important to note it. There won't be a continuing effect if the impact on the program and budget can be evaluated immediately upon the occurrence of the claim's cause. However, if the claim's effects are not foreseen or cannot be quantified at the time the contractor notifies the owner, the claim will in this instance continue to have an impact. Here, the contractor is requested to provide an account that includes details on the amount claimed and the grounds supporting the claim. The contractor must periodically/monthly/as the engineer may reasonably request, submit further interim accounts outlining the total amount of the claim and any additional grounds for it (FIDIC 1987, 1992).

Chances of winning are considerably diminished in the absence of comprehensive and adequate documentation substantiating the stated claims. The construction sector is known for not recording processes and transactions; for example, during the information explosion during construction processes, a significant amount of important papers flow daily throughout the project. Site records may appear to have little value initially, but when issues occur, their importance for recognizing claims increases (Bakhary *et al.*, 2015). A claim submission must include the same kind of evidence that the attorney would use in his trial in order to establish or corroborate the facts and circumstances supporting the claim.

According to Abdul-Malak *et al*., (2002), the following sources provide the documentation that is often needed for claim analysis and documentation:

• Correspondence related to the project;

• Contract terms and specifications;

• Construction timelines (original and updated)
• Site diary (labor, equipment, and material records)
• Videos and pictures of the progress (with commentary)
• Recordings of site meetings
• Records of disruption and delay
• Day-to-day work reports
• Register drawings (details of amendments and revisions made to plans)
• Documentation for bills of quantities
• Breakdown of tender pricing for the contractor
• Daily progress reports (including the date, the weather, the temperature, the type and amount of work, the materials supplied, the assignments and allocation of resources, and so forth); Observation and instruction logs
• Certificates and applications for progress payments
• Delivery records for supplies and equipment provided by the owner
• A list of all submissions, including shop drawings, vendor brochures, samples of materials, erroneous work calculations, scaffold designs, bar-bending schedules, etc.
• Cost and productivity reports; and
• Report on site safety and accidents.

Andy (2011), in his book recommended that, the contents of a typical claim submission document could be as follows:

- Front Cover: - (The claimant's name, the project title, the claim title or brief description of the issue, the revision reference, the revision date.)
- Executive Summary
- Statement of Claim: The statement of claim serves as an introduction to the entire document by briefly describing the contract, the project, the nature of the claim, and the events giving birth to the claim. If the document is a resubmission or a revision to the claim, it should be noted in this area as well as whether the claim is an interim or final submission.
- Definitions, Abbreviations, and Clarifications: This Section contains a list of all the definitions, acronyms, and explanations that are used throughout the contract and claim document. The format and structure of the claim document are also explained in this Section.
- The Contract Particulars
- The Method of Delay Analysis

- Details of the Claim for an Extension of the Time for Completion
- detailed Information about the Request for Additional Payment
- Appendices that gives more information's

Andy (2011) explicitly demonstrates that claim substantiation process shall consist of two part. The narrative, which contains the project's details, describes the conditions giving rise to the claim, illustrates its impacts, and explains the logic behind any supporting documentation created to support the claim's effects and/or amount.

Appendices that include material needed to support, demonstrate, and support the claim, such as programming, calculations, and project records.

A well-presented document shows the competence of both the firm presenting it and the person(s) in charge of creating it.

Table2. 3 construction claim substantiation challenges

Challenges	**Sources /authors/**
Incomplete contract documents for substantiation	(Tochaiwat.K,2005)
Failure to submit reports	
Incomplete records/report submission	
Failure to keep up-to-date program	(Abdul-Malak *et al*, 2002)
Unavailability of written document for substantiation	(Tochaiwat.K,2005)
Requires a vast number of documents to be reviewed and people to be interviewed	(Mohamad. Y *et al*.,2013)
Unavailability of claim standard forms/format	(Lew Yoke-Lian *et al.*,2012)
Inadequate time to thoroughly prepare due to high workload	
Contractors' over estimation of claim damages	
Lack of skilled staffs for preparing claim submission	(Hail,2019,Abel,2017)

2.5.4 Claims Assessment and Evaluation process

In the event of a Contractor's claim, the Engineer may only act in the manner specified in the contract .Additionally, the majority of contract types, including FIDIC, provide that the Engineer must take a considerable part in the review and assessment of claims. '*Whenever these Conditions provide that the Engineer shall proceed in accordance with this Sub - Clause 3.5[Determinations] to agree or determine any matter . . . If agreement cannot be reached, the Engineer must decide fairly in line with the Contract, taking into account all significant parameters.*

Claim Assessment Stage may involves the following sub processes

Engineer's Preliminary Review

The employer's representative in the first place shall check the following SMEC (2018):The sufficiency of the substantiated document, and the fulfillment of the precedent conditions in order to decide whether the submitted substantiated claim is accepted for a review and identify whether clarifications needed to be requested or not. The Employer's Representative/engineer shall either request or instruct the Contractor to resubmit the Substantiated Claim, or to provide further Clarifications. The Employer's Representative/Engineer shall exhaust in identifying all clarification requirements and be very careful not to indicate to the Contractor any meritorious inputs that assist his substantiation.

The Contractor shall timely respond accordingly and either resubmit the Substantiated Claim or provide the requested Clarifications. Andy (2011) establishes that the Engineer may have chance of make the following decision:-

1. Reject the claim since the claimant hasn't provided enough evidence to support it. Clearly, in his response, the reply must give valid justifications for such a refusal.
2. Respond by requesting that the claimant give further information so that a proper evaluation may be conducted. In this situation, it would be important to notify the claimant just what more information is required and/or which parts of the claim do not give enough information to make a conclusion.
3. Create a determination that is based on the claim submission, the responder's personal understanding of the situation, and any other documents that are accessible to the respondent.

If the claim is handled amicably, the Engineer's decision usually becomes significant and may be taken into account by the claimant and Employer. If not, the process is then directed to

alternative conflict resolution techniques that have been proven effective, such formal arbitration and legal action.

The Engineer must give the Contractor written notice if they are refused a request for an extension by the Engineer. With the provision that the Engineer, in considering any such extension, shall take into account all the facts known to him at that time, including the effects of any omission of work or considerable reduction in the quantity of any item of work. If the contractor makes a written request for it, the engineer must review the circumstances that led to the delay in order to decide whether to grant a further extension of the deadline for completion (Kumaraswamy et al, 2003).

Table2. 4 Challenges during assessment and evaluation of claims

Challenges	**Sources /authors/**
Engineer lack of construction knowledge to assess the claim	(Tochaiwat.K,2005)
So Many Documents /Engineer requests excessive details	
Partiality of Engineer during assessment	
Much higher bargaining power of the employers	
Contractors' Delays in Response to Claims clarification	
Unsatisfactory evidence to convince other party	(Abel,2017)
Failure of the contractor to submit claim chronological order	(Hansen *et al*.,2019)
There is a tendency to protect own interest	(Hansen *et al*.,2019)
Poorly submission by contractor/lack of details and particulars	(Mohamad. Y,*et al*.,2013)
Analysis methods used by contractor different with the method used by the engineer	

2.6 Methods of Analysis (Amount / Quantum) the Claims

The contractor's primary responsibility is to substantiate the claim, which is to support it and show the accuracy of its facts. The claims made by the contractor typically fall into two categories: time and cost. In the first type, the contractor asks a change in contract due dates and milestones to compensate for delays that it did not create. In the second category, the contractor

requests payment for extra time, higher equipment expenses (rental or ownership), increased finance costs, increased site overhead, increased home office overhead, and lower labor productivity, among other things (Semple *et al*. 1994) Keep in mind how closely the two groups are related. For example, any delays are likely to increase all cost components, and any productivity decline increases the time necessary to complete the activity. Therefore, the contractor may claim any combination of the aforementioned elements, or maybe all of them. The contractor's usual quantification techniques are described in the following section. Note that the party handling the claim (engineer or others) applies the same techniques to verify the accuracy of the contractor's computations.

A. Delay Estimation/Extension of Time

Assessment of the influence of employer events on the work schedule for contractors and determination of the degree to which progress will be affected are the primary goals of a delay assessment. To resolve a claim or disagreement about a schedule slippage amicably, it is necessary to do an analysis of the delay to determine what occurred during the project, when and how delay events affected the schedule, and which party was responsible. It must be kept in mind that a delay does not always result in a time extension. For instance, if an activity is delayed by 25 days, it does not immediately entitle you to a 25-day extension of time as the delay event must affect the critical path of the program in order to affect the completion date.

It's possible that a delay event won't affect the completion date and will just take up float in the program, or that the delayed activities aren't on the critical path. Alternately, it's possible that the delay event consumes the entire available float, putting the activity on the critical path and impacting the completion date (Andy, 2011). As-planned vs. As-built, impacted as-planned, collapsed as-built, window analysis, and time impact analysis are the five most often referenced delay analysis techniques in the literature. The key distinctions between these methods, according to Tochaiwat *et al*., (2004), are their input schedules. While some methods demand an as-built schedule, others require an as-planned schedule.

As-planned vs. As-Built

This is one of the most popular methods for delaying analysis since it only compares the activities on the as-planned schedule with the as-built schedule to provide a detailed examination of the delay. The fundamental benefit of this technique, according to Lovejoy (2004), is that it offers a clear analysis that is simple to use. Its drawbacks, however, include failing to recognize

the critical path, assuming that the baseline's schedules logically hold, and not accounting for delay mitigation.

Impacted As-Planned: This approach works by incorporating delay into the as-planned schedule and calculating its impact on project completion dates.

The assessment can be done fast and easily since it uses the as-planned timetable and does not need an as-built schedule (Stumpf, 2000). However, this approach has some drawbacks. For instance, it may presume that the as-planned schedule is perfect and that the contractor has always followed to the original schedule, with no one else to blame for delays other than the owner (Stumpf, 2000). In order to assess the impact of a delay, this method highly depends on the baseline (as-planned) schedule and does not account for the impact of the actual work done. Unfortunately, an analysis based on an unrealistic baseline schedule will suffer from false logic as well as overestimated project durations. The third argument that Stumpf (2000) noted as undermining the usage of this technique is that it operates under the presumption that the owner is the only person accountable for delays, and only owner related delays are introduced into the as-planned program to support this presumption. According to research by Muluken (2018), this form of analytical approach is usually applied by employers and contractors in the case of a federal road project in Ethiopia.

As-Built Collapse

With this approach, an as-built schedule that accounts for all delays is initially produced. The as-built schedule, which reflects how the project would have moved in the absence of the delay, is then created by removing the delay from the original time schedule. If there is a good as-built timetable, this technique can be constructed fast and easily, claims (Stumpf, 2000). In contrast, Lovejoy (2004) expressed the view that this method, when compared to the Window Analysis method, provides accurate answers at a cheap cost.

Window analysis

This technique, commonly referred to as the contemporaneous period analysis, is one of the most reliable methods for examining construction delays (Hegazy & Menesi, 2008). With this process, the project is split into several windows of time. The first step in the delay analysis is to update the schedule for the first window using as-built data, taking into account all delays that occurred during that time while maintaining the remaining as-planned schedule for the remaining windows. The difference between the project completion date of the updated schedule and the

schedule that existed before the review process indicates the amount of project delay caused by the delays in the first window.

The similar process is carried out one again to analyze the remaining window and calculate the overall delay time. Due to its capability to account for the critical path's dynamic character, this technique has been considered as one of the most accurate delay analysis methods. The biggest disadvantage of this approach is that it takes too much time and effort to finish. According to Muluken (2018), consultants frequently employ this sort of analytical approach in the case of a federal road project in Ethiopia.

Time Impact Analysis

By the Society of Construction Law; Delay and Disruption Protocol, 2002, this method was acknowledged as the most reliable method of delay analysis. These method's shortcomings are mentioned by Arditi & Pattanakitchamroon (2006) in their study. First, a lot of information is needed to complete the analysis, and a progress/as-planned schedule in CPM form is essential. A regularly updated schedule is also strongly required. And a timetable that is updated on a regular basis is strictly essential. Second, because this system provides extensive analysis and requires a routinely updated schedule, time and effort are needed to performing the analysis, making it costly to execute, especially when there are several delaying events. The third reason, as stated by Arditi & Pattanakitchamroon (2006) is that time impact analysis is complicated since it derives cumulative findings from several sources of contemporaneous data. As a consequence, the analysis's outcome may be impacted by a variety of factors.

B. Productivity-Loss Estimation Methods for claim

During the course of a construction project, complaints of "disruption" and additional costs are frequently voiced, but they are infamously difficult to verify. One of the main causes of this is that productivity losses are frequently challenging to recognize and differentiate when they occur, as opposed to other types of money claims, which are more directly concerned with the occurrence of a distinct and compensable event along with a distinct and direct consequence, such as an instruction for a discrete variation during the course of the works or a properly notified compensation event.

Loss of production, disturbance, obstruction, or interruption of a Contractor's regular working procedures, which leads to poorer efficiency, are all examples of disruption. Disrupted work in the context of construction refers to work that is executed less effectively than it would have been without the disruption. If the Employer was to blame, it can result in a right to

compensation under the terms of the agreement or as a result of a contract violation (SCL Delay and Disruption Protocol, 2002).

A variety of approaches have been developed and used by the construction industry to estimate lost labor productivity. These methods can be grouped into the following categories depending on the correct data input. The calculations for project practice-based methodologies such as measured mile analysis, baseline productivity analysis, earned value analysis, and comparison studies are all based on the project records. They should therefore be more trustworthy than other generic approaches.

Measured mile analysis

The most acceptable methodology for estimating the costs of lost productivity is the measured mile method, which is widely accepted. To calculate the productivity loss caused on by the impact of a known group of events, the analysis compares identical tasks in impacted and non-impacted the project's phases. It is based on an extrapolation of the actual number of hours worked.

In order to obtain judicial acceptance, the measured mile calculation may compare similar job activities. The appeal of the measured mile is that calculations are made using real contract performance as opposed to the preliminary estimate. As a result, rather than comparing some hypothetical anticipated performance, it compares actual performance on-site with actual performance (SCL Delay and Disruption Protocol, 2002).

Baseline productivity analysis

This method was suggested as a way to get around some of the restrictions and unrealistic assumptions of an existing measured mile approach. Baseline analysis is dependent on the contractor's actual performance on the project under consideration, the same as the measured mile technique. The determination of the baseline productivity is a crucial element of this approach. It stands for the contractor's highest and most reliable productivity on the project. In contrast to the measured mile analysis, the baseline analysis does not require clearly defined non-impacted and impacted periods or consecutive reporting periods in the baseline time frame. To put it another way, the baseline analysis is more adaptable therefore more useful in the current practice (SCL Delay and Disruption Protocol, 2002).

Earned value analysis

When there is little information about the actual units of work installed on the project, productivity measurement might be challenging. In these cases, the projected labor hours can be

determined using a simplified version of the earned value analysis approach. To determine the quantity of labor hours, when they were utilized, as well as what activities, one can refer to the contractor's estimate or, alternatively, the monetary value of payment applications, contract amounts, or unit rates. Earned hours can be calculated by multiplying physical units of work accomplished by budget unit rates. The difference between the earned hours and the actual hours spent during the impact period is then compared in order to determine the productivity loss that occurred (SCL Delay and Disruption Protocol, 2002).

Calculating labor productivity can be assisted by measuring the earned value of current project data, such as percentages of completion from schedule updates or payment applications. The claimant may instead, as an alternative, compare the actual revenue per hour of labor to the anticipated revenue per hour. Estimated labor hours can also be determined using earned value analysis.

Construction program analysis this method of analysis widely used in construction projectes.it mainly focused on and used updated actual working programs. The next analysis method is comparisons of estimated vs. actual man hour productivities. It's done comparing of the estimated with the actual one.

2.7Conditions Precedent

A condition precedent is a contractual requirement that must be met before a contractual right or obligation begins. If the claiming party fails to apply correctly or fails to do so within the time frame specify, it will be unable to recover money or time. A schedule of modifications is often used to add conditions precedent to a standard form contract. As a result, in contracts, we may see the addition of conditions precedent to the clauses governing time extensions and claims for loss and price. Even though there could be significant consequences for failing to satisfy a condition precedent, failure to provide the required notice within the agreed time frame could be fatal to the claim, regardless of the validity of the underlying claim. Nevertheless, notice can play a crucial role in construction projects because it enables issues to be investigated in real time and gives more time to respond to problems as they arise to allow for mitigation. Such a chance should benefit both the client and the contractor. It can also encourage dealing with contractor claims as they arise throughout the course of the project, which should, in theory, prevent the common issue of dealing with a build-up of the contractor's claims at the project's conclusion, which frequently leads to final account disputes between the employer and the contractor (GAR,

2021). A condition precedent notification clause may be an efficient project management technique to encourage a more collaborative approach between the employer and contractor when parties have a good understanding of contractual procedure, as opposed to being a procedural trap or impediment. However, the exact wording of the clause and the legislation that governs the contract are frequently what determine whether such clauses are legally effective.

2.8 Effects of claim

Escalation of costs: If a claim is not promptly handled, work may be suspended or delayed. Budgeted funds for another item will be used to cover the rise in labor, material, and equipment costs that led to the claim. Globally, claims and disputes take 10 to 15 months and cost an average of $40 to $60 million. According to ARCADIS (2016) which was mentioned in (SMEC, 2018), the majority of claims and disputes are found in public infrastructure projects.

The consequences of construction claims on project cost and timeline are supported by research. According to Semple *et al* (1994), the majority of claims involved some kind of delay, and in some instances, the delay went over the initial contract duration by more than 100%. More than half of the claims resulted in project expenses that were at least 30% higher than what was originally agreed upon. According to Callahan, (1998), the cost of settling disputes and claims for large civil contracts increased on average by 7% for transportation agencies in the United States and Canada. According to research conducted by Girmay in 2003, the financial impact of claims in international projects in Ethiopia has been the most significant effect. Such assertions have been made about certain projects. For instance, the Addis Ababa Ring Road Project (AARRP) contractor has requested claims of around 220 million birr, or 41.08 percent of the project's cost. This would substantially raise project costs in the end.

b. Contractor cash flow: The contractor's cash flow will decrease since the interim valuation calculated excludes compensation for pending claims, which must be fully investigated and determined.

C. Reduction in finance costs: One overhead expense that frequently suffers greatly in claim situations brought on by delays, when substantial direct costs are being spent while a claim is still being examined, is the cost of financing the cost with any work.

D.Project abandonment is the most common result of a claim on a project. It is discovered that contractors suspend their work until finally terminating the contract. An adversarial relationship between the parties can be avoided and improved by properly managing and addressing claims.

E.Failure to complete: Claims in projects cause failure to complete at the specified completion date, which causes delays in projects. The reason might also be that the cost restriction or objective has been surpassed and the customer is unable to proceed, or because of changes in work that extend the time.

F.Other Impacts of Claims

The impact the claim process may have on the project's implementation is another important factor. The parties start to view one other as enemies once the claim issues are sent to arbitration, and this will have a much higher impact possibly one that is even more severe than the financial impact on the whole project life. Therefore, in order to further the project's goals, responsible parties should make an effort to foster a climate of positive working relationships while taking a hard stance in the treatment of potential claim situations (Girmay, 2003).

2.9 Claims and Condition of Contact

Owner and participating foreign agencies choose the contract condition to be used. FIDIC is usually applied in construction projects that are supported by international organizations, with public projects like highways and hydroelectric power getting more emphasis. Most local construction projects, particularly those supported by private owners, use MoWUD 1994. PPA 2006/11 is used for public building projects because the requirements are more appropriate for the nature of building work than they are for massive infrastructure projects. In most circumstances, the issue is not the contractual agreement itself, but rather its knowledge and interpretation, which demands the use of professional contract administration employees.

2.9.1 FIDIC Condition of Contract

If the Contractor wants to move forward with any claim for additional payment and/or an Extension of Time, he must strictly adhere by the important instructions in the International Federation of Design and Consulting (FIDIC Red Book). It is essential that the Contractor's key staff fully understand the conditions of this sub-clause and implement them from the commencement of the Contract. It's important to note that the Contractor must inform the Engineer of their claim "not later than 28 days after the Contractor became aware, or should have been aware, of claim. A "circumstance" is anything that typically impacts how the works perform, whereas an "event" might be represented as a "happening" or "occurrence." In any case, FIDIC does not try to differentiate between "events" and "circumstances."

There are times when Contractors may be unsure whether a certain occurrence or situation possibly already under discussion with the Engineer will result in a claim, requiring the Contractor to formally notify the Engineer of the claim. It is advised that, in cases of uncertainty, the Contractor sends a notice of claim regardless of any continuing negotiations because to the strict time restrictions for giving a notice of claim. Claims can be simply dropped, but once the notification deadline has past, they cannot be resurrected.

A Contractor must first determine whether provision of the Contract gives them the right to make a specific claim before determining whether an incident or circumstance justifies sending notice of a claim. The Contractor must ensure that the notice of claim is properly stated when submitting it in order to establish the fundamental parameters of the claim.

As stated above, the Contractor must notify the Engineer (along with a copy to the Employer) as soon as is reasonably possible after becoming aware of the pertinent event or condition giving rise to the claim, but no later than 28 days afterwards.

The notice may merely consist of a brief letter of notice and must sufficiently describe the "incident or condition" for the Engineer to understand it.. There is no urgent need to specify how much more time or money are needed. At this early point, it's possible that the Contractor doesn't yet have all the necessary data. By using the authorized method of communication, the notification must be sent to the Engineer at the address listed in the contract. The Engineer's Representative on site should not get the original notification unless it is expressly stated in the contract; nonetheless, he should receive a copy, not least because he will frequently be agreed to write off on site records. The Contractor is obligated to keep up-to-date records that may be required to prove the claim's reality and its amount.

The Contractor shall deliver to the Engineer a fully detailed claim, together with all supporting details upon which the claim is based, together with the Extension of Time and additional payment sought, within 42 days of the time the contractor knew (or ought to have known) about the occurrence or circumstance giving rise to the claim. It should be remembered that the Contractor only has 14 days left to support and assess the claim if he gave notice on the 28th day following the incident. The Contractor faces the risk of having claims for both an Extension of Time and additional payment reduced or denied if he fails to submit his thorough claim within the agreed time frame and if the mistake subsequently hinders or biases the Engineer from conducting a comprehensive examination.

If the event or scenario continues to have an impact, the Contractor must send additional interim claims at regular intervals, including the total amount of additional payment sought as well as the total amount of accumulated delay. Within 28 days of the occurrence or circumstance's effects ceasing, a final claim must be submitted. Until the conclusion of the Defects Liability Period, the consequences of some claims, such as "Adjustment for Changes in Legislation" and "Adjustment for Changes in Cost," may be felt.

The Engineer will continue in line with Sub-Clause 3.5 "Determinations" to agree upon or decide the Extension of Time payable to the Contractor and any extra payments to which the Contractor may be eligible after receiving the Contractor's completely documented claim.

'Within a period of 42 days after receiving the Contractor's fully detailed claim, the Engineer shall either approve or disapprove the claim stating his reasons. He can request additional information.

There will be chance the determination and implementation delayed. Payment to the Contractor is not due until included in an Interim Payment Certificate issued by the Engineer. Nonetheless, the Contractor should continue to evaluate and submit interest calculations as other remedies may be available.

Although the Contractor is sanctioned because of a failure to follow the procedural obligations of Sub - Clause 20.1, there are no immediate consequences in respect of any procedural failings by the Engineer.

If the Contractor is improperly penalized because of a failure of the Engineer to adhere to the requirements of Sub - Clause 20.1, this should be drawn to the attention of the dispute review expert/board DRE/DRB informally or formally, as appropriate.

All situations relating to assertions must be looked into, documented, and, to the greatest extent possible, agreed upon by the Contractor and the Engineer as and when they occur, in order that the scope and relevance of such claims may be appropriately assessed when they are submitted at a later date. For this reason, the Contractor must provide the Engineer on a daily basis with records of all the facts and situations that he deems pertinent and may desire to rely upon in support of his claims, in a format approved by the Engineer.

2.10 Ethiopian Road Administration Claim Handling Process

A construction claim is unavoidable incident in the construction industry, even if we have good experience and knowledge. Contract-related, extra-contractual events, environmental challenges, and so on can all give rise to a claim. The federal road projects are also not out of this situation.

There are a number of claims raised in the day-to-day construction activities of those projects. Scholars agreed that the most important things are good risk management and taking proactive measures before events occur; once a claim is filed, the next step is to take active mitigation measures and use appropriate and efficient step-by-step claim handling procedures.

In federal road projects for the handling of claims, there are mainly three principal players as follows: (1) the employer/Ethiopian Road Administration/ (2) the contractor and (3) the engineer/employer representative depending on the contract document based on. The contractors are, most of the time, the claimants, the engineer/employer representatives are the assessors of the claim, and finally the employer gives its approval. From the start of the claim to the approval level by ERA, the process has its own steep and procedure.

The contractors involved in the federal road project are responsible for completing the work in accordance with the quality, time, and specifications specified in the contract document. If there is anything that is missing or out of the contract, they need to identify and recognize the event before they raise the claim. This process is known as "identification of the claim." To have such early identification, the contractor needs to have good contractual knowledge and legal awareness.

After identifies the event, they are responsible for notifying the engineer or employer representatives of the process known as "claim notification". "Notification," as the name implies, is the process of giving notice or awareness to a concerned party about the situation on the ground. In federal road projects, most of this process is initiated and sent by the contractor to the consultant and employer. In this section, the contractors must clearly state the situation, the causes of the event, and the measurement action that will be taken to handle the situation in a short and precise manner, and submit it to the engineer/employer representative within the time specified in the contract document. These time frames depend on the contract agreement, but most of the time is not extended beyond 28 calendar days.

The FIDIC contract conditions clearly stated that contractors must submit their claim within 28 days of becoming aware of, or should have become aware of, the event or circumstances. If the contractors do not complete this within the specified time frame, the consultant has the right to reject the claims. As the interview result showed, in most of the federal road projects, the contractors didn’t submit their claim notification according to the time on contract document.

After the contractors notify the claim event to the consultant and copy to ERA, they have to submit a full document that has full evidence and computation. This process is known as "claim

substantiation." In this document, the contractors include the amount of money and time they have to be entitled. Here, a contract document like FIDIC states that within 42 days, the contractor shall submit particular documents to the engineer. But it is not always applicable to federal road projects.

Based on the documents submitted by the contractor, the engineer/employer representative assesses and gives its decision and refers to ERA for the approval. Referred documents from the engineer and substantiated documents sent from the contractor to the employer are assessed by the employer and if the determination given by the engineer is accepted, the claim is approved. If not, the employer gives its determination and correction and sends them back to the parties. If the contractor agrees with the employer's decision, the claim is resolved; otherwise, the contractor has the right to refer the case to the next dispute resolution method by notifying the employer in writing "notice to dispute" within 14 days.

2.11 Improvement Mechanisms for Claim Handling Process

Along with the development of market economy, the construction company needs to pay more attention to claim management (Songseng & Jing, 2011) cited in (Zaneldin, 2006). The challenge under these circumstances is to find efficient ways of preparing, evaluating, and settling claims.

Management of claims is the management of risks. It begins with the allocation of risk in the project owner's selection of a particular construction method, continues in the prime contract, subcontracts and purchase orders, and culminates in the prevention of and, if necessary, the successful resolution of changes and any claims that occurs during a project.

Table2. 5 Claim handling process Improvement mechanisms

Claim handling process Improvement mechanisms	**Source/Authors/**
Having well organized claim management procedures	(Zaneldin, 2006)
Assign staff which have good claim "claims consciousness, familiarity and Awareness of potential claim situations	(Bakhary et al.,2017)
Having good knowledge on terms and condition of contract document	
Good communication among stakeholders	
Prepare well organized contract document	
Notice the claim earlier as soon as possible	
Develop good record keeping system	
Establishing Claim Settlement team	

Preparation of Claim Standard Forms/format	(Tochaiwat ,2005)
Early Recording of Details of Claim leading Events	

2.12 Research gap

Table2. 6 research gap

Authors	Country	Area	Objectives	Gap identified
Girmay (2003)	Ethiopia	Road	• Assess cause of claims, contract administration practice in international projects	• Focused only on international projects, missed each claim handling procedures • Used only case study approach
Abdisa (2003)	Ethiopia	Road and building	• To briefly survey the contract administration experience in Ethiopia • To identify the possible causes of claims • To identify the best practices observed in contract administration	• Missed claim handling process • No challenges faced during claim handling process stated • Focused on claim type and causes
Abel (2017)	Ethiopia	Road	• Investigate claims management practices, various types of claims and improvement mechanisms	• Focused on theoretical aspect of claim management practice • Address only local contractors • Miss claim assessment and analysis techniques • Used only survey approach
Liu li (2009)	Ethiopia	Both	• Identify claims in international construction contract	• Mainly focused on the construction contract that the projects used to manage and administrate the claim raised in the projects.

Tochaiwat (2005)	Thailand	Building	• The objective of this research is to develop a claim management system for the employers	• Only building sector addressed • Practical claiming process not addressed
Aibinu (2007)	Singapore	Both	• Develop a conceptual relationship between perception of fairness, conflict intensity and a contractor's potential to dispute the contractor administrator's decisions in the process for administering claims on a projects	• Assess the relationship b/n fairness and decision of claims
Zaneldin (2006)	UAE	Road	• Assess the types of claims • Assess the causes of claims and their frequency	• This research presents the results of a study of the types, causes, and frequency of construction claims in the emirates of Dubai and Abu Dhabi not the challenges and process
Bakhary *et al* (2017)	Malaysia	Building	• Objectives of this research is to identify the problems associated with claim process experienced by contractors	• It assessed the claim process in Malaysia focusing on survey and assessed the theoretical in Malaysian context

Chapter Three

Research Methodology

3.1 Introduction

The systematic method of enunciating the problem, formulating a hypothesis, collecting facts or data, analyzing the facts, and reaching certain conclusions, either in the form of solutions to the problem at hand or in the form of generalizations for some theoretical formulation, is known as research (Kothari ,2004). As a result, research methodology is a strategy for bringing all of the research processes together and guiding the researcher toward the study's goals. As a result, the purpose of this section is to provide the research methodology that used to achieve the research objectives as stated at the beginning.

3.2 The Research Design

A research design is a set of conditions for data collection and analysis that tries to combine relevance to the research goal with ease of implementation. In essence, the research design is the conceptual framework for conducting research; it is the blueprint for data collection, investigation, and analysis (Kothari, 2004).

In this context, thus, the research followed both qualitative[1], quantitative approaches[2] and (mixed approach)[3], which emphasizes in-depth investigation of information through the collection of currently available relevant data. A research design should ensure that the evidence collected addresses the research questions asked and it is essential that it ensures coherency and rigour. This is necessary because the design establishes the links between the research problem and the findings and conclusions. It provides the mechanisms to explicate the data to test the validity of the problem statement, and in order to acquire the relevant data, the appropriate question must be asked.

[1] Studies classified as qualitative research do not make an effort to quantify their findings by statistical analysis or summarization. It provides information on the numerous behavioral components and other study-related variables (Zegeye et al., 2009). A qualitative method results in research that generates hypotheses (Auerbach and Silversten, 2003)

[2] The systematic and scientific study of quantitative phenomena and qualities, as well as their relationships, is known as quantitative research. Such research's major goal is to create and use mathematical theories, models, and hypotheses related to natural events (Zegeye et al., 2009). The quantitative methodology results in research that tests hypotheses (Auerbach and Silversten, 2003).

[3] The mixed approach means using both qualitative, quantitative and other suitable methods together in order to address and tackle the research question from a multidirectional perspective.

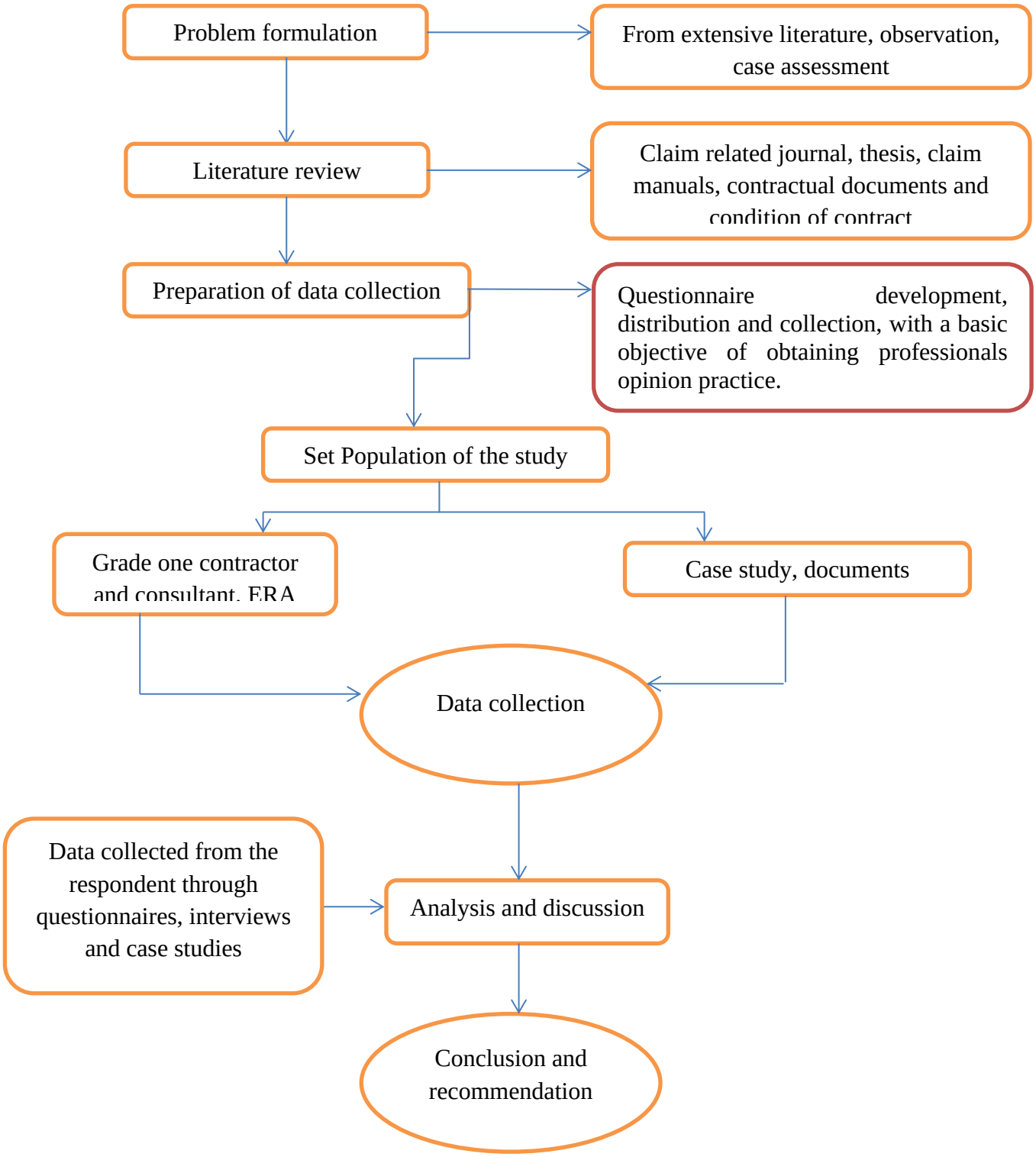


Fig.3.1Research flow chart

3.3 The Research Population

A population is the entire collection of items that is the focus of concern. The target population determine the scope of the survey. To define a population, defining the population unit & setting population a boundary is very crucial (Defining and Framing the Population, 2015).

Accordingly, depending on the research topic and the purpose of the study, the main participants/population/ of this study were Ethiopian Roads Administration (the Employer or client), main Contractors and Consulting firms currently involving in the federal road construction projects. Particularly from the Employer side head quarter offices all the Construction Project management directorates were the population.

From Contractors and Consultants: - Grade-1 contractors were selected for the analysis. Since, they have a lot of experience in the road sector and have a better chance in participating in different road projects contracts. At the same time for consultant, the research tries to address currently involving consultants.

For case study: - Particularly in this particular case where it can be expected projects by ERA to be, administered and, the documents and archives concerning the relevant projects can be important data source. Therefore, with the selection of the cases also channeled into the potential availability of data (Stake, 1995), the available documents relevant to the cases were collected and relevant data's were analyzed.

3.4 Research Sample and Sampling Method

As indicated above, the target populations for this study were contractors, consultants, and employer (ERA) for the questionnaire and ERA's road projects for document analysis. Currently, a number of road construction projects are under construction by different grades of contractors and supervised by different classes of consultants. Since the target population of this research is higher grade contractors and consultants Grade 1 and Class 1, respectively, the number of contractors and consultants currently involving in federal road projects, which accessed from each directorate, shows that around 53 active contractors and 40 consultants were currently participating in federal road projects.. Therefore, due to time and resource constraint the researcher used the following statistical equations based on (Genn, Israel) sample size determination formulas:

No - Sample size

Z - Z value (e.g. 1.96 for 95% confidence level)

P - Percentage picking a choice, expressed as a decimal (0.50 used for sample size needed).

q- 1-p

e- Margin of error (+5%)

$$n_0 = \frac{Z^2 pq}{e^2}$$

No = $\underline{(1.96^2)\ (0.5)\ (0.5)}$ = 385

$(0.05)^2$

The following formula is used to determine the number of samples to be taken if the sample size is small.

$$\mathbf{n = \frac{no}{1+(no-1)/N}}$$

Using the above formula contractor 46 for consultants 36 respondents sampled .The researcher used a purposive sampling technique to choose the respondents for the employer. It is known that ERA has five regional directorates and one express way directorate. Each directorate has its own project management structure starting from directorate to low level project staff. Each directorate has its own team leader, lead engineer, and other technical staff. Accordingly, the researcher purposively picks five respondents from each directorate who have been directly involved in the claiming process.

3.5 Type and Source of Data

The data collection approach adopted for conducting this research includes both primary[4] and secondary sources. Questionnaire, interview and desk study provide the primary data for this thesis whereas, the secondary data sources include renowned claim related journals ,research papers, condition of contracts ,contractual documents and reviewing related archival documents such as claim /requests/notification, correspondences between parties, claim substantiation documents and other related documents on contractual issues of various construction works. These different methods of data collection methods used in order that the data or information obtained from one can be supplemented by the others whereby the collected data gives multiple evidences.

[4] Primary data's are which obtained directly from respondents via different data collection instruments

3.5.1 Primary Data sources

Data sources are the respondents or other entity which involved in the research and provide information and perception/opinion.

The research collected the primary data's from the following data sources:-

From ERA: Particularly from the employer side headquarter offices, all the construction project management directorates were involved. Specifically, staff involved in contact administration (particularly claim administration), the engineering department, team leader, project engineer, and site engineers involved in data collection. The respondents were selected purposively. The reason behind using the above techniques is to pick the person who has better awareness and information about the case.

Consultant and contractor: For the contractor and consultant, this research included staff working on claims and related issues, a project manager, a site engineer/resident engineer, and a contract administrator.

3.5.2 Secondary data source

The researcher compiled/gathered secondary data from the following sources;-

Records of inspections, Project correspondence, Conditions of contract, claim substantiation documents, claim related journals and researches.

3.6 Data Collection Techniques

3.6.1 Questionnaire's

Since a questionnaire is issue-focused and acts as a survey to identify the primary concerns and attitudes of respondents towards the problems, it can provide first-hand information for a research topic (Kasiem, 2008), which is quoted in (Getaneh, 2011). A questionnaire is given to a chosen road sector players in this thesis, including employers (ERA), contractors, and consultants.

For the questionnaire survey respondents are purposively selected from employer's organization, contractors and consultants who have involving in the federal road construction sector. Questioners are one and the most suitable data collection mechanism for this research. The questionnaires were prepared from extensive literature review on construction claim and consulted by different expert in the area. The questionnaire consisted both open and close ended questions. Close end questions help the respondents to choose or select their perception directly from the listed alternative whereas, open end question give chances for the respondents to give more information regarding to the issues.

The questionnaire used for this research has the following sections and discussed below:-

Section 1: The category of organization in which the respondents serve, his/ her role in the organization, the respondents working experience, and position that respondent mostly involved.

Section 2: contains the critical challenges /problems occur during contractors claim handling process in federal road projects. Some of the main questions were Likert scale rating format ranging from 1 to 5 where; strongly Agree (SA) = 5 and Strongly Disagree (SD) = 1. The purpose of the Likert scale is to make it simpler for respondents to provide straightforward answers.

Section 3: also display the improvement mechanisms of claiming process in order to avoid/mitigate challenges during the process.

3.6.2 Interview

Thus, there were semi structured interview[5] question for the proposed respondent and sample. The reason behind semi structure interview is to guide the interviewee to the specific issue that related to the topic and to have validated and in depth information. The respondents were selected from different department that has relation with the issue purposively. A semi-structured (focused) interview, specifically a face-to-face type of interview, was conducted with experts in the samples to have a better insight into the current construction claim handling process and challenges faced and to cross check with survey result. The data from the interview also filled the gap identified from the document/archive and triangulated the data gathered through a query survey. While conducting the interview Yin, (2003) suggests that key probing issues are selected from the document/archival study, concepts and other best practices addressed in the literature review.

However, interviews, especially face-to-face interviews are vulnerable to interviewer bias and response bias. Therefore, as much as possible, it is the researcher's responsibility to try to avoid such bias from happening. The interview was held by Amharic in order to create good communication environment and minimize communication challenges .More than 17 peoples were interviewed and it took about 25-45 minutes per individual.

[5] This type of interview has a predetermined set of questions (generalized form of questionnaire) with a flexible order depending on what the interviewer perceives the subject matter by looking at the respondent capability and exposure or experience.

3.6.3 Desk Study

Desk studies on claim administration was used in this research to support or supplement responses and arguments found by questionnaire and interview through in-depth analysis of some cases of a project. Of course, because the cases are specific to one component of a problem or practice, the conclusions reached may not apply generally but rather to a specific incident. For this reason, desk studies under this research used to supplement the findings obtained through questionnaire and interview in a way to bridge the gulf.

3.7 Data Analysis Method

According to Sullivan, (2001) data analysis may be the most difficult and fascinating part of research. It refers to deriving meaning from the data that had been collected in a study and the analysis assumed many forms. To achieve the research objectives both qualitative and quantitative methods of data analysis will apply. To analyze the questionnaires quantitatively the studies are uses simple descriptive statistics such as frequency, tables, and mean score formula.

$$MS = \frac{\sum(fxs)}{N}$$

Where F = Frequency of responses for each score.

S = Score given to each factor (from 1 to 5)

N = Total number of responses concerning each factor

The qualitative explanation is employed for key informant interview responses and open ended questions which are analyzed thematically. Analysis of key informant interviews data done using the theoretical proposition strategy recommended by Yin, (2003) which requires interview data analyzed under key themes.

3.8 Quality Assurance

Validity

There are various ways in which researchers try to show that their findings are reliable (Coolican, 1994). Probably the most satisfactory technique is to determine if the results of a qualitative analysis can be duplicated. This can be done by comparing the findings from an interview study with those from a desk study.

Validity of the Instrument

Correctness and reasonability of the data are indicators of data validity. It refers to whether the questionnaire in this case measures what it intends to measure. Content validity is based on the adequacy with which the items in an instrument measure the attributes of the study. The researcher conducted face validity (i.e. first is experts or people who understand and have knowledge on the topic read through the questionnaire and evaluated whether the questions effectively capture the topic under investigation or not.

Reliability

Data is considered reliable[6] when it is complete, accurate and unaltered. To ensure its accuracy it must be consistent and correct. Reliability is an extent to which any measuring procedure yields the same results on repeated trials (Carmines & Zellers, 1999). The value of the reliability coefficient theoretically can range between -1.00 and +1.00. For most purposes, reliability coefficients above 0.7 are considered satisfactory (Taherdoost, 2016). The reliability coefficient of the scale was established by Cronbach alfa using Stastical Package for Social Science (SPSS) package. The result from the SPSS indicated that it's between 0.711 and 0.859 which is acceptable.

3.9 Summary of Research methodology

Table3. 1 Summary of Research methodology

Research questions	**Methods adopted**	**Quality assurance**
• What are challenges of construction claim identification process? • What are challenges of construction claim notification process? • What are challenges of construction claim substantiation process? • What are challenges of construction claim	**Study design:** Survey i.e., a questionnaire & interview survey **Population:-**Grade 1 contractors and consultant currently invoving.for ERA all regional construction project management directorates. **Data collection instrument**: Literature review, semi-structured interview,	Reliability and validity also checked by Cronbach alfa value and expert judgment respectively. The process of document analysis as a data source generally calls for elements of content analysis and thematic analysis.

[6] Reliability is the consistency of research measurement, or the degree to which an instrument measures the same way each time it is used under the same condition with the same subjects.

assessment process? • How claim handling process improved?	document review & survey. **Data analysis:-**The perception or opinion collected from the respondents' analyzed through stastical analysis method (mean score) and presented through table. The interview question analyzed through thematic analysis method. **Note**: - all the above methods were applied for each research questions**.**	

Chapter Four

Result and Discussion

4.1 Introduction

This chapter presents the analysis of the data collected for this study via a document review, a questionnaire & an interview survey. The results obtained from the respondents and cases are generally categorized into two that are survey questionnaires and case studies the collected data are then analyzed, discussed, and presented respectively. Based on the order of the respective research objectives the data's are analyzed and interpreted. Consecutively, the case studies are then analyzed and presented to further insight and in-depth understanding regarding the constructs of the study and to triangulate the quantitative findings.

4.2 Profile of the questionnaires Respondents

In this study, a total of 107 questionnaires were distributed to different professionals related to Claim handling process those involved in federal road construction projects. From this 80 questionnaire were returned 2 of them were invalid the rest 78 used for the analysis. Among the respondents, 21(26.92%) were from the client, 24(30.76%) were from the consultants, and 33 (42.3%) were from contractors.

Table 4. 1 Summary of the questionnaire response.

Parties	**Frequency**	**% percentage**	**Cumulative %**
Client [ERA]	21	26.92	26.92
Contractor	33	42.30	69.23
Consultant	24	30.76	100
Total	78	100	

4.3 Educational Background of the Respondents

Table4. 2 Educational background

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	BSc	49	62.8	62.8	62.8
	MSc	29	37.2	37.2	100.0
	Total	78	100.0	100.0	

The educational background of responders from federal road projects is shown in Table 4.2 above. According to the survey, respondents' educational backgrounds range from BSc to MSc. About 49 (62.8%) has a BSc, while 29 (37.2%) has an MSc. As a result, the researcher has more confidence that the respondents understand the concept given their level of education.

4.4 Respondents Experience

Table4. 3 respondent's experience

respondents experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0to5	14	17.9	17.9	17.9
	5to10	52	66.7	66.7	84.6
	11to15	10	12.8	12.8	97.4
	>15	2	2.6	2.6	100.0
	Total	78	100.0	100.0	

Table 4.3 indicates that the experience of the participants in the research was 17.9% of the respondents had 0–5 years of experience, whereas 66.7% had 5–10 years of experience. 12.8 & 2.6% have 11–15 and > 15 years of experience respectively on federal road projects.

Table4. 4 time related efficiency

How do you rate Time related efficiency of claim handling process in federal road projects?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Efficient	4	5.1	5.1	5.1
	Efficient	18	23.1	23.1	28.2
	Not Efficient	56	71.8	71.8	100.0
	Total	78	100.0	100.0	

As we can see from Table 4.4, 5.1% of the respondents believe that the claim handling process of federal road projects is very efficient. Whereas 23.1 % of the respondents believe that the time-related efficiency of the claiming process is efficient, the rest 71.8% of the respondents agreed that the claim handling process in road projects, particularly in federal projects, is not

efficient. Efficiency is the maximum level of performance that requires the fewest inputs and produces the greatest amount of output. Efficiency requires reducing the number of unnecessary resources used to produce a given output, including personal time and energy (investopedia).

In our case time efficiency implies that how fast the claiming cases settled down as the contractual document specified. The above result indicates that the process of claiming takes a longer time for settlement and resolution. Studies in Malaysia shows that the overall submission and assessment of the claims take more time than time as stipulated in (PAM 2006).

Table4. 5 responsible parties for time related in efficiency.

If your answer for the Q.1 is not efficient who is most of the time responsible?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Contractors	17	21.8	30.4	30.4
	Consultants	12	15.4	21.4	51.8
	Employer	27	34.6	48.2	100.0
	Total	56	71.8	100.0	

Most of the respondents who said the claim handling process is inefficient agreed that employers, contractors, and consultants are to blame for the claim not being settled on time.

27 respondents blame the employer for the inefficiency of the claim. As the authors stated at the beginning of this section, the claim handling process is dependent on the employer for approval. Because approval has its own hierarchy, drafted by project engineer, reviewed by team leader, recommended by regional director and finally supported by Construction Project Management Deputy Director General (CPM, DDG). So, approvals may take longer. Contractors and consultants are the second and the third responsible party for the inefficiency of the claim timely settlement.

4.5 Challenges of Claim Handling Process

4.5.1 Claim Identification Challenges (Contractors)

Table4. 6 challenges of claim identification process

	N	Mean	Rank
Inaccessibility of documents used to identify a claim	78	3.885	1

Poor communication between site and head office	78	3.692	2
Insufficient construction contract knowledge by project site staff	78	3.615	3
Difficulties in detecting any problem on site which potentially becomes a claim	78	3.564	4
Insufficient skilled personnel for detecting a claim	78	3.423	5
Valid N (listwise)	78		

Table 4.6, shows the challenges of identification process of claim handling. According to respondents result inaccessibility of documents used to identify a claim was the first challenge. Documents are very crucial for the claim process and administration of the project. Accordingly, the stakeholders need to have good record keeping system.

Poor communication between site and head office staff is the second problem of identification sub process once the event occurred the concerned party need to communicate the event earlier and as soon as possible .Insufficient construction contract knowledge by project site staff the third major problem. A difficulty in detecting any problem on site which potentially becomes a claim was also a challenge.

4.5.2 Claim Notification Challenges (Contractors)

Table4. 7 challenges of claim notification process

	N	Mean	Rank
Delay in notification the claim timely	78	4.103	1
Failure to give notice	78	3.897	2
Inaccessibility of supporting documents needed for notice	78	3.641	3
Giving notice informally/give notice in word	78	3.628	4
Poor communication/instruction to proceed with submitting the notice	78	3.577	5
Contractors give ambiguous and incomplete notice	78	3.462	6
The short time of notification period	78	3.167	7
Ambiguous procedures in claim notification	78	3.000	8
No standard format for preparing notice	78	2.962	9

According to the respondents' response, delay in notification of the claim timely is the major problem of claim notification process, with a mean score of (4.103). This challenge was considered as a critical challenge by (Abel, 2017). The author found that failure to follow conditions of contract (like notifying as per the time table specified in the contract) is usually seen as a problem in road projects. The notification time may vary from one contract document to another, but most of the time it doesn't exceed 28 calendar days. The Findings of Hai (2019) ranked delay in notification of the claim as the second most critical challenge for analysis of extension of time claims.

The aforementioned finding was supported by one of the interviewees. She claimed that "*our contractors are quite distant from informing the concerned parties of the event in a timely manner. They are informed when the incident sparks a controversy". Consultant side*[7]

Failure to give notice is the second agreed problem faced during the process, as it has a mean score of (3.89). This means most of the claimants didn't submit notification papers to the consultant. The result is in line with the finding of Tochaiwat K. (2005) that there is a trend of submitting the particular document without notifying the other party. Such conditions may create an opportunity for rejection of the claim and make contractors responsible for the situation.

"*Even if contractors didn't submit their claim notification paper or failed to submit their claims within the stated time frame, the engineer will tolerate and accept their claim if the causes of the claim are obvious and convincing*, " team leader, Client's representative[8]

Inaccessibility of supporting documents needed for notice and giving notice informally (giving notice in words) are the third and fourth basic challenges of notification. The result is also supported by Bakhary *et al*. (2015). The inaccessibility of supporting documents needed for notice was the first challenge pointed out by his respondent.

Bakhary *et al.* (2015) believe that claim notifications need to be done in writing and as detailed as possible. In the preparation of supporting documents for claim notification, a good documentation system and accurate site records are very important. The construction sector seems to have a reputation for routinely not properly documenting processes and transactions.

[7] Ethiopian construction work and supervision road sector contract administration department team leader (has more than 13 years of experience).
[8] Ethiopian road authority north directorate team leader (has 10 years claim and related experience on road sector)

Verbal instructions given by the contractor, client / client representative and the inaccurate recorded information are the main problems in claim process. If the client does not come out with written instruction, the contractor should make an initiative to get the proper written instruction from them. This would provide support and evidence for the contractor's claims.

Poor communication/instruction to proceed with submitting the notice is the fifth challenges during notification process. Communication is an essential activities for claiming process because every process need active and accurate communication mediums and process so if there is poor communication the information shall not circulate timely and in the way they required this highly affect the notification process. The short time of notification period, ambiguous procedures in claim notification and no standard format for preparing notice are the least problems faced during notification process as ranked by the respondents.

4.5.3 Claim Substantiation Challenges (Contractors)

Table4. 8 challenges of Claim substantiation

	N	Mean	Rank
Incomplete records/report submission	78	4.103	1
Unavailability of written document for substantiation	78	4.051	2
Failure to keep up-to-date program	78	4.026	3
Failure to submit reports	78	3.705	4
Contractors' over estimation of claim damages	78	3.679	5
Requires a vast number of documents to be reviewed and people to be interviewed	78	3.564	6
Lack of skilled staffs for preparing claim submission	78	3.333	7
Inadequate time to thoroughly prepare due to high workload	78	3.321	8
Unavailability of claim standard forms/format	78	3.231	9
Incomplete contract documents for substantiation	78	3.167	10
Valid N (listwise)	78		

From the survey result, incomplete records/report submission is the first ranked challenge during the substantiation process with a mean score of (4.103). Contractors are not submitted complete

and full detailed document during substantiation process. Kululanga (2001) elaborated that Claim substantiation should be logically built up, well organized, and factually convincing. Thus, a claim should be written in a format that emphasizes the fact that a contract requirement was breached. Then, a contractor should prove that the owner's actions are what led to the damage. Atkinson (1985) cited in Kululanga (2001) has fittingly said that presentation is best separated into two, the entitlement and the quantum. The legal and factual grounding should appear in the first section, and the expected recovery for the claim should be in the second. The survey results also indicate the unavailability of written documents for substantiation is the second challenge during claim substantiation it has an overall mean of (4.051). Unavailability of information is not only a problem for this particular sub process; it's also a crucial challenge in all claim handling processes. Hai (2019), stated claim notification, examination, and presentation are highly affected by the lack of an adequate project document. He also enumerated the causes of this documentation challenge. This is because the party was instructed verbally, and the record-keeping process was inadequate. According to Jergeas and Hartman (1994), maintaining accurate records is essential for preventing or resolving disputes.

Failure to keep an up-to-date program is the third challenge of this sub process, with an overall mean of (4.02). Once the schedule is changed or modified, the contractor shall modify and update their program because if the extension of time claim is raised, the determination may be made based on the currently updated work program. L. Lew (2012) in his study found that entitled 'Issues and Challenges Faced in the Management of Claims for Construction Projects' Failure to keep an up-to-date program is the second challenge out of forty-six challenges. Therefore the contractors need to update their working program timely as required.

Fourthly, the respondent agreed that failure to submit reports is a challenge with a mean score of (3.705). Failure to submit the substantiation means that contractors don't submit their particulars for claim. Contractors' over estimation of claim damages also fifth problem faced the stakeholder during substantiation. This case also confirmed during case studies which mentioned at the end of this section. The sixth problem of the substantiation process is that it requires a vast number of documents to be reviewed and people to be interviewed. The claiming process needs a number of records to convince the other opposing side. Therefore, the claimant needs to dig out and search for each piece of evidence. In such a case, the claimant consumes more time and resources.

Inadequate time to thoroughly prepare due to high workload, lack of skilled staff for preparing claim submission, unavailability of claim standard forms/format, and incomplete contract documents for substantiation got seventh to tenth rank by the respondents.

Table4. 9 contractor's substantiation of the claim

Do you think contractors substantiate and submit detailed claim according to time stated in the contract?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	20	25.6	25.6	25.6
	no	58	74.4	74.4	100.0
	Total	78	100.0	100.0	

The majority of respondents (58%) think that the contractor does not fully substantiate and submit the claim within the time range specified in the contract document, while only 20% of respondents think that the contractor does so. Studies conducted in Malaysia by L. Lew (2012) support the finding. He concludes that most of the extension of time claim in Malaysia submitted within reasonable time not as time stated in contract. He also believes to submit claims for EOT within 28 days is too rush. It takes time and may require several parties to prepare supporting records.

As one of the interviewed person said, "*Most of the contractors do not follow the time frame for submitting particular documents for their claim; they submit their claim when they require an extension of time and cost compensation." contract engineer ,consultant side*[9]

Timely Submission of detailed evidence helps the contractor to keep its claim process timely and get a response early. Braimah (2008) emphasized that timely submission and prompt assessment of EoT claims are essential as this will reduce the difficulties of claim resolution since all claims related fact still will be fresh in mind of everybody involved. If the contractor fails the time frame, the consultant has the right to reject the claim.

"*As a trend, contractors justify their request for a cumulative extension of time when the project Completion time is reached,"* senior engineer, and client representative.[10]

[9] claim and contract administrator in Yotek construction company has >13 years of experience on road projects
[10] Senior project engineer in Ethiopian road administration .(8 years of experience)

The below table illustrates, for those who say 'No', their belief as to why the contractors failed to meet the time frame.

Table4. 10 reasons why the contractor failed to substantiate claim according to time stated in the contract

	N	Mean	Rank
Poor paperwork control by the contractor	58	3.845	1
Focus on progress of work and not on claim/contractor's staff too busy on other tasks	58	3.741	2
General lack of details	58	3.707	3
Time taken in claim substantiating process by the contractor	58	3.569	4
Lack of contractor's management resources	58	3.517	5
Actual delay/cost could not be determined until end of construction	58	3.362	6
Valid N (listwise)	58		

Poor paper work controlled by the contractor is mentioned as the first reason why the contractors didn't substantiate their claim timely. Paperwork, basically based on the availability of a contemporary record keeping system. It is obvious that for the contractors don't have a good record keeping system this leads them to poor paper work. The problem is not limited to local cases; it is also common problems associated with the production of project records in the UK (Stuart Carmichael and Maria Murray, 2006).However, the accuracy of the entitlement determination is still dependent on the quality of the program and progress data provided by all partners.

The next reason given by respondents was that they concentrate on the progress of their work rather than the claim. A road project has a large number of tasks to be done and requires large resources and time, so commonly the contractors focus on executing their tasks and giving less attention for claiming process .The result was also confirmed by (M.M. Kumaraswamy, and K. Yogeswaran, 2003). Focus on progress of work and not on claims/contractor's staff too busy on other tasks/lack of staff (in contractor's organization) to deal with EOT claims is mentioned.

General lack of details also the third challenges of substantiation process there will be lack of detailed evidence during claiming they try to dig out and find the detail. Time taken in claim

substantiating process by the contractor is the fourth challenges of contractor substantiation process. It is known that for the single claim a number of documents, evidences and computation documents submitted together. To compile and make good claim submittal it needs time and resource and this lead for delay. Lack of contractor's management resources and Actual delay/cost could not be determined until end of construction were the last challenges respectively.

4.5.4 Claim Assessment and Evaluation Process (contractors, consultants, and employer)

Table4. 11 challenges of Claim assessment and evaluation process

	N	Mean	Rank
Unsatisfactory evidence to convince other party	78	3.910	1
Poorly submission by contractor/lack of details and particulars	78	3.821	2
Contractors' Delays in Response to Claims clarification	78	3.769	3
There is a tendency to protect own interest	78	3.654	4
So Many Documents /Engineer requests excessive details	78	3.526	5
Failure of the contractor to submit claim chronological order	78	3.500	6
Much higher bargaining power of the employers	78	3.436	7
Partiality of Engineer during assessment	78	3.346	8
Engineer lack of construction knowledge to assess the claim	78	3.128	9
Valid N (listwise)	78		

Assessment and evaluation is the last claim handling process in federal road projects. This process contains examination of contractor's substantiated document and gives determination& approval. Like the above sub process the respondent requested to rank challenge during application of this sub task. Unsatisfactory evidence to convince other party is the first challenge faced during assessments and evaluation. This means the contractor submit particular which couldn't show or support the case accurately this may lead them for additional clarification or rejection of their claim by the engineer and/or client. So the contractors need to support his evidence with accurate and reliable information and documents. The finding also supported with Abel (2017) result.

Respondent secondly mentioned that Poorly submission by contractor/lack of details and particulars is issue during assesement.The Engineer is obliged to assess the submitted claims for extensions of time, while the onus of providing adequate information for this evaluation rests with the claimant (contractor) this result line with finding of Yusuwan *et al.(*2013) .He illustrated that Poorly submission by contractor/lack of details and particulars such as support the claim was ranked first by the respondents, implying that this is the biggest challenge faced by engineers in performing the assessment process. The findings also imply that the industry is still dealing with the same issues after many years, such as a lack of effective and efficient project activity record keeping, which results in inadequate contract administration. Contractors' Delays in Response to Claims Clarification is another challenge faced scoring (3.769) mean score. If the particulars submitted by the contractor are not clear and sufficient to conduct the assessments, the engineer has the right to request the contractor to submit detailed clarification. SMEC (2018) says that this clarification can be done not more than twice if there is insufficient time during the preliminary assessment period. So the contractors shall submit the requested clarification in accordance with the contract agreement. Failing to do this results in delays on assessments and abolishes the process. Contractors' delays in response to claims are not only our problem; it's also a challenge in the Malaysian construction industry (Tochaiwat K., 2005). There is a tendency to protect own interests, which is ranked as the fourth challenges as it has an overall mean of (3.654). All parties have a given responsibility to do or not to do. For instance, the FIDIC contract document in clause 3.5 [engineer determination] clearly states the engineer shall be impartial during the claim administration process, which means it shall be serve both the contactor and the client equally. The contractor shall also claim having concrete evidence not to cover his fault whereas the consultant shall determine fairly and finally, the employer shall also assess and give approval.

If they do their best, the claiming process becomes easy and acceptable. The fifth challenge, as a result of respondents' perception, is so many documents or engineer requests for excessive details. The engineer has the right to request additional document that support and clarify the cases.SMEC, (2018) state that the engineer has the right to ask the clarification document not more than two time.

Much higher bargaining power of the employers, failure of the contractor to submit a claim in chronological order, partiality of the engineer during assessment and the engineer's lack of construction knowledge to assess the claim is the rest challenges ranked by the respondents.

Table4. 12 engineer recommendation and determination

Does the Engineer assesses and gives you recommendation for claims according to time stated in the contract?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	28.2	28.2	28.2
	No	56	71.8	71.8	100.0
	Total	78	100.0	100.0	

Respondents asked whether the engineer assesse their claim timely as contract document mentioned.22% answered that the engineer gives the response timely whereas the rest 56% answered the engineer doesn't give them the response timely.

Respondents those who said 'No' also requested to give their perception on the reason why the engineer failed for the above cases. The result tabulated as follow:

Table4. 13 reasons why the Engineers failed to assess the claim claims according to time stated in the contract

	N	Mean	Rank
Delay in approval by Employer	56	4.071	1
Poorly presented submissions/lack of particulars	56	3.911	2
Late submission of claims by the contractors/engineer waits for final information from contractor	56	3.857	3
Insufficient personnel to process the assessment	56	3.429	4
Delay analysis methods used by contractor different with the method used by the engineer	56	3.357	5
Valid N (listwise)	56		

Most of the respondents agreed that delay in approval by the employer was the cause for the delay of assessment of the claims. Once the engineer assesse claims he/she refer the result to the client [ERA] for the approval purpose. The client then assesse and cross check contractors result, engineer's determination and its own result. If the client agreed with the engineer determination then it will approved if not the client give its determination and sent back to both party. The result also confirmed by one of the interviewee as follow:

'The approval process also has its own hierarchy, first the ERs engineers check consultants determination and if ok, approved by team leader and referred to regional directorate. Then

regional directorate assesse the documents and again refer to deputy general director and general director finally gives its approval. As we can see the process need more time and resource'. Senior engineer of ERA[11].

Secondly, poorly presented submissions/lack of particulars mentioned as cause for assessment delay. Clearly and properly articulated and combined claim make the assessment process easier and fast. Andy (2011) in his book clearly stated that the claimant shall be considered their claim presented before the court which means as they have to compiled there claim in good manner to convince the judge. The same thing for the engineer if the document is good, the engineer will happy and feels comfortable and assess the claim easily without getting bored.

Thirdly, late submission of claims by the contractors/engineer waits for final information from contractor is the third reason for the delay. The engineer has the right to ask the contractor for more clarification if the submitted document is unclear and biased. The contractors also responsible to resubmit the requested document timely, between this forth and back process the assessment time extend beyond the expected one.

Insufficient personnel to process the assessment and delay analysis methods used by contractor different with the method used by the engineer are mentioned as the least cause for delay on the assessment process respectively.

4.6 Delay Claim Analysis Techniques

Table4. 14 Delay claim analysis techniques

	N	Mean	Rank
Time Impact Analysis	78	3.910	1
Impacted as Planned	78	3.256	2
As planed vs. as built	78	3.141	3
Window analysis	78	2.526	4
Collapsed As-Built	78	2.385	5

The above table shows that top construction delay analysis technique used in federal road projects. Time impact analysis technique ranked as the first delay analysis method by scoring (3.91) mean value. This technique of delay analysis required a detailed contemporaneous record, an updated schedule, and was primarily concerned with how each individual event affected the project's completion time. This approach has been recognized as the most reliable technique of

[11] ERA, east directorate participating in project administration for the past 11 years.

delay analysis by Society of Construction Law; Delay and Disruption Protocol (2002). A study conducted by Yusuwan *et al*., (2013) revealed that this delay analysis method is the second most widely used method in the Malaysian construction industry. The second widely used delay analysis method is impacted as planned by the scoring mean value of (3.256). As the name implies, this method assesses and analyses the impact of the delay on the planned schedule. Because it uses the as-planned program and does not need an as-built schedule, the assessment can be done fast and easy (Stumpf, 2000).But it has its own limitations it requires a reliable as-planned schedule. Muluken (2018) state that this type of analysis method is widely used by contractor and employer the case of federal road project in Ethiopia. The third delay analysis method used in federal road projects is as planned vs. as built. Due to its simplicity, it's widely used in the construction industry. It's performed simply by comparing the activities on the as-planned schedule with the as-built schedule for detailed assessment of the delay.

Window analysis and collapsed as-built are rarely used delay claim analysis techniques by scoring (2.526) and (2.385) respectively. According to Braimah & Ndekugri (2009), the window analysis methodologies are not widely used because they require accurate and complete project records for their applications, which unfortunately are often lacking in practice. For both detailed records and highly resource consuming techniques, they weren't widely used.

4.6.1 Challenges of Using Delay Analysis Technique

Table4. 15 Challenges of using delay analysis technique

	N	Mean	Rank
Lack of properly updated program	78	4.128	1
Lack of adequate project information	78	4.115	2
Unrealistic base line program	78	3.974	3
Lack of skill	78	3.500	4
Difficulties in using the technique	78	3.282	5
High cost involved in usage of methods	78	3.192	6
Valid N (listwise)	78		

According to the respondents' response, the lack of a properly updated program is the first challenge during the use, and the analysis of the delay has a mean score of (4.128). As we know, some of the techniques require current or updated programs to analyze the delay. Once the previous claim is assessed, the program will be assessed and updated for the coming work. The

result is supported by Muhammad *et al.,* (2016), the poor programming such as unrealistic baseline programme and poorly updated programmers as another major source of problems responsible for the difficulties and disputes on EoT claims resolutions. Programs were frequently not timely updated in federal road projects, which made it difficult to analyze the time extension. Programmers are updated to regularly communicate the actual project status, maintain the program's usefulness as a management tool, track modifications to the original plan, record actual performance of all parties, and support forensic or prospective delay analysis.

Moreover this is supported by Braimah and Ndekugri (2009) that poorly updated programmers and baseline programme without CPM network were ranked highest by the respondents as obstacles to the use of delay analysis methods.

On the whole, "lack of adequate project information" ranked as the number two top challenge, following "lack of properly updated program." The highest rank attained by "Lack of adequate project information" corroborates with the construction industry's poor track record of maintaining adequate project records, as observed by previous studies (Scott, S.; Assad, S., 1999).Despite numerous suggestions for better record-keeping procedures, this issue has persisted throughout years. The third challenge during analysis is the unrealistic base line program. The fundamental and first scheduled program for the building is known as the base line program. The overall timetable of the activities is impacted if the baseline fails. Following the unrealistic baseline program, the next problems are a lack of ability and difficulties implementing the technique. The fundamental precepts for using the methodologies are experience and skill.

4.6.2 Disruption /productivity analysis methods

Table4. 16 Disruption /productivity analysis methods

	N	Mean	Rank
Construction Programme Analysis	78	3.962	1
Baseline productivity analysis	78	3.321	2
Estimated Versus Actual Man-hour Expenses	78	3.282	3
Earned Value Analysis	78	3.192	4
Measured Mile Analysis	78	3.000	5
Valid N (list wise)	78		

Table 4.16 illustrated the disruption or productivity analysis methods used by the respondent the case of federal road project. The results indicate that the construction program analysis method is a widely used technique to analyze disruption in federal road projects. A construction program analysis is the program which is prepared by the contractor and approved by the consultant before the construction activity starts. So the disruption was easily identified from the construction program approved by the consultant. Following construction program analysis, baseline productivity analysis and estimated versus actual man-hour expenses are used as the analysis method. The former one is based on the base line schedule, and the latter one is carried out by comparing the estimated (planned) productivity with the actual productivity on the ground. Earned value analysis &measured mile analysis are the least productive analysis methods used by the respondent. Earned hours can be calculated by multiplying physical units of work accomplished by budget unit rates. The difference between the earned hours and the actual hours spent during the impact period is then compared in order to determine the productivity loss that occurred. This method doesn't show the clear cause and effect of disruption on the ground.

4.7 Case Studies

Case A

Claim No. 1

The contract for the Works was awarded by the Ethiopian Roads Authority to the Contractor, China First Highway Engineering Co. Ltd, by Letter of Award, on 14th April 2015.

Table4. 17 Basic Contract Data of the Project Contract II: Bilbala -Sekota. Road Project

Project Name	Construction of Gashena-Lalibela-Sekota, Contract II: Bilbala -Sekota. Road Project
Financier	Federal Democratic Republic of Ethiopia
Contractor's name and address	China First Highway Engineering Co. Ltd. Addis Ababa, Ethiopia
Date of Contract Signature	April 14, 2015
Commencement Date	June 12, 2015
Original Contract Period	1185 days (Excluding Defect Liability period)
Original Completion date	September 09, 2018
Defects Notification period	365 Calendar days
Type of Contract	Admeasurements' with fixed unit price
Original Contract price (including contingency, provisional sum and VAT)	ETB 2,042,059,919.33

Extra variation works have been issued to the Contractor in accordance with Clause-51 of the Conditions of Contract and in consideration of the Public Procurement's directives to modify the *town limit and width of the road in Sekota Town section* following the public request addressed to the Employer in this regard. The overall Contractor's EOT Claims submitted/raised are summarized.

In line with the Consultant notification, the contractor has submitted his detailed particulars of the claim under his EOT Claim No.1 submission via a letter on April 2016 and requested for 109 calendar days of extension of time.

Accordingly, the Engineer had assessed same in line with the Contract provisions and found that there was significant increase in quantities of critical activities as alleged by the Consultant, as such, recommended ***79 calendar days*** of EOT to the Employer through his letter dated 23rd

December 2016 for approval as required under Sub-clause 2.1 (c)[12] of the Particular Conditions of the Contract.

Having reviewed Engineer's determination, the Employer had issued comments on same and requested the Engineer to clarify the following points; otherwise, to make necessary corrections in this regard.

- ✓ To justify why the starting dates of some of the critical activities in the Sekota Town section have been changed in reconstructing Master Work program.
- ✓ To check the effect of the varied work against the overall project activities instead of using the quantities and completion dates of the activities in the section from Km186+900 to Km 189+659 for Contractor's EOT claim assessment.

Accordingly, considering the aforementioned comments; the Engineer had revised his determination and recommended ***79 calendar days*** of EOT under his cover letter on May 11, 2017.

Basis of Consultant's Claim

The extracts of the Contractual basis of the Contractor's claim are highlighted hereunder;

- ✓ ***Sub-clause 44.1*** of the GCC entitles the Contractor for extension of time, in the event of;

(The volume or type of additional work)

- ✓ **Sub Clause 44.2** of the GCC states regarding compliance of notice provisions: the Engineer is not bound to make any determination unless the Contractor has;

  a) within 28 days after such event has first arisen notifies the Engineer with a copy to the Employer, and

  b) Within 28 days, or such other reasonable time as may be agreed by the Engineer, after such notification submitted to the Engineer detailed particulars of any extension of time."

- ✓ As also highlighted in section (a) herein above, the requirement of the notice to claim provision has been fulfilled for Contractor's EOT Claim No.1.In this regard, the Engineer has found that contention as to notice provision is acceptable; hence, proceeded with the verification and quantification of his claim.

- ✓ ***Sub-clause 51.1*** of the GCC states that;

[12] Sub clause 2.1 Engineers Duty and Authority

“The Engineer shall make any variation of the form, quality or quantity of the works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion, be appropriate, he shall have the authority to instruct the Contractor to do and the Contractor shall do any of the following:

a) Change the nature, quality, or kind of any work contained in the Contract;

b) Omit any work included in the Contract (but not if the omitted work is to be completed by the Employer or by another Contractor);

d) Modify any element of the works' levels, lines, positions, or dimensions; carry out any additional work that is required to complete the works; or

e) Modify the timing or sequence in which any part of the works is to be built.

Analysis of causes and effects

For the improvement of the horizontal and vertical alignment of the original design of Sekota town due to the unnecessary very sharp horizontal curves with noticeable sight distance problem and steep vertical grades with miss-phasing problems for the proposed DS-4 standard road of the town section. Thus as the basis of EoT claim, the Contractor avers, among others, that as can be referred from the approved Clause-14.1 Work Program, most of the activities included in the critical path are affected by extra work in volume and nature due to VO No.1. Thus, additional time is required to the contract completion time. The Consultants further alleges that based on the Original approved Work Program (WP) shows that earthwork and pavement activities and drainage works in Sekota Town section are in the critical path; and as such, any change on these activities has direct impact on the completion date of the project.

As per the master work program and original contract completion date, the project is supposed to be completed by **9th September 2018** with an original contract period of **1185** ***calendar days***. However, due to the additional works instructed under VO No.1, 79***calendar days*** of extension of time has been granted to the Contractor pursuant to the contract and subsequently the revised contract completion date is set to be on **28th November 2018.**

The employer have thoroughly reviewed Engineer’s assessment along with Contractor’s claim in line with the relevant contract provisions and contemporary records and found that the Contractor is entitled for extension of time due to the declared increase in the project quantities as a result of the issuance of variation orders in accordance with Sub-clause 44.1 (a) of the General Condition of the contract.

In view of the foregoing, employer concur with engineer determination that the Contractor is entitled for an extension time of 79 calendar days due to increase in the project quantities as a result of extra variation works issued under VO No1.

Claim No. 2

Bilbala-Sekota road project was designed to be constructed with double bituminous surface treatment (DBST) surface type by the design consultant; however, during implementation of the project, the surface type of the road has been changed to Asphalt Concrete under variation order in line with sub-clause 2.1, due to difficult terrain condition of the area and increase in volume of traffic. ERA top management and other government officials visited the project site and conducted consultation with the respective public administration. During consultation, the local people and administration had requested to change the surface type of the road from DBST to AC considering the incompatibility of DBST with the terrain condition of the area. Engineer was requested to review the viability of public request and submit his proposal to address the case raised by the local people.

2nd November 2018, the Engineer had submitted his proposal to change the pavement type from Double Bituminous Surface Treatment to Asphalt Concrete surface type and initiated Variation in accordance with Clause 51 of the GCC. Having reviewed Engineer's submission, through a letter dated 14th November 2018, the Employer had approved the Engineer's proposal for upgrading the surface of the road to Asphalt Concrete standard and advised the Engineer to make assessment and submit the contractual implication of the said variation instruction.

Having reviewed Contractor's offer and after due consultation with the contracting parties in line with the requirement of the contract, the Engineer had advised the Contractor to submit his revised time proposal. Having reviewed Contractor's proposal and after making detail assessment through the letter dated 16th January 2019, the Engineer has submitted Variation Order No. 3 proposal and requested Employer's *no-objection* for the additional cost required to execute the said variation order without considering the time implication of same.

Subsequently, having reviewed Engineer's proposal in line with the relevant provisions of the contract, through a letter dated 29th January 2019, the Employer has given his "*no objection*" for the proposed change of pavement surface type from DBST to AC and advised the Engineer to review Contractor's EoT request and submit his determination for Employer's subsequent action

Accordingly, through his letter dated 13th March 2019, the Contractor has submitted Extension of Time request associated with the said change in the surface type of the project from DBST to AC (Variation Order No.3) for Engineer's approval; Contractor's EoT request and his contractual basis has been summarized in the table below.

Table4. 18 Contractor's Proposal for EOT Entitlement for VO. No.3

Item No.	Delay Causation	Contractor's Proposal for EOT Entitlement for VO. No.3 (Cal days)	Supporting Contractual Provisions
1	Additional Variation works due to VO No.3	***427***	Sub-Clause 44.1(c)of GCOC Sub-Clause 51 of GCOC

Engineer's Analysis and Recommendation

To check whether the said head of Contractor's EOT claim is in compliance with procedure and contractual entitlement, the Engineer has reviewed the Contractor's EOT submission. Accordingly, the Engineer has recommended granting an extension of time of **230 Calendar Days** to the Contractor under Contractor's EOT Claim submitted in connection with Variation Order No.3 (VO.No.3) that would shift the revised completion date of the project from 26th May 2019 to 11th January 2020.

The engineer mentioned that *irrespective of the absence of detailed Extension of Time analysis* in the Contractor's submission, the Engineer is deemed to act fairly whenever carrying out his duties or exercising his authority specified in or implied by the Contract.

Finally the employer have reviewed Engineer's approach along with Contractor's alleged claim in line with the relevant provisions of contract and contemporary records and accepted Engineer's determination. Therefore, in accordance with Sub-clause 2.1(c) of the Conditions of the Particular Application of the contract; the Employer hereby has given his approval for an Extension of Time of **230 Calendar Days** that would establish a new completion date of the project to be on 11th January 2020.

Case B

Claim No .4 (EOT 04)

Table4. 19 Basic Contract Data of the Project Contract Construction of Gashena – Lalibela - Sekota Road Upgrading Project; Contract I: Gashena - Bilbala

Contract Data	
Contract Name	Construction of Gashena – Lalibela - Sekota Road Upgrading Project; Contract I: Gashena - Bilbala
Funding/Financer	Government of the Federal Democratic Republic of Ethiopia (FDRE)
Contracting Authority	Ethiopian Roads Authority
Length (km)	90+000 km + Bypass 15Km (Total 105Km)
Type of Contract	Admeasurements
Construction Type	Road Upgrading to a DS4 standard
Contractor	China Railway No.3 Engineering Group Co., Ltd. Plc.
Notification of Award	December 26, 2013
Contract Signing Date	January 15, 2014
Commencement Date	February 12,2014
Original Completion Date	February 11, 2018
Original Contract Period	1460 Calendar Days
Defects Notification/DL Period	365 days from the issue of the Taking Over Certificate
Revised Completion Date	January 09, 2019

Contractor claim

In this case the Contractor has claimed that he is entitled further time extension to complete the project due to

1) Suspension of the project works when hostile and violent actions occurred at the Contractor's camp from July 27, 2018 until he is notified that works can be resumed on February 15, 2019 in normal circumstances and sought 203 Cal days extension of time based on Sub Clause

40.2 of the General Conditions of Contract. To substantiate his claim for suspension the Contractor has attached the required documents:

To substantiate his claim for suspension the Contractor has attached the following documents:

- Contractor's Letter to the Employer with copy to the Engineer dated July 31, 2018 and Special Report on the Hostile act on the contractor's main Camp at Lalibela Town with details list of equipment damaged, Contractor's and Engineer's facilities, stolen properties in cash and kind
- Contractor's Letter to the Engineer with copy to the Employer dated Aug 01, 2018 giving notice to claim in relation to the Attack in the Main Camp.
- Engineer's Letter to the Director of Northern Region Construction Contract Management Directorate with copy to the Contractor on August 24, 2018 regarding the discussion and understandings reached to resume works.
- Engineer's letter to the Contractor with copy to the Employer advising the Contractor to commence the maintenance and preparation works as the staff of the Engineer has been mobilized partly.
- Engineer's letter to the Contractor instructing the Contractor to re-start the permanent works effective immediately.
- Contractor's letter to the Engineer with copy to Employer submitting his schedule for resumption of the weeks

Engineer's Assessment and Recommendation

The Contractor has submitted on August 01, 2018 a notification of claim to the Engineer within 28 days. Thus, the Contractor's claim has merit for consideration.

The Contractor has submitted special report to the employer and the Engineer on the incident expressing in detail the damages that has occurred through his letter.Tri-partite Meeting has been held with the Employer, the Engineer and the Contractor in the presence of their representatives in which the situation was discussed and understanding was reached in relation to resumption of the Works after hostile incident of July 27, 2018.

It is to be noted though that the work was suspended for more than 84 calendar days that would have triggered termination of contract by the Contractor, this suspension was caused due to external act of hostilities that fall under the Employer's risk, as defined in Sub Clause 20.4 of the GCC, and the Contractor has not invoked termination of contract, sub clause 40.3 does not apply.

The Engineer has determined that the project was suspended for 202 calendar days. As provided

in the Conditions of Contract, Sub Clause 40.1 and 40.2 of the GCC, the Contractor will be entitled to extension of time of 202 Cal days due to suspension of the works.

The engineer determination also accepted and approved by the employer.

Case C

Table4. 20 Basic Contract Data of the Project Contract 2: Ajire – Keraker – Ketema Negus

Project Name	Contract 2: Ajire – Keraker – Ketema Negus Design and Build Road Project
Functional class	Link Road,DC-4 standard, with DBST
Works Contract Signing Date:	June 18, 2018
Commencement Date:	September 21, 2018
Time for Completion:	3Yrs/ 1096 calendar days
Original Completion Date:	September 21, 2021
Contract Type:	Lump-Sum
Project Delivery System:	Design & Build
Project Length:	55.94 km
Warranty Period	Three Years
Defect Liability Period	365 calendar days plus 3yrs warranty period
EOT Granted so far	63 Calendar Days
Revised Completion Date	22 November 2021 (the project was suspended from 27th June 2021 to 14th February 2022 due to security problem)
To date Progress (end of March 2022)	30.75km /53.95%

The Contractor through the letter dated on 18th November 2021 has *submitted Extension of Time claim No. 02 and additional cost claim* in connection with the following heads of claims that he deems entitle to Extension of Time and Additional Payment.

Table4. 21 Contractor's Submission of EOT Claim Heads

Contractor's Submission of EOT Claim Heads			
No.	**Delay Causation**	**EOT Submitted by the Contractor (Cal. days)**	**Supporting Contractual Provisions**
1	Delay due to shortages of cement	***164***	Sub-Clause 8.3 (c) and 19.1 of GCC

2	Delay due to Keraker Town design Alignment Change	***123***	Sub-Clause 8.3 and 6.2.2 of GCC
3	Delay due to Insecurity	***181***	Sub-Clause 8.3, 5.3, 17.3 and 17.4 of GCC
	Total	**468**	
Contractor's Cost Claim Heads			
No.	**Delay Causation**		**Amount Submitted by the Contractor (birr)**
1	Continued Provision of Employer's Representative Facilities which would have been put to the Contractor's use at the end of Completion of the works		16,216,089.00
2	Continued Services and maintenance of the Employer's Representative Facilities		307,156.80 per month
3	Recovery for the Extended duration of the time for completion		3,148,532.00 per month

The Contractor; gives justification and substantiation in support of his contractual entitlement to extension of time, has requested 468 calendar days that would make the completion date of the project to be 5 th March 2023.

Employer's Representative Determination on the Contractor's EOT Claim

Subsequently, the Employer's Representative has proceeded to determine the Contractor's request as fairly as required under the Contract. Therefore, the Employer's Representative has assessed the Contractor's heads of claim in line with master work program, the contractual provisions and project correspondences made among the Contracting parties.

The approach applied by Employer's Representative in determining the time required to compensate the claimed lost time due to the aforementioned alleged delay events is as follows:

i. The master work program submitted and consented by the Employer's Representative is taken as the base resource;

ii. The activities in the master work program are utilized as deemed necessary in determining the delay;

Iii.The activities which are shown on the critical path of the original master work program are, among others, earthwork, pavement and ancillary works; and

iv. Documents of communication regarding each claim head.

Consequently, the Employer's Representative has reviewed the cause and delay analysis presented by the Contractor in respect of the Extension of Time component and Cost component in line with the Contract provisions, the available factual records and his understanding of the case.

In general, taking into account the forgoing; the Employer's Representative has recommended an Extension of Time of ***282 Calendar Days*** to the Contractor under Contractor's EOT Claim No. 02 [Delay due to Shortage of Cement 37 calendar days; Delay in Approval of Keraker Town design 75 calendar days; Delay due to Insecurity 170 calendar days] that would shift the revised completion date of the project.

Employer assessment and stance

In view of the foregoing, employer reviewed Employer's Representative approach along with Contractor's alleged claim in line with the relevant provisions of contract and contemporary records and accepted Employer's Representative determination.

Finally, the employer point out that, as the Employer's Representative expressed under his determination states that *"the Contractor has claimed recovery of additional cost without providing detailed justifications and showing how he arrives at the mentioned amount*"; the Employer could not make assessment on the said cost claim in the absence of detail particulars of the matter.

Case D

Table4. 22 Basic contract data of the project

Contract Data	
Contract Name	Construction of Azezo- Gorgora Road Upgrading Project
Funding/Financer	Government of the Federal Democratic Republic of Ethiopia (FDRE)
Contracting Authority	Ethiopian Roads Authority (ERA)
Length (km)	52.70
Condition of Contract	FIDIC-IV, *edition 1987*
Type of Contract	Ad-measurements
Construction Type	Road Upgrading to a DS4 standard
Contractor	Gemshu Beyene Construction Plc.
Notification of Award	January 17, 2013

Contract Signing Date	January 23, 2013
Commencement Date	February 27,2013
Original Completion Date	August 29 ,2015
Original Contract Period	911 Calendar Days
Defects Notification/DL Period	365 days from the issue of the Taking Over Certificate
EOT No. 1 Approved to date	337 Calendar days
Revised Completion Date	July 31, 2016
Total to date accomplishment; as of end of May 2016	90.5%

The Contractor through its letter dated 5th December 2015 has submitted his claim for EoT No. 2 owing to the impediment on the execution of the construction works of the town section as a result of the delay in the clearance of the ROW obstruction as summarized in the table below:

Table4. 23 Summary of Contractor's claim

I.N.	Claim Head	EoT Claimed
1.	Delay in the removal of ROW obstruction	
1.1	Delay in the execution of the earthwork activity of the town section (i.e. between mid Sep 2015 and Nov.2015 end)	76 Cal. Days
1.2	Delay in execution of U-channel side drainage works in town section (i.e. including 28 calendar days for curing)	170 Cal. Days
1.3	Delay due to mobilization and demobilization of resources	29 Cal. Days
	Total EoT Claimed	**275l. Days**

History of Events

The Contractor has submitted his EOT claim No. 2 on the 5th of December 2015 under the title of "*Project Delay as a result of the Delay in the Removal of ROW obstruction*". In his submission, the Contractor argued that, he did not acquire the required possession of site, which is free from ROW obstruction, within the stipulated contractual time frame as per the requirement of Sub-Clause 42.1 of the CoPA.

In accordance with the provisions of Sub-Clause 42.1 of the CoPA, the Employer shall give a possession of site to the Contractor to enable him commence and proceed with the execution of the Works in accordance with the program referred to in Clause 14 or otherwise in accordance with such reasonable proposals as the Contractor come up with. Nevertheless, the Contractor

shall give the Engineer with a copy to the Employer, not less than three months' notice of his requirement of possession of site for road reserve, detour, and borrow pits, quarry sites, stockpiling area and spoil area.

The Contractor stated that, considering the three-month prior notice of contractual requirements for enquiring possession as stipulated under the provisions of Sub-Clause 42.1 of the CoPA, he has been submitting his possession of site requirements along with the list of obstructions to the Engineer for timely clearance.

Contractor's Claim and Reasoning

The Contractor, through his letter Ref. No GEBEC-02/AG/27.1-1163/2008 dated December 5, 2015 has forwarded his EOT claim No. 2 requesting for 275 calendar days due to the delay in the removal of the Right of Way obstruction of the town sections.

The Contractor in his submission has indicated that, all the earthwork activities (except for the town sections) were completed by the end of July 2015. The Contractor mentioned that, he could not execute the town sections earthworks construction due to the delay in the removal of the ROW obstructions. In addition, the proposed drainage construction of the town sections has also become a critical activity for completion unlike the Contractor's original assumption due to the ROW problem.

The Contractor indicated that, he would require a total length of 2.3km (4.6km in both directions) completed at Earthworks level to proceed with the "U gutter" construction as planned. In this respect, the Contractor has sought for 76 calendar days of EoT for completion of the earthworks of the town section and 170 calendar days of EoT for the execution of the "U gutter" side drainage works including 28 calendar days for curing of concrete works for the side drainage works for the town section.

Aside to his requirement for additional time for completion of the works of the town section, the Contractor has also requested 29 calendar days for mobilization and demobilized of resources for the earthworks construction.

Basis of Contractor's Claim

The Contractor's basis his claim under the provisions of Sub-Clause 42.1 of the CoPA. The provisions of Sub-Clause 42.1 of the CoPA states that, "If the Contractor suffers delay and/or incurs costs from failure on the part of the Employer to give possession in accordance with the terms of Sub-Clause 42. 1, the Engineer shall, after due consultation with the Employer and the Contractor, determine:

(a) *Any extension of time to which the Contractor is entitled under Clause 44, and*

(b) The amount of such costs, which shall be added to the Contract Price, and shall notify the Contractor accordingly, with a copy to the Employer.

Furthermore, the Contractor, as mentioned in his letter referenced above, presented his claim pursuant to the provisions of Sub-Clause 44.1(c) of the GCC, which states, In the event of:

(d) *Any delay, impediment or prevention by the Employer, or*

(e) Other special circumstances which may occur,

other than through a default of or breach of contract by the Contractor or for which he is responsible, being such as fairly to entitle the Contractor to an extension of the Time for Completion of the Works, or any Section or part thereof, the Engineer shall, after due consultation with the Employer and the Contractor, determine the amount of such extension and shall notify the Contractor accordingly, with a copy to the Employer"

Contractor's Time Extension Analysis

The Contractor's indicated that, all the earthwork activities of the project *(except for the town section)* were substantially completed by the end of July 2015. Although the Contractor has managed to complete the earthworks construction; the Contractor could not commence the earthworks construction at the town sections of the project owing to the delay in the clearance of the RoW obstructions. Albeit the fact that, the Contractor has planned to start the earthworks construction after the onset of the 2015 rainy season, he could not commence to the construction works due to the unresolved RoW problem. Due to same, the Contractor asserts that, the planned earthworks operation was suspended from September 2015 mid up to the end of November 2015, which is 76 calendar days, until the finalization of the clearance of the RoW obstructions of the town section.

The Contractor has also claimed that, the planned operation of Concrete lining work for the side drainage construction has also been disrupted due to the delay in clearance of the ROW obstruction. In his submission, the Contractor has pointed out that, as per his construction methodology, in order to enable him to create sufficient working space for the subsequent activities i.e. the sub-grade, sub-base and pavement layers; the U-gutter shall be constructed ahead for an average length of 2.3km *(i.e. 4.6 km of U-gutter for both sides)*.

Hence, using a productivity rate of 39 lm per day, the Contractor has requested for 142 calendar days EOT [*i.e. 142 calendar days (118*7/6) + (118*13/365)*] and 28 calendar days of EoT for curing of the concrete "U gutter". In view of this, the Contractor has stated that, he would require

a total of 170 calendar days of EoT for the execution of 4.6km of concrete lining works for the side drainage construction of the town sections ahead of the commencement of the construction of sequential activities.

Besides to the above, the Contractor contended that, as per his original works program, he has planned to execute the construction works of the project in a continuous and progressive manner. Nevertheless, as stated above, he was obliged by the situations to skip the town sections and demobilize his resources from the town section until the RoW obstructions cleared. Accordingly, the Contractor has claimed for 24 working days (or 29 calendar days) for the mobilization and demobilization of resources.

All in all, the Contractor has claimed ***275 Calendar days*** (170+76+29) days EOT in an interim basis due to the alleged project delay encountered due to the delay in the removal of the RoW obstruction of the town sections.

Engineer's Analysis and Recommendation

The Engineer, having confirmed the fulfilment of the notice requirements under the Contractor's submission as indicated in table 3, has reviewed the Contractor's EOT claim No. 2 in line with pertinent contract provisions and considered the relevant EoT deterministic factors *(i.e. productivity and planned quantity of works during the claimed period)* to make his determination; Engineer's approach and assessment are briefly described as follows;

The Engineer before going into detail analysis of the Contractor's submission, a thorough review has been made on the Contractor's revised works program, which was submitted after incorporating the Engineer's comment. In such accord, the Contractor, in his consented Sub-clause 14.2 revised program, has showed that his planned construction arrangement denoting borrow to fill and concrete lining activity as critical activity (with no free float).

The Engineer has reviewed the revised work schedule of the Contractor and in this respect; the Engineer has noted that, the Contractor has not submitted a space-time diagram along with his revised works program to demonstrate the section and the timing of the execution of the works. Due to same, the Engineer assumed that, the Contractor could execute the project works including the town section only by skipping the sections, which have a ROW issues to mitigate the extent of the damage. In view this; the Engineer has assessed the available workload of each of the critical item of the project works against the Contractor's schedule as discussed herein below:

As per the detail analysis and based on the pertinent facts stipulated on the Contractor's revised work program, it is concluded that, the Contractors could have executed the earth works operation and attain his plan in the town section that are free from RoW obstruction. Additionally, the Contractor's monthly IPCs' has showed that, the Contractor has executed huge quantity above his plan within the said town section. Hence, in view of this, the Engineer stated that, he has rejected the Contractor's alleged claim for 76 calendar days EoT as a result of delay in the clearance of the RoW obstruction and consecutive delay of the planned earthworks construction.

As it has been clearly indicated in the Contractor's submission, the Contractor has assumed an average productivity rate of 39 lm/day for the construction of concrete lining activity. And, for the town section construction of the said activity, the Contractor has required an advance clearance of ROW for about 2.3km in order to finalize the concrete lining works and proceed with the subsequent project activities. Based on the above assumption, the Contractor computed 170 calendar days *(118*1.2+28 days of curing)* of EoT *i.e. including 28 calendar days of curing time* to proceed to the subsequent activity. Accordingly, the Contractor has requested to be entitled for 170 calendar days of EoT.

However, the Engineer, as shown in the following table, has re-distributed the remaining work volume in the section where RoW obstruction is free due to the fact that the Contractor can assign his resources and execute the works on these sections so that the delay would be reasonably mitigated as specified on the relevant provision of the Contract. In doing so, the Engineer taking into account an average productivity rate of 72.3 lm/day from the Contractor works program and average actual performance from site records. The remaining volume of the concrete lining has been distributed *(carry over to the next month*) within the available working days without any free float. Accordingly, those working days which have exceeded the intended completion period will be granted to the Contractor.

As the Engineer redistributed the whole volume of work considering the assumed average productivity (72.3 lm/day) and has been compared with the availed workload as shown in the following table. Hence, wherever there is no RoW free section, equivalent EOT is granted, which is exhibited in the first three (3) months.

The delay in the clearance of the ROW has only affected the Contractor's plan for the execution of the concrete lining works during the months of September to December 2014. According to the Engineer's assessment, the total additional time required for completion of the concrete

lining works is 59 working days or 98 calendar days (59*1.18+28 curing days); which was elapsed due to the delay in the clearance of the ROW obstruction of the town section.

Since the Engineer assessment is made after the finalization of the RoW obstruction i.e. March 2016, the determined EoT is in accordance with the provisions of Sub-Clause 42.1 and Sub-Clause 44.1 (b) and (d) of the conditions of contract.

Therefore, in consideration of all the above issues, the Engineer has presented its determination of ***98 calendar days*** as an Extension of Time from the completion date, i.e. 31st July 2016. This makes the revised completion date to be December 8, 2016 excluding the month of August, as the same is considered to be the rainy season.

The employer has thoroughly reviewed Engineer's determination along with the Contractor's alleged claim in line with the relevant contract provisions and found that the Contractor is entitled for an EoT due to the delay in the clearance of the ROW obstruction based on the provisions of Sub-Clause 42.1 and 44.1 of the Condition of the contract.

Accordingly, the employer found that the recommended ***59 Working Days (98 Calendar Days)*** EoT in connection with the delay in the clearance of the RoW in the activity of the Concrete Lining Works in the town sections as justifiable and contractually acceptable.

The contractor's EoT claim in connection with the demobilization and mobilization is rejected as there was no space-time diagram in the revised works programme to demonstrate the Contractor's plan of execution of the works of the town section with specified time frame. Besides, as the Contractor was having sufficient section *i.e. at the rural and within town section* in order to enable him to proceed with the sequential activities of the works between the months of September to December 2014; it is concluded that, the Contractor's assertion for 29 calendar days EoT for demobilization and mobilization is found unacceptable.

The following table summarizes the Contractor's Extension of Time request, Engineer's recommendation and Employer's stance for all heads of the Contractor's extension of time claims.

Table4. 24 Summary of EoT Claim

I. No.	*Head of Claim*	*Contractor's Request*	*Engineer's Determination*	*Employer's Approval*
		Calendar Days		
1	Delay due to the clearance of the ROW obstruction			Same with the Engineer's assessment
1.1	Delay in the execution of the earthwork activity of the town section (i.e. between mid Sep 2015 and Nov.2015 end)	76	Rejected	
1.2	Delay in execution of U-channel side drainage works in town section (i.e. including 28 calendar days for curing)	170	98	
1.3	Delay due to mobilization and demobilization of resources	29	Rejected	
Total		***275***	***98***	***98***

Therefore, in accordance with the provisions of Sub-clause 2.1 (c) of the Conditions of the Particular Application of the Contract; the Employer hereby gives his approval for an EoT of ***98 Calendar Days*** in connection with the aforementioned head of claims pursuant to the provisions of Sub-Clause 42.1 and 44.1 and establish a new completion date of the project to be on December 8, 2016.

Finally, the employer would like to point out that, as the Contractor performance was also poor due to his own culpable delay, the Employer believes that the Contractor is not entitled for time related cost due to the fact that, neither party can benefit from the default of their own in the presence of concurrent delay by both parties.

4.7.1 Cases Analysis

Table 4.25 case study analysis

	Case A	Case B	Case C	Case D
Procedures the stakeholders followed to settle the claims	As we can see from the case studies, the handling process circulates between the three parties in the contract [contractor, engineer/employer representative and employer]. The contractor is the initiator of the claim, the engineer is the determinant of the claim submitted by the contractor, and the employer is the final body for approval of the claim which is determined and recommended by the engineer. Accordingly, the claim handling process follows the aforementioned process mentioned in the literature part and analysis part. In the above cases, the contractor identified and notified the claim events according to the time stated in the special condition of the contract or within 28 calendar days indicating the event, cause, and the effect and the provisional clause in which the claim based on. The engineer/employer representatives conducted an investigation before giving the determination on whether the contractor followed the steps and the process for claiming. If the requirements of the notice to claim provision have been fulfilled for the contractor's claim, then the Engineer proceeds with the verification and quantification of his claim. This process is seen in the above four cases. The contractor also submitted his particular documents to support the claims and convince the engineer and the employer. For the above cases, the contractor submits notification letters, different submittal letters, corresponding letters b/n engineers and contractors, request letters, contract documents that show the responsible parties, work programs, and etc. Based on the above documents, the engineer/employer representative gives its determination and recommendation. Before giving the determination, there were a detailed consultation and discussion between the parties, especially for cases A and B. For extension of time claims, the determination is given based on the impact of the events on the critical activities, unless otherwise the claim may be rejected. Here, after the engineer gave its determination, he referred to the employer for approval as required under Sub-clause 2.1. This clause limits the engineer's rights and gives approval rights to the employer. After carefully examining the Engineer's evaluation and the Contractor's claim in accordance with the relevant contract clauses and current documents, the employer may accept or reject the conclusion. Most of time, the decision of the engineer was accepted by the employer.			

	Case A	Case B	Case C	Case D
Head of claims/causes of claims/	**Claim No 1**: Variation order or additional work: change the quantity of the work to modify the town limit and width of the road in the Sekota Town section. As a condition of the contract, the engineer has the right to make variations to the work. In case A variation is initiated by the local public administration. **Claim No. 2**: variation due to the change in road surface from DBST to asphalt concrete. The change was made due to the difficult terrain conditions of the area and an increase in traffic volume.	Suspension of the project works when hostile and violent actions occurred at the Contractor's camp on July 27, 2018. Risk due to Security case rest on employer because it is categorized under neutral risk.	Delay due to shortages of cement Delay due to Keraker Town design Alignment Change Delay due to Insecurity	1.Delay in the removal of ROW obstruction 1.1 Delay in the execution of the earthwork activity of the town section (i.e. between mid Sep 2015 and Nov.2015 end) 1.2 Delay in execution of U-channel side drainage works in town section (i.e. including 28 calendar days for curing) 1.3 Delay due to mobilization and demobilization of resources
Bases of the claims	The extracts of the Contractual basis of the Contractor's claim are highlighted hereunder; Sub-clause 44.1 of the GCC entitles the Contractor for extension of time, in the event of;	The Contractor basis his claim on the provisions of Sub-clause 40.1 of the General Condition of the Contract; which states that "The Contractor shall, on the instructions of the Engineer,	General conditions of contract which states that "the contractor may apply for an extension of the time for completion of the project if he is or will be delayed either before or after the	The Contractor's basis his claim under the provisions of Sub-Clause 42.1 of the CoPA. The provisions of Sub-Clause 42.1 of the CoPA states that, "If the Contractor suffers delay and/or incurs costs from failure on the part of the Employer to give possession in

	(The volume or type of additional work) • Sub-clause 51.1 of the GCC states that; "The Engineer shall make any variation of the form, quality or quantity of the works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion, be appropriate, he shall have the authority to instruct the Contractor to do and the Contractor shall do any of the following: • a) Change the nature, quality, or kind of any work contained in the Contract.	suspend the progress of the Works or any part thereof for such time and in such manner as the Engineer may consider necessary and shall, during such suspension, properly protect and secure the Works or such part thereof so far as is necessary in the opinion of the Engineer. Unless such suspension is (d) Necessary for the proper execution of the Works or for the safety of the Works or any part thereof (saves to the extent that such necessity arises from any act or defaults by the Engineer or the Employer or from any of the risks defined in Sub-Clause 20.4).	time for completion by any of the following causes; •(c) a cause of delay giving an entitlement to extension of time under a sub-clause of these conditions, unless the contractor has not complied with such sub-clause •(e) any delay, impediment or prevention by the employer	accordance with the terms of Sub-Clause 42. 1, the Engineer shall, after due consultation with the Employer and the Contractor, determine: **(**a) Any extension of time to which the Contractor is entitled under Clause 44, and (d) Any delay, impediment or prevention by the Employer

4.8 Improvement mechanism for contactors claim handling process

Table 4. 26 Improvement mechanisms for contactors claim handling process

	N	Mean	Rank
Develop good record keeping system(all)	78	4.692	1
Having good knowledge on terms and condition of contract document(all)	78	4.487	2
Take proactive claim management measure(all)	78	4.462	3
Assign staff which have good claim "claims consciousness, familiarity and Awareness of potential claim situations(all)	78	4.449	4
Having well organized claim management procedures(all)	78	4.449	5
Early Recording of Details of Claim leading Events(contractors)	78	4.397	6
Create Good communication among stakeholders(all)	78	4.308	7
Notice the claim earlier as soon as possible(contractors)	78	4.308	8
Establishing Claim Settlement team(all)	78	4.128	9
Preparation of Claim Standard Forms/format(all)	78	4.128	10
Valid N (list wise)	78		

Table 4.17 shows claim handling improvement mechanisms. The mechanisms were extensively assessed and complied in questionnaire form, and respondents were requested to rank them according to their perception. As you can see from the above table, all the variables scored more than four mean values. This indicated that the entire respondent agreed the variables could reduce challenges and improve the claim handling process.

According to survey results, develop good record keeping system ranked as the first improvement mechanism, having a mean value of (4.69). The result indicated that the respondent strongly agreed that having a well-organized and good record keeping system is the best solution for the claim administration challenge. Many delay claims have been unsuccessful directly because there was a lack of accurate records produced contemporaneously at the time of the delay.

N. Zubaida (2012) suggests that a key success factor in claims management and substantiation is the project documentation system and the maintenance of proper records. The better the documents related to the project are maintained, the easier it is for the claims managers to formulate their claims. The formulation and presentation of the claim to the employer can go

more quickly due to the accessibility and convenience of access to the data required for substantiation. Having good knowledge of the terms and conditions of a contract document is the second improvement mechanism of claim handling by scoring (4.487). A claim arises when there is a variation between what the contract document says and actual work. Having good contractual knowledge helps the claimant as well as the respondent to know the cause and responsible parties. Yusuwan *et al.,* (2012) also supports the above ideas. He mentioned that the claimant must firstly determine the contract provision under which he/she is entitled. To make such claims, the claimant shall have adequate information and knowledge of contractual documents.

Take proactive claim management measurement is the third by the respondent. The contactor, the employer, and the consultant before entering into the contract revise the clause, quantities, and other contractual documents to help them minimize and mitigate issues and risks that lead to claims later. Not only assign and organize claim teams earlier to make them ready and standby to resolve the claims stated as third improvement mechanisms. Having well organized claim management procedures is the fourth improvement mechanism based on the survey results with a (4.449) mean score. In federal road projects, FIDIC is an often used contract document. This document specifies the procedure the claimant shall follow. It is very important for contractors to submit claims according to the steps specified in the contract conditions, provide a detailed list of the additional costs and time, and present satisfactory evidence. Early recording of details of claim leading events is the fifth improvement mechanism. Keeping the record helps the claimant to get the evidence easily when needed.

Create good communication among stakeholders, notice the claim earlier as soon as possible, Establishing a claim settlement team and preparation of claim standard forms/format is the rest improvement method by survey result, with a mean value of (4.308, 4.308, 4.128, 4.128) respectively. By applying the above concept properly, the claim handling process of federal road projects can be improved.

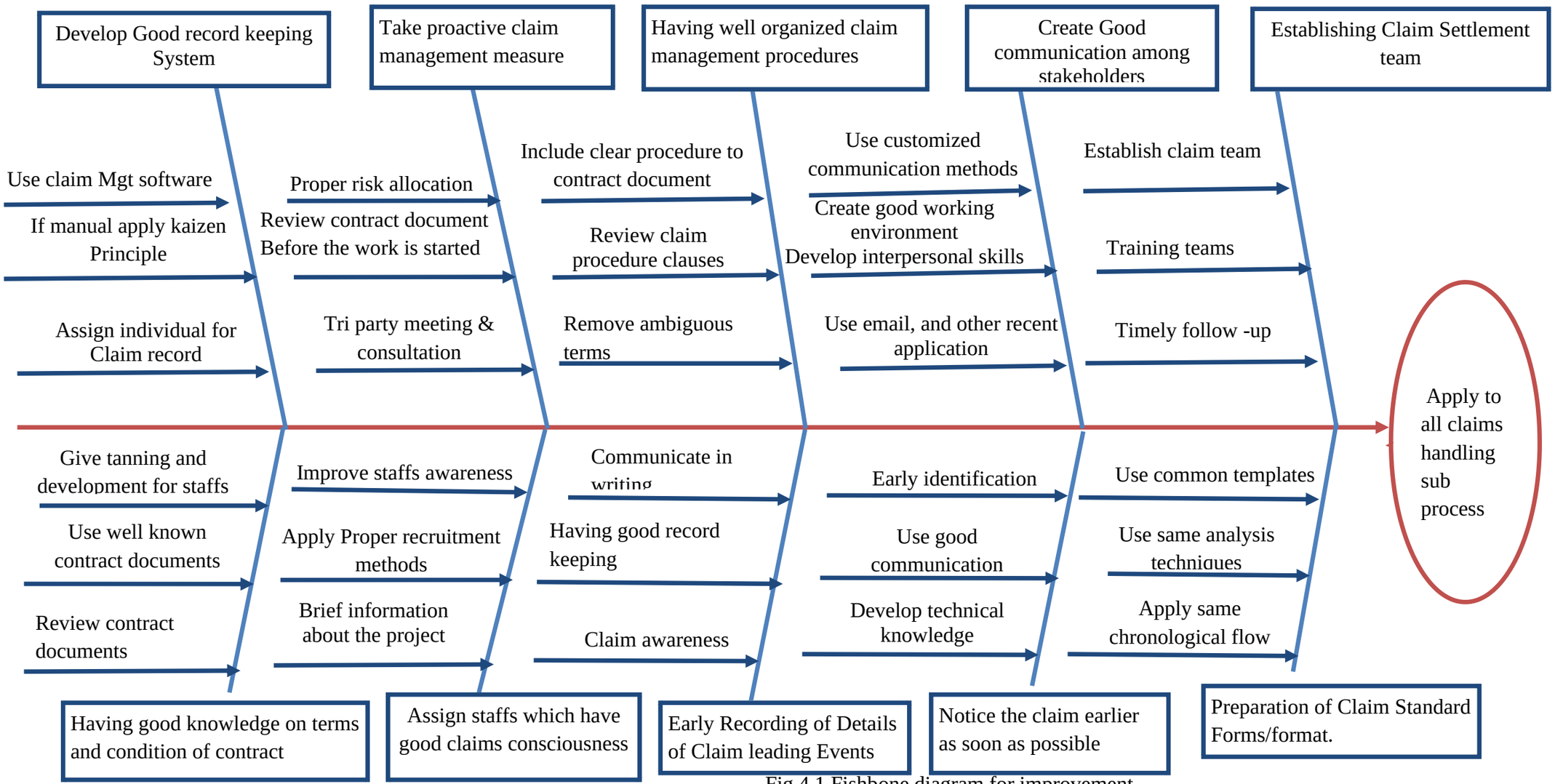


Fig 4.1 Fishbone diagram for improvement

4.9 Research validation

Research findings must be validated in order to be considered plausible, credible, reliable, and defensive (Burke Johnson, 2015). Following the completion and conclusion of the research, experts from the industry, including ERA, contractor firms, consulting companies, and other lecturers, were chosen and identified based on their experience with claim-related issues.

Beginning with the preparation of the questioner and the selection of responders, the validation test was conducted. As a result, practically all experts concurred on the claim processing process and the difficulties encountered during its execution. The experts also asked that the developed fishbone diagram and the improvement mechanisms presented be verified. Almost all experts demonstrated agreement on the mechanisms and diagram.

In general, among the seven industry professionals who were invited, nearly all of the participants agreed with the factors and improvement strategies that had been identified. They also agreed that the claiming process would be enhanced if the aforementioned variables were thoroughly explored, and improvement procedures were put in place.

Both the survey and the document result confirm that the contractor is the initiator of the claims and the employer is the final decision maker. Results clearly showed identification, notification, substantiation and assessment is four main sub processes. Challenges obtained from the survey also related with the result of interview and case analysis it also shows the validity of the research as stated under chapter three.

Chapter Five

Conclusion and Recommendation

5.1 Conclusion

This study was carried out to assess the claims handling procedures now in use in Ethiopia's construction industry, particularly for federal road construction projects. Following a thorough study of the survey results and document review's findings, The conclusion that is in line with the study's objectives is presented in the following chapter, just as it was previously presented and discussed. Additionally, recommendations were made and areas for further research were noted. Following a thorough review of the literature, document analysis, and interview data, the existing practice and difficulties were evaluated.

- Most of the respondent agreed that the claim handling process in road projects, particularly in federal projects, is not efficient. Respondents also believe employer, contractor and consultant are responsible for the time related inefficiency of the claiming process.
- The majority of respondents think that the contractor does not fully substantiate and submit the claim within the time range specified in the contract document. Poor paperwork control by the contractor, Focus on progress of work and not on claim/contractor's staff too busy on other tasks, General lack of details, Time taken in claim substantiating process by the contractor Lack of contractor's management resources were the first reason of delay on substantiation of required documents.
- Not only has the substantiation processed the assessments process also suffer due to delay. Delay in approval by Employer, Poorly presented submissions/lack of particulars and late submission of claims by the contractors/engineer waits for final information from contractor led the engineer to fail timely assess the claim.
- Federal road projects follow the following claiming process, start from recognition of the claims, notification, and substantiation then finally closed out by assessment and approvals.

  Identification is the first and most important step of the claiming process. This procedure is followed to identify the event and circumstances that led to the claim as soon as possible. Respondents ranked the following challenges of this process, such as inaccessibility of documents used to identify a claim; poor communication between site and head office;

insufficient construction contract knowledge by project site staff; and difficulties in detecting any problem on site which potentially becomes a claim, respectively challenging the identification.

- Identification followed by notification of the claim: Here the claimant informs the engineer or the employer about the situation according to the time stated on the contract documents. Delay in notification the claim timely, failure to give notice, inaccessibility of supporting documents needed for notice, giving notice informally/give notice in word, poor communication/instruction to proceed with submitting the notice were critical challenges facing the process.
- Thirdly, the claimant (contractor) submits a detailed claim to the engineer for the assessment. In this process incomplete records/report submission, unavailability of written documents for substantiation, failure to keep an up-to-date program, failure to submit reports, contractors' overestimation of claim damages, requiring a vast number of documents to be reviewed and people to be interviewed were challenges in the substantiation process.
- Finally, the engineer assesses and gives its recommendation, which is referred to the Ethiopian road authority for approval. In this sub process, the final decision is expected from ERA's representative. Similarly, unsatisfactory evidence to convince other party, poorly submitted by contractor/lack of details and particulars, contractors' delays in response to claims clarification, there is a tendency to protect their own interests, so many documents/engineer requests excessive details, and the failure of the contractor to submit claim chronological order were big issues.
- Time impacted and construction program analysis are highly used delay claim and disruption claim analysis techniques
- Besides the process and challenge, the research assessed the improvement mechanism for the claiming process. Though developing good record keeping system, having good knowledge on terms and condition of contract document, taking proactive claim management measure, by assign staff which have good claim "claims consciousness," familiarity and Awareness of potential claim situations we can have good changes..

5.2 Recommendations

- The study generally showed that there are a number of difficulties in claim handling and administration. The stakeholders need to give more attention to claims. Basic problems seen

all through the process were failure to have a good record and documentation trends. The claim is directly related to the availability of evidence and records. Accordingly, the contractors need to develop a good record-keeping system.Tranning and development for staff working on claim is essential it helps them to have good skill and knowledge.

- The contractors need to notify and substantiate the claims as stipulated time on special condition of contract. Whereas the engineer and the employer need to assess and approve the claims according to contractual time.
- It is better if the contractors update and review each documents and information required for the coming work.
- During substantiation and assessments the contractors need to submit convincing information for the engineer. It helps the engineer to perform its task easily and fast. Generally the stakeholders give attention for the contract document and procedure stated on the contract.

Recommendation for Further Studies

Further study should be conducted to investigate claim process and challenges on building construction sectors.

Comparisons of effectiveness of claim handling process among design build and design bid build contract.

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Appendix A

Publishable Journal manuscript

Assessment of Challenges of Construction Claims Handling: The Case of Federal Road projects

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ABSTRACT

One of the issues a construction project might encounter is claim. Construction claim is essentially a demand made by one party to another. Claims will arise whenever a party alleges either an event has occurred or a right is denied or an obligation has not been performed that entitle a remedy to be requested. They may be classified by the related parties, rights claimed, legal basis, or characteristics of claims. Whatever the claim, the ultimate goal is to be qualified for an extension of time or/and additional payment. Studies show that public infrastructure projects have major claims and challenges. Accordingly, this paper analyses the current practice of claim handling process in federal road construction projects, challenges faced claim handling processes & the way it can be improved. The perception & experience of claim professionals involved in road construction projects was assessed via questionnaire & interview surveys and case studies were also used. Accordingly, the result showed that claim handling process in federal road projects has mainly four steps, which are identification, notification, substantiation and assessment and evaluation. There are also three main participants in a typical claim handling process involved in federal road projects; employer, contractor, and claims certifier/engineer/employer representative. Additionally, the result also revealed that many challenges faced during handling of claims. Inaccessibility of documents used to identify a claim, delay in notification claims timely were critical challenges of identification and notification

process respectively. Incomplete records/report submission, unsatisfactory evidence to convince other party, poorly submission by contractor/lack of details and particulars were the top ranked challenges of substantiation and assessment process correspondingly. Developing good record keeping system, having good knowledge on terms and condition of contract document, take proactive claim management measure are ranked high by the respondents for improving the claim handling process. Furthermore, to support the survey result the research used some selected case studies and conduct in depth investigation and analysis. The finding expected to provide an important study results for client, contractor and consultant as well as professionals within the area of the study by easily identifying the core and sub-problematic areas.

Key words: Construction claim, Claim handling, Federal Road Project, Contract document

Introduction

The construction industry is a very competitive, complex where people with various skills, perspectives, and levels of construction process knowledge interact. Participants from a wide range of professions participate in this complicated environment with their own aims and expectations for maximizing their individual advantages (Asseged, 2016). According to Girmay (2003), the site-specificity and custom-built nature of civil engineering projects makes them unique. Every project is planned and carried out in a particular location and under a particular set of circumstances. Because of this, it is challenging to predict in advance how a project will end out. Therefore, it is frequently challenging to estimate precisely in advance what the total cost of a project will be.

Civil engineering projects tend to be claim sensitive because of their special characteristics and the uncertainty of their nature. A construction claim is essentially a demand made by one party to another. It is a request for additional compensation due to any modification to the original contract (khekale & Futane, 2015). For the purposes of this study, "construction claims" refers to any request by main contractors to the engineer made in accordance with any applicable contract provision for payment, extension of time, or damages due to any alleged duty breach by the employer (Client), the engineer, or neutral risk events (Aibinu , 2007).

Claims can be categorized according to the parties involved, the rights asserted, the legal foundation, and other factors. Whatever the claim, the ultimate goal is to be qualified for an Extension of Time or/and additional payment.

Claims may go through a life cycle (from the time of occurrence or inception to the time of engineer determination). During this time, there may also be a number of disputes, discussions, and counterclaims because this is not a very simple process (Aibinu, 2007). There may be repeated back and forth movements between the parties. To achieve proper resolutions and avoid claims growing into disputes claims handling and administration must follow a comprehensive step-by-step process (Tochaiwat, 2006).

Claim handling is the process which starts from identification of claim, followed by notification of the claim, substantiation of the claim and end with claim assessment. Once an event occurs a contractor shall identify and recognize the event before it becomes controversy. Construction

claim notice entails notifying the opposite party of a potential problem in a non-adversarial manner. The majority of contracts stipulate that claim must be notified within 28 days of the contractor becoming aware of, or should have become aware of, a circumstance. It is crucial to notify owners of possible claims within a reasonable amount of time, as stipulated under the contract.

Once a contractor notifies the claim, he needs to substantiate with supportive evidence that helps to convince the engineer and employer within the stated time. After the contractor submit the detailed claim, then, the engineer assesses and gives his recommendation within the stipulated time frame. As previously stated the contactor has the option of accepting or rejecting the engineer's response and proceed to the next dispute resolution system. It may not be a really straightforward process, and a number of challenges or problems will be encountered during the process.

Contractors must have solid, organized policies and procedures in place for the handling of claim and change order scenarios in order to protect themselves and increase the likelihood of an appropriate and profitable recovery in the event of claims and change orders. It is crucial that contractors must submit claims in accordance with the procedures outlined in the contract conditions, it shall explicitly state the additional costs and time, and provides sufficient justification. Furthermore, clients must implement a comprehensive strategy for tracking and handling contractor claims (Zaneldin, 2006).

Numerous studies are conducted globally to examine challenges with claim handling processes, including lack of claim awareness, lack of contract knowledge, and lack of experienced staff. The challenges also include an inadequate recording system, a lack of evidence, disagreements between parties, delay in notification and assessments, among others (Hai, 2019).

A country like Ethiopia cannot be free to these issues; studies show that public infrastructure projects have major claims and challenges in the process. Research conducted by Tsige (2020), supports this argument. The study revealed that an increased number of claims of contractors have shown in contracts with alleged extension of time and its subsequent additional cost for different reasons in federal road projects. However, most contractors present their claims after long time of the occurrence. This remains to sort out evidence and knowledge of the objectives of the conditions at the time of the event. Despite the cause and management method of claims there are challenges and difficulties faced during the application of the handling process. Hence, the aim of this study is to assess the challenges of claim handling process and assessing improvement to overcome the problems.

Therefore the focus of this paper is on assessment critical challenges of Construction Claims Handling Process and to find improvement mechanisms for the challenges in federal road projects. In the road to hit the above mentioned main objective, this study simultaneously embraces the following specific objective

- To assess challenges of claim identification process the case of federal road projects.
- To assess challenges of claim notification process the case of federal road projects.
- To assess challenges of claim substantiation process the case of federal road projects.

- To assess challenges of claim assessment and evaluation process the case of federal road projects.
- To assess claim handling improvement mechanisms the case of federal road projects.

Research Methodology

The Research Design

In this context, thus, the research will follow both qualitative, quantitative approaches and (mixed approach) , which emphasizes in-depth investigation of information through the collection of currently available relevant data. A research design should ensure that the evidence collected addresses the research questions asked and it is essential that it ensures coherency and rigour.

The Research Population

A population is the entire collection of items that is the focus of concern. The target population

determines the scope of the survey. To define a population, defining the population unit & setting population a boundary is very crucial (Defining and Framing the Population, 2015).

Accordingly, depending on the research topic and the purpose of the study, the main participants/population/ of this study were Ethiopian Roads Administration (the Employer or client), main Contractors and Consulting firms currently involving in the federal road construction projects. Particularly from the Employer side head quarter offices all the Construction Project management directorates were the population.

From Contractors and Consultants: - Grade-1 contractors were selected for the analysis. Since, they have a lot of experience in the road sector and have a better chance in participating in different road projects contracts. At the same time for consultant, the research tries to address currently involving consultants.

Research Sample and Sampling Method

As indicated above, the target populations for this study were contractors, consultants, and employers (ERA) for the questionnaire and ERA's road projects for document analysis. Currently, a number of road construction projects are under construction by different grades of contractors and supervised by different classes of consultants. Since the target population of this research is higher grade contractors and consultants (Grade 1 and Class 1, respectively), The number of GC1 contractors and class one consultants currently involving in federal road projects, which acceced from each directorate, shows that around 53 active contractors and 40 consultants are currently participating in federal road projects.. Therefore, due to time and resource constraint the researcher used the following statistical equations based on (Genn, Israel) sample size determination formulas:

no - Sample size

Z - Z value (e.g. 1.96 for 95% confidence level)

P - Percentage picking a choice, expressed as a decimal (0.50 used for sample size needed).

q- 1-p

e- Margin of error (+5%)

No = (1.962) (0.5) (0.5) = 385

(0.05)2

The following formula is used to determine the number of samples to be taken if the sample size is small.

Using the above formula contractor:-46

For consultants:-36

The researcher used a purposive sampling technique to choose the respondents for the employer. It is known that ERA has five regional directorates and one express way directorate. Each directorate has its own project management structure starting from directorate to low level project staff. Each directorate has its own team leader, lead engineer, and other technical staff. Accordingly, the researcher purposively picks five respondents from each directorate who have been directly involved in the claiming process. So, a total of 25 respondents were selected for the questionnaire survey.

Type and Source of Data

Primary Data sources

Data sources are the respondents or other entity which involved in the research and provide information and perception/opinion.

The research collected the primary data's from the following data sources:-

From ERA: Particularly from the employer side headquarter offices, all the construction project management directorates were involved. Specifically, staff involved in contact administration (particularly claim administration), the engineering department, team leader, project manager, and site engineers involved in data collection. The respondents were selected purposively and using a snowballing system. The reason behind using the above techniques is to pick the person who has better awareness and information about the case.

Consultant and contractor: For the contractor and consultant, this research included staff working on claims and related issues, a project manager, a site engineer/resident engineer, and a contract administrator.

Secondary data source

The researcher compiled/gathered secondary data from the following sources;-

Records of inspections, Minutes of site meetings, Project correspondence, Conditions of contract, claim substantiation documents, claim related journals and researches.

Data Collection Instrument

Questionnaires

A questionnaire is given to a chosen road sector players in this thesis, including employers (ERA), contractors, and consultants.

For the questionnaire survey respondents are purposively selected from employer's organization, contractors and consultants who have involving in the federal road construction sector. Questioners are one and the most suitable data collection mechanism for this research. The questionnaires were prepared from extensive literature review on construction claim and consulted by different expert in the area. The questionnaire consisted both open and close ended questions. Close end questions help the respondents to choose or select their perception directly from the listed alternative whereas, open end question give chances for the respondents to give more information regarding to the issues.

Interview

Thus, there were semi structured interview question for the proposed respondent and sample. The reason behind semi structure interview is to guide the interviewee to the specific issue that related to the topic and to have validated and in depth information. The respondents were selected from different department that has relation with the issue purposively. A semi-structured (focused) interview, specifically a face-to-face type of interview, was conducted with experts in the samples to have a better insight into the current construction claim handling process and challenges. The data from the interview also filled the gap identified from the document/archive and triangulated the data gathered through a query survey. While conducting the interview Yin, (2003) suggests that key probing issues are selected from the document/archival study, concepts and other best practices addressed in the literature review.

However, interviews, especially face-to-face interviews are vulnerable to interviewer bias and response bias. Therefore, as much as possible, it is the researcher's responsibility to try to avoid such bias from happening. The interview was held by Amharic in order to create good communication environment and minimize communication challenges .More than 17 peoples were interviewed and it took about 25-45 minutes per individual.

Desk Study

Desk studies on claim administration was used in this research to support or supplement responses and arguments found by questionnaire and interview through in-depth analysis of some cases of a project. Of course, because the cases are specific to one component of a problem

or practice, the conclusions reached may not apply generally but rather to a specific incident. For this reason, desk studies under this research used to supplement the findings obtained through questionnaire and interview in a way to bridge the gulf.

Data Analysis Method

According to Sullivan, (2001) data analysis may be the most difficult and fascinating part of research. It refers to deriving meaning from the data that had been collected in a study and the analysis assumed many forms. To achieve the research objectives both qualitative and quantitative methods of data analysis will apply. To analyze the questionnaires quantitatively the studies are uses simple descriptive statistics such as frequency, tables, and mean score formula.

$$MS = \frac{\sum(fxs)}{N}$$

Where F = Frequency of responses for each score.

S = Score given to each factor (from 1 to 5)

N = Total number of responses concerning each factor

The qualitative explanation is employed for key informant interview responses and open ended questions which are analyzed thematically. Analysis of key informant interviews data done using the theoretical proposition strategy recommended by Yin, (2003) which requires interview data analyzed under key themes.

Quality Assurance

Validity

There are various ways in which researchers try to show that their findings are reliable (Coolican, 1994). Probably the most satisfactory technique is to determine if the results of a qualitative analysis can be duplicated. This can be done by comparing the findings from an interview study with those from a desk study.

Validity of the Instrument

Correctness and reasonability of the data are indicators of data validity. It refers to whether the questionnaire in this case measures what it intends to measure. Content validity is based on the adequacy with which the items in an instrument measure the attributes of the study (Nanally, 2000). The researcher conducted face validity (i.e. first is experts or people who understand and have knowledge on the topic read through the questionnaire and evaluated whether the questions effectively capture the topic under investigation or not.

Reliability

Data is considered reliable when it is complete, accurate and unaltered. To ensure its accuracy it must be consistent and correct. Reliability is an extent to which any measuring procedure yields the same results on repeated trials (Carmines & Zellers, 1999). The value of the reliability coefficient theoretically can range between -1.00 and +1.00. For most purposes, reliability coefficients above 0.7 are considered satisfactory (Taherdoost, 2016). The reliability coefficient of the scale was established by Cronbach alfa using Stastical Package for Social Science (SPSS) package. The result from the spss indicated that it's between 0.711 and 0.859 which is acceptable.

Result and Discussion

Challenges of construction claim handling process

Profile of the questionnaires Respondents

In this study, a total of 107 questionnaires were distributed to different professionals related to Claim handling process those involved in federal road construction projects. From this 80 questionnaire were returned 2 of them were invalid the rest 78 used for the analysis. Among the respondents, 21(26.92%) were from the client, 24(30.76%) were from the consultants, and 33 (42.3%) were from contractors.

Table 4. 25 Summary of the questionnaire response.

Parties	Frequency	% percentage	Cumulative %
Client [ERA]	21	26.92	26.92
Contractor	33	42.30	69.23
Consultant	24	30.76	100
Total	78	100	

Educational Background of the Respondents

Table4. 26 Educational background

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	BSc	49	62.8	62.8	62.8
	MSc	29	37.2	37.2	100.0
	Total	78	100.0	100.0	

The educational background of responders from federal road projects is shown in Table 4.2 above. According to the survey, respondents' educational backgrounds range from BSc to MSc. About 49 (62.8%) has a BSc, while 29 (37.2%) has an MSc. As a result, the researcher has more confidence that the respondents understand the concept given their level of education.

Respondents Experience

Table4. 27 respondent's experience

respondents experience				
	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	0to5	14	17.9	17.9	17.9
	5to10	52	66.7	66.7	84.6
	11to15	10	12.8	12.8	97.4
	>15	2	2.6	2.6	100.0
	Total	78	100.0	100.0	

Table 4.3 indicates that the experience of the participants in the research was 17.9% of the respondents had 0–5 years of experience, whereas 66.7% had 5–10 years of experience. 12.8 & 2.6% have 11–15 and > 15 years of experience respectively on federal road projects.

Table4. 28 time related efficiency

How do you rate Time related efficiency of claim handling process in federal road projects?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Efficient	4	5.1	5.1	5.1
	Efficient	18	23.1	23.1	28.2
	Not Efficient	56	71.8	71.8	100.0
	Total	78	100.0	100.0	

As we can see from Table 4.4, 5.1% of the respondents believe that the claim handling process of federal road projects is very efficient. Whereas 23.1 % of the respondents believe that the time-related efficiency of the claiming process is efficient, the rest 71.8% of the respondents agreed that the claim handling process in road projects, particularly in federal projects, is not efficient. Efficiency is the maximum level of performance that requires the fewest inputs and produces the greatest amount of output. Efficiency requires reducing the number of unnecessary resources used to produce a given output, including personal time and energy (investopedia).

In our case time efficiency implies that how fast the claiming cases settled down as the contractual document specified. The above result indicates that the process of claiming takes a longer time for settlement and resolution. Studies in Malaysia shows that the overall submission and assessment of the claims take more time than time as stipulated in (PAM 2006).

Table4. 29 responsible parties for time related in efficiency.

If your answer for the Q.1 is not efficient who is most of the time responsible?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Contractors	17	21.8	30.4	30.4
	Consultants	12	15.4	21.4	51.8
	Employer	27	34.6	48.2	100.0
	Total	56	71.8	100.0	

Most of the respondents who said the claim handling process is inefficient agreed that employers, contractors, and consultants are to blame for the claim not being settled on time.
27 respondents blame the employer for the inefficiency of the claim. As the authors stated at the beginning of this section, the claim handling process is dependent on the employer for approval. Because approval has its own hierarchy, drafted by project engineer, reviewed by team leader, recommended by regional director and finally supported by Construction Project Management Deputy Director General (CPM, DDG). So, approvals may take longer. Contractors and consultants are the second and the third responsible party for the inefficiency of the claim timely settlement.

Challenges of Claim Handling Process

Claim Identification Challenges (Contractors)

Table4. 30 challenges of claim identification process

	N	Mean	Rank
Inaccessibility of documents used to identify a claim	78	3.885	1
Poor communication between site and head office	78	3.692	2
Insufficient construction contract knowledge by project site staff	78	3.615	3
Difficulties in detecting any problem on site which potentially becomes a claim	78	3.564	4
Insufficient skilled personnel for detecting a claim	78	3.423	5
Valid N (listwise)	78		

Table 4.6, shows the challenges of identification process of claim handling. According to respondents result inaccessibility of documents used to identify a claim was the first challenge. Documents are very crucial for the claim process and administration of the project. Accordingly, the stakeholders need to have good record keeping system.
Poor communication between site and head office staff is the second problem of identification sub process once the event occurred the concerned party need to communicate the event earlier and as soon as possible .Insufficient construction contract knowledge by project site staff the third major problem. A difficulty in detecting any problem on site which potentially becomes a claim was also a challenge.

Claim Notification Challenges (Contractors)

Table4. 31 challenges of claim notification process

	N	Mean	Rank
Delay in notification the claim timely	78	4.103	1
Failure to give notice	78	3.897	2
Inaccessibility of supporting documents needed for notice	78	3.641	3

Giving notice informally/give notice in word	78	3.628	4
Poor communication/instruction to proceed with submitting the notice	78	3.577	5
Contractors give ambiguous and incomplete notice	78	3.462	6
The short time of notification period	78	3.167	7
Ambiguous procedures in claim notification	78	3.000	8
No standard format for preparing notice	78	2.962	9
Valid N (listwise)	78		

According to the respondents' response, delay in notification of the claim timely is the major problem of claim notification process, with a mean score of (4.103). This challenge was considered as a critical challenge by (Abel, 2017). The author found that failure to follow conditions of contract (like notifying as per the time table specified in the contract) is usually seen as a problem in road projects. The notification time may vary from one contract document to another, but most of the time it doesn't exceed 28 calendar days. The Findings of Hai (2019) ranked delay in notification of the claim as the second most critical challenge for analysis of extension of time claims.

The aforementioned finding was supported by one of the interviewees. She claimed that "*our contractors are quite distant from informing the concerned parties of the event in a timely manner. They are informed when the incident sparks a controversy". Consultant side*

Failure to give notice is the second agreed problem faced during the process, as it has a mean score of (3.89). This means most of the claimants didn't submit notification papers to the consultant. The result is in line with the finding of Tochaiwat K. (2005) that there is a trend of submitting the particular document without notifying the other party. Such conditions may create an opportunity for rejection of the claim and make contractors responsible for the situation.

"*Even if contractors didn't submit their claim notification paper or failed to submit their claims within the stated time frame, the engineer will tolerate and accept their claim if the causes of the claim are oblivious and convincing*, " team leader, Client's representative

Inaccessibility of supporting documents needed for notice and giving notice informally (giving notice in words) are the third and fourth basic challenges of notification. The result is also supported by Bakhary *et al*. (2015). The inaccessibility of supporting documents needed for notice was the first challenge pointed out by his respondent.

Bakhary *et al.* (2015) believe that claim notifications need to be done in writing and as detailed as possible. In the preparation of supporting documents for claim notification, a good documentation system and accurate site records are very important. The construction sector seems to have a reputation for routinely not properly documenting processes and transactions. Verbal instructions given by the contractor, client / client representative and the inaccurate recorded information are the main problems in claim process. If the client does not come out with written instruction, the contractor should make an initiative to get the proper written instruction from them. This would provide support and evidence for the contractor's claims.

Poor communication/instruction to proceed with submitting the notice is the fifth challenges during notification process. Communication is an essential activities for claiming process because every process need active and accurate communication mediums and process so if there is poor communication the information shall not circulate timely and in the way they required this highly affect the notification process. The short time of notification period, ambiguous procedures in claim notification and no standard format for preparing notice are the least problems faced during notification process as ranked by the respondents.

Claim Substantiation Challenges (Contractors)

Table4. 32 challenges of Claim substantiation

	N	Mean	Rank
Incomplete records/report submission	78	4.103	1
Unavailability of written document for substantiation	78	4.051	2
Failure to keep up-to-date program	78	4.026	3
Failure to submit reports	78	3.705	4
Contractors' over estimation of claim damages	78	3.679	5
Requires a vast number of documents to be reviewed and people to be interviewed	78	3.564	6
Lack of skilled staffs for preparing claim submission	78	3.333	7
Inadequate time to thoroughly prepare due to high workload	78	3.321	8
Unavailability of claim standard forms/format	78	3.231	9
Incomplete contract documents for substantiation	78	3.167	10
Valid N (listwise)	78		

From the survey result, incomplete records/report submission is the first ranked challenge during the substantiation process with a mean score of (4.103). Contractors are not submitted complete and full detailed document during substantiation process. Kululanga (2001) elaborated that Claim substantiation should be logically built up, well organized, and factually convincing. Thus, a claim should be written in a format that emphasizes the fact that a contract requirement was breached. Then, a contractor should prove that the owner's actions are what led to the damage. Atkinson (1985) cited in Kululanga (2001) has fittingly said that presentation is best separated into two, the entitlement and the quantum. The legal and factual grounding should appear in the first section, and the expected recovery for the claim should be in the second. The survey results also indicate the unavailability of written documents for substantiation is the second challenge during claim substantiation it has an overall mean of (4.051). Unavailability of information is not only a problem for this particular sub process; it's also a crucial challenge in all claim handling

processes. Hai (2019), stated claim notification, examination, and presentation are highly affected by the lack of an adequate project document. He also enumerated the causes of this documentation challenge. This is because the party was instructed verbally, and the record-keeping process was inadequate. According to Jergeas and Hartman (1994), maintaining accurate records is essential for preventing or resolving disputes.

Failure to keep an up-to-date program is the third challenge of this sub process, with an overall mean of (4.02). Once the schedule is changed or modified, the contractor shall modify and update their program because if the extension of time claim is raised, the determination may be made based on the currently updated work program. L. Lew (2012) in his study found that entitled 'Issues and Challenges Faced in the Management of Claims for Construction Projects' Failure to keep an up-to-date program is the second challenge out of forty-six challenges. Therefore the contractors need to update their working program timely as required.

Fourthly, the respondent agreed that failure to submit reports is a challenge with a mean score of (3.705). Failure to submit the substantiation means that contractors don't submit their particulars for claim. Contractors' over estimation of claim damages also fifth problem faced the stakeholder during substantiation. This case also confirmed during case studies which mentioned at the end of this section. The sixth problem of the substantiation process is that it requires a vast number of documents to be reviewed and people to be interviewed. The claiming process needs a number of records to convince the other opposing side. Therefore, the claimant needs to dig out and search for each piece of evidence. In such a case, the claimant consumes more time and resources.

Inadequate time to thoroughly prepare due to high workload, lack of skilled staff for preparing claim submission, unavailability of claim standard forms/format, and incomplete contract documents for substantiation got seventh to tenth rank by the respondents.

Table4. 33 contractor's substantiation of the claim

Do you think contractors substantiate and submit detailed claim according to time stated in the contract?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	20	25.6	25.6	25.6
	no	58	74.4	74.4	100.0
	Total	78	100.0	100.0	

The majority of respondents (58%) think that the contractor does not fully substantiate and submit the claim within the time range specified in the contract document, while only 20% of respondents think that the contractor does so. Studies conducted in Malaysia by L. Lew (2012) support the finding. He concludes that most of the extension of time claim in Malaysia submitted within reasonable time not as time stated in contract. He also believes to submit claims for EOT within 28 days is too rush. It takes time and may require several parties to prepare supporting records.

As one of the interviewed person said, "*Most of the contractors do not follow the time frame for submitting particular documents for their claim; they submit their claim when they require an extension of time and cost compensation." contract engineer ,consultant side*

Timely Submission of detailed evidence helps the contractor to keep its claim process timely and get a response early. Braimah (2008) emphasized that timely submission and prompt assessment of EoT claims are essential as this will reduce the difficulties of claim resolution since all claims related fact still will be fresh in mind of everybody involved. If the contractor fails the time frame, the consultant has the right to reject the claim.

"*As a trend, contractors justify their request for a cumulative extension of time when the project Completion time is reached,"* senior engineer, and client representative.

The below table illustrates, for those who say 'No', their belief as to why the contractors failed to meet the time frame.

Table4. 34 reasons why the contractor failed to substantiate claim according to time stated in the contract

	N	Mean	Rank
Poor paperwork control by the contractor	58	3.845	1
Focus on progress of work and not on claim/contractor's staff too busy on other tasks	58	3.741	2
General lack of details	58	3.707	3
Time taken in claim substantiating process by the contractor	58	3.569	4
Lack of contractor's management resources	58	3.517	5
Actual delay/cost could not be determined until end of construction	58	3.362	6
Valid N (listwise)	58		

Poor paper work controlled by the contractor is mentioned as the first reason why the contractors didn't substantiate their claim timely. Paperwork, basically based on the availability of a contemporary record keeping system. It is obvious that for the contractors don't have a good record keeping system this leads them to poor paper work. The problem is not limited to local cases; it is also common problems associated with the production of project records in the UK (Stuart Carmichael and Maria Murray, 2006).However, the accuracy of the entitlement determination is still dependent on the quality of the program and progress data provided by all partners.

The next reason given by respondents was that they concentrate on the progress of their work rather than the claim. A road project has a large number of tasks to be done and requires large resources and time, so commonly the contractors focus on executing their tasks and giving less attention for claiming process .The result was also confirmed by (M.M. Kumaraswamy, and K.

Yogeswaran, 2003). Focus on progress of work and not on claims/contractor's staff too busy on other tasks/lack of staff (in contractor's organization) to deal with EOT claims is mentioned.
General lack of details also the third challenges of substantiation process there will be lack of detailed evidence during claiming they try to dig out and find the detail. Time taken in claim substantiating process by the contractor is the fourth challenges of contractor substantiation process. It is known that for the single claim a number of documents, evidences and computation documents submitted together. To compile and make good claim submittal it needs time and resource and this lead for delay. Lack of contractor's management resources and Actual delay/cost could not be determined until end of construction were the last challenges respectively.

Claim Assessment and Evaluation Process (contractors, consultants, and employer)

Table4. 35 challenges of Claim assessment and evaluation process

	N	Mean	Rank
Unsatisfactory evidence to convince other party	78	3.910	1
Poorly submission by contractor/lack of details and particulars	78	3.821	2
Contractors' Delays in Response to Claims clarification	78	3.769	3
There is a tendency to protect own interest	78	3.654	4
So Many Documents /Engineer requests excessive details	78	3.526	5
Failure of the contractor to submit claim chronological order	78	3.500	6
Much higher bargaining power of the employers	78	3.436	7
Partiality of Engineer during assessment	78	3.346	8
Engineer lack of construction knowledge to assess the claim	78	3.128	9
Valid N (listwise)	78		

Assessment and evaluation is the last claim handling process in federal road projects. This process contains examination of contractor's substantiated document and gives determination& approval. Like the above sub process the respondent requested to rank challenge during application of this sub task. Unsatisfactory evidence to convince other party is the first challenge faced during assessments and evaluation. This means the contractor submit particular which couldn't show or support the case accurately this may lead them for additional clarification or rejection of their claim by the engineer and/or client. So the contractors need to support his evidence with accurate and reliable information and documents. The finding also supported with Abel (2017) result.
Respondent secondly mentioned that Poorly submission by contractor/lack of details and particulars is issue during assesement.The Engineer is obliged to assess the submitted claims for extensions of time, while the onus of providing adequate information for this evaluation rests with the claimant (contractor) this result line with finding of Yusuwan *et al.(*2013) .He illustrated that Poorly submission by contractor/lack of details and particulars such as support the claim was

ranked first by the respondents, implying that this is the biggest challenge faced by engineers in performing the assessment process. The findings also imply that the industry is still dealing with the same issues after many years, such as a lack of effective and efficient project activity record keeping, which results in inadequate contract administration. Contractors' Delays in Response to Claims Clarification is another challenge faced scoring (3.769) mean score. If the particulars submitted by the contractor are not clear and sufficient to conduct the assessments, the engineer has the right to request the contractor to submit detailed clarification. SMEC (2018) says that this clarification can be done not more than twice if there is insufficient time during the preliminary assessment period. So the contractors shall submit the requested clarification in accordance with the contract agreement. Failing to do this results in delays on assessments and abolishes the process. Contractors' delays in response to claims are not only our problem; it's also a challenge in the Malaysian construction industry (Tochaiwat K., 2005). There is a tendency to protect own interests, which is ranked as the fourth challenges as it has an overall mean of (3.654). All parties have a given responsibility to do or not to do. For instance, the FIDIC contract document in clause 3.5 [engineer determination] clearly states the engineer shall be impartial during the claim administration process, which means it shall be serve both the contactor and the client equally. The contractor shall also claim having concrete evidence not to cover his fault whereas the consultant shall determine fairly and finally, the employer shall also assess and give approval.

If they do their best, the claiming process becomes easy and acceptable. The fifth challenge, as a result of respondents' perception, is so many documents or engineer requests for excessive details. The engineer has the right to request additional document that support and clarify the cases.SMEC, (2018) state that the engineer has the right to ask the clarification document not more than two time.

Much higher bargaining power of the employers, failure of the contractor to submit a claim in chronological order, partiality of the engineer during assessment and the engineer's lack of construction knowledge to assess the claim is the rest challenges ranked by the respondents.

Table4. 36 engineer recommendation and determination

Does the Engineer assesses and gives you recommendation for claims according to time stated in the contract?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	28.2	28.2	28.2
	No	56	71.8	71.8	100.0
	Total	78	100.0	100.0	

Respondents asked whether the engineer assesse their claim timely as contract document mentioned.22% answered that the engineer gives the response timely whereas the rest 56% answered the engineer doesn't give them the response timely.

Respondents those who said 'No' also requested to give their perception on the reason why the engineer failed for the above cases. The result tabulated as follow:

Table4. 37 reasons why the Engineers failed to assess the claim claims according to time stated in the contract

	N	Mean	Rank
Delay in approval by Employer	56	4.071	1
Poorly presented submissions/lack of particulars	56	3.911	2
Late submission of claims by the contractors/engineer waits for final information from contractor	56	3.857	3
Insufficient personnel to process the assessment	56	3.429	4
Delay analysis methods used by contractor different with the method used by the engineer	56	3.357	5
Valid N (listwise)	56		

Most of the respondents agreed that delay in approval by the employer was the cause for the delay of assessment of the claims. Once the engineer assesse claims he/she refer the result to the client [ERA] for the approval purpose. The client then assesse and cross check contractors result, engineer's determination and its own result. If the client agreed with the engineer determination then it will approved if not the client give its determination and sent back to both party. The result also confirmed by one of the interviewee as follow:

'The approval process also has its own hierarchy, first the ERs engineers check consultants determination and if ok, approved by team leader and referred to regional directorate. Then regional directorate assesse the documents and again refer to deputy general director and general director finally gives its approval. As we can see the process need more time and resource'. Senior engineer of ERA

Secondly, poorly presented submissions/lack of particulars mentioned as cause for assessment delay. Clearly and properly articulated and combined claim make the assessment process easier and fast. Andy (2011) in his book clearly stated that the claimant shall be considered their claim presented before the court which means as they have to compiled there claim in good manner to convince the judge. The same thing for the engineer if the document is good, the engineer will happy and feels comfortable and assess the claim easily without getting bored.

Thirdly, late submission of claims by the contractors/engineer waits for final information from contractor is the third reason for the delay. The engineer has the right to ask the contractor for more clarification if the submitted document is unclear and biased. The contractors also responsible to resubmit the requested document timely, between this forth and back process the assessment time extend beyond the expected one.

Insufficient personnel to process the assessment and delay analysis methods used by contractor different with the method used by the engineer are mentioned as the least cause for delay on the assessment process respectively.

Improvement mechanism for contactors claim handling process

Table4. 38 Improvement mechanism for contactors claim handling process

Descriptive Statistics				
	N	Mean	Std. Deviation	Rank
Develop good record keeping system	78	4.692	.5419	1
Having good knowledge on terms and condition of contract document	78	4.487	.5031	2
Take proactive claim management measure	78	4.462	.6384	3
Assign staff which have good claim "claims consciousness," familiarity and Awareness of potential claim situations	78	4.449	.6168	4
Having well organized claim management procedures	78	4.449	.6576	5
Early Recording of Details of Claim leading Events	78	4.397	.5661	6
Create Good communication among stakeholders	78	4.308	.5654	7
Notice the claim earlier as soon as possible	78	4.308	.6306	8
Establishing Claim Settlement team	78	4.128	.8274	9
Preparation of Claim Standard Forms/format	78	4.128	.7448	10
Valid N (list wise)	78			

Table 4.17 shows claim handling improvement mechanisms. The mechanisms were extensively assessed and complied in questionnaire form, and respondents were requested to rank them according to their perception. As you can see from the above table, all the variables scored more than four mean values. This indicated that the entire respondent agreed the variables could reduce challenges and improve the claim handling process.

According to survey results, develop good record keeping system ranked as the first improvement mechanism, having a mean value of (4.69). The result indicated that the respondent strongly agreed that having a well-organized and good record keeping system is the best solution for the claim administration challenge. Many delay claims have been unsuccessful directly because there was a lack of accurate records produced contemporaneously at the time of the delay.

N. Zubaida, (2012) suggests that a key success factor in claims management and substantiation is the project documentation system and the maintenance of proper records. The better the documents related to the project are maintained, the easier it is for the claims managers to formulate their claims. The formulation and presentation of the claim to the employer can go more quickly due to the accessibility and convenience of access to the data required for substantiation. Having good knowledge of the terms and conditions of a contract document is the second improvement mechanism of claim handling by scoring (4.487). A claim arises when there is a variation between what the contract document says and actual work. Having good contractual knowledge helps the claimant as well as the respondent to know the cause and

responsible parties. Yusuwan *et al.,* (2012) also supports the above ideas. He mentioned that the claimant must firstly determine the contract provision under which he/she is entitled. To make such claims, the claimant shall have adequate information and knowledge of contractual documents.

Take proactive claim management measurement is the third by the respondent. The contactor, the employer, and the consultant before entering into the contract revise the clause, quantities, and other contractual documents to help them minimize and mitigate issues and risks that lead to claims later. Not only assign and organize claim teams earlier to make them ready and standby to resolve the claims stated as third improvement mechanisms. Having well organized claim management procedures is the fourth improvement mechanism based on the survey results with a (4.449) mean score. In federal road projects, FIDIC is an often used contract document. This document specifies the procedure the claimant shall follow. It is very important for contractors to submit claims according to the steps specified in the contract conditions, provide a detailed list of the additional costs and time, and present satisfactory evidence. Early recording of details of claim leading events is the fifth improvement mechanism. Keeping the record helps the claimant to get the evidence easily when needed.

Create good communication among stakeholders, notice the claim earlier as soon as possible, Establishing a claim settlement team and preparation of claim standard forms/format is the rest improvement method by survey result, with a mean value of (4.308, 4.308, 4.128, 4.128) respectively. By applying the above concept properly, the claim handling process of federal road projects can be improved.

Conclusion and Recommendation

Conclusion

This study was carried out to assess the claims handling procedures now in use in Ethiopia's construction industry, particularly for federal road construction projects. Following a thorough study of the survey results and document review's findings, The conclusion that is in line with the study's objectives is presented in the following chapter, just as it was previously presented and discussed. Additionally, recommendations were made and areas for further research were noted. Following a thorough review of the literature, document analysis, and interview data, the existing practice and difficulties were evaluated.

Most of the respondent (71.8%) of the respondents agreed that the claim handling process in road projects, particularly in federal projects, is not efficient. Respondents also believe employer, contractor and consultant are responsible for the time related inefficiency of the claiming process.

The majority of respondents think that the contractor does not fully substantiate and submit the claim within the time range specified in the contract document. Poor paperwork control by the contractor, Focus on progress of work and not on claim/contractor's staff too busy on other tasks, General lack of details, Time taken in claim substantiating process by the contractor Lack of contractor's management resources were the first reason of delay on substantiation of required documents.

Not only has the substantiation processed the assessments process also suffer due to delay. Delay in approval by Employer, Poorly presented submissions/lack of particulars and Late submission of claims by the contractors/engineer waits for final information from contractor led the engineer to fail timely assess the claim.

Federal road projects follow the following claiming process, start from recognition of the claims, notification, and substantiation then finally closed out by assessment and approvals.

Identification is the first and most important step of the claiming process. This procedure is followed to identify the event and circumstances that led to the claim as soon as possible. Respondents ranked the following challenges of this process, such as inaccessibility of documents used to identify a claim; poor communication between site and head office; insufficient construction contract knowledge by project site staff; and difficulties in detecting any problem on site which potentially becomes a claim, respectively challenging the identification.

Identification followed by notification of the claim: Here the claimant informs the engineer or the employer about the situation according to the time stated on the contract documents.

Delay in notification the claim timely, failure to give notice, inaccessibility of supporting documents needed for notice, giving notice informally/give notice in word, poor communication/instruction to proceed with submitting the notice were critical challenges facing the process.

Thirdly, the claimant (contractor) submits a detailed claim to the engineer for the assessment. In this process incomplete records/report submission, unavailability of written documents for substantiation, failure to keep an up-to-date program, failure to submit reports, contractors'

overestimation of claim damages, requiring a vast number of documents to be reviewed and people to be interviewed were challenges in the substantiation process.

Finally, the engineer assesses and gives its recommendation, which is referred to the Ethiopian road authority for approval. In this sub process, the final decision is expected from ERA's representative. Similarly, unsatisfactory evidence to convince other party, poorly submitted by contractor/lack of details and particulars, contractors' delays in response to claims clarification, there is a tendency to protect their own interests, so many documents/engineer requests excessive details, and the failure of the contractor to submit claim chronological order were big issues.

Time impacted and construction program analysis are highly used delay claim and disruption claim analysis techniques

Besides the process and challenge, the research assessed the improvement mechanism for the claiming process. Though developing good record keeping system, having good knowledge on terms and condition of contract document, taking proactive claim management measure, by assign staff which have good claim "claims consciousness," familiarity and Awareness of potential claim situations we can have good changes..

Recommendations

- The study generally showed that there are a number of difficulties in claim handling and administration. The stakeholders need to give more attention to this claim. Basic problems seen all through the process were failure to have a good record and documentation trends. The claim is directly related to the availability of evidence and records. Accordingly, the contractors need to develop a good record-keeping system.Tranning and development for staff working on claim is essential it helps them to have good skill and knowledge.
- The contractors need to notify and substantiate the claims as stipulated time on special condition of contract. Whereas the engineer and the employer need to assess and approve the claims according to contractual time.
- It is better if the contractors update and review each documents and information required for the coming work.
- During substantiation and assessments the contractors need to submit convincing information for the engineer. It helps the engineer to perform its task easily and fast. Generally the stakeholders give attention for the contract document and procedure stated on the contract.

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Appendix B

Research Questionnaire

ADDIS ABABA UNIVERSITY

Ethiopian Institute of Architecture, Building Construction and City Development

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Dear Participants,

As part of fulfilling the requirements for MSc. Degree in Construction management and I am carrying out the research on the topic" Assessment of Challenges of Construction Claims Handling Process: The Case of Federal Road projects

The specific objectives of this thesis are:-

- To assess challenges of claim identification process the case of federal road projects.
- To assess challenges of claim notification process the case of federal road projects.
- To assess challenges of claim substantiation process the case of federal road projects.
- To assess challenges of claim assessment and evaluation process the case of federal road projects.
- To assess claim handling improvement mechanisms the case of federal road projects.

Thus, your responses to the questions would be the basis for the research and will be kept strictly confidential, where only my academic advisor and I will have access to the information you provided and it will be exclusively used for the research. You may kindly aware of time constraints in such academic requirement researches; hence, I sincerely request you to complete and return the questionnaire as soon as possible to enable me finalize the research on time to meet the deadline.

Thank you for your invaluable time and cooperation.

Kind Regards,

Kasahun Worku/Researcher/

General Information

Company Name_____

Position _____

Educational Qualification (MSc, BSc….,)_____

_____

How many years of Experience do you have (…….)

Section 2; Construction Claim Handling Process and Challenges Related Questions

1. How do you rate Time related efficiency of claim handling process in federal road projects?

Very efficient ☐ efficient ☐ not efficient ☐

Other (Please specify)…….

2. If your answer for the Q.1 is below fair who is most of the time responsible?

Contractor ☐ consultant/engineer ☐ employer ☐

Other (Please specify) ……

3. Do you think contractors substantiate and submit detailed claim according to time stated in the contract?

Yes ☐ No ☐

4. If your answer is No for Q.3 what are the reasons for late submission?

Reasons	**Strongly Agree(5)**	**Agree(4)**	**Neutral(3)**	**Not agree(2)**	**Strongly not agree(1)**
Actual delay/cost could not be determined until end of construction	☐	☐	☐	☐	☐
Focus on progress of work and not on claim/contractor's staff too busy on other tasks	☐	☐	☐	☐	☐
General lack of details	☐	☐	☐	☐	☐
Lack of contractor's management resources	☐	☐	☐	☐	☐
Poor paperwork control by the contractor	☐	☐	☐	☐	☐
Time taken in claim substantiating process by the contractor	☐	☐	☐	☐	☐

Other (Please specify)

…….....

5. Does the Engineer assesses and gives you recommendation for claims according to time stated in the contract?

Yes ☐ No ☐

6. If your answer is No for Q.5 what are the reasons?

Reasons	Strongly Agree(5)	Agree(4)	Neutral(3)	Not agree(2)	Strongly not agree(1)
Poorly presented submissions/lack of particulars	☐	☐	☐	☐	☐
Late submission of claims by the contractors/engineer waits for final information from contractor	☐	☐	☐	☐	☐
Insufficient personnel to process the assessment	☐	☐	☐	☐	☐
Delay analysis methods used by contractor different with the method used by the engineer	☐	☐	☐	☐	☐
Delay in approval by Employer	☐	☐	☐	☐	☐

Other (Please specify)

……..

Please identify (carefully) and express your opinion on the degree (level) of agreement of the following challenges/problems faced claim handling process in federal road projects. (Please tick the appropriate box). Strongly agree = 5, agree =4, neutral = 3, not agree = 2, strongly not agree = 1

No	Claim identification process	Level of Agreement				
Claim Identification Process		**Strongly Agree(5)**	**Agree(4)**	**Neutral(3)**	**Not agree(2)**	**Strongly not agree(1)**
1	Insufficient construction contract knowledge by project site staff	☐	☐	☐	☐	☐
2	Difficulties in detecting any problem on site which potentially becomes a claim	☐	☐	☐	☐	☐

3	Insufficient skilled personnel for detecting a claim	☐	☐	☐	☐	☐
4	Poor communication between site and head office	☐	☐	☐	☐	☐
5	Inaccessibility of documents used to identify a claim	☐	☐	☐	☐	☐
Other (Please specify)						
Claim Notification Process		**Strongly Agree(5)**	**Agree(4)**	**Neutral(3)**	**Not agree(2)**	**Strongly not agree(1)**
6	The short time of notification period	☐	☐	☐	☐	☐
7	Contractors give ambiguous and incomplete notice	☐	☐	☐	☐	☐
8	Inaccessibility of supporting documents needed for notice	☐	☐	☐	☐	☐
9	Poor communication/instruction to proceed with submitting the notice	☐	☐	☐	☐	☐
10	Delay in notification the claim timely	☐	☐	☐	☐	☐
11	Failure to give notice	☐	☐	☐	☐	☐
12	No standard format for preparing notice	☐	☐	☐	☐	☐
13	Giving notice informally/give notice in word	☐	☐	☐	☐	☐
14	Ambiguous procedures in claim notification	☐	☐	☐	☐	☐
Other (Please specify)						
Claim Substantiation Process		**Strongly Agree(5)**	**Agree(4)**	**Neutral(3)**	**Not agree(2)**	**Strongly not agree(1)**
15	Incomplete contract documents for substantiation	☐	☐	☐	☐	☐
16	Failure to submit reports	☐	☐	☐	☐	☐
17	Incomplete records/report submission	☐	☐	☐	☐	☐
18	Failure to keep up-to-date program	☐	☐	☐	☐	☐
19	Unavailability of written document for substantiation	☐	☐	☐	☐	☐

20	Requires a vast number of documents to be reviewed and people to be interviewed	☐	☐	☐	☐	☐
21	Unavailability of claim standard forms/format	☐	☐	☐	☐	☐
22	Inadequate time to thoroughly prepare due to high workload	☐	☐	☐	☐	☐
23	Contractors' over estimation of claim damages	☐	☐	☐	☐	☐
24	Lack of skilled staffs for preparing claim submission					
Other (Please specify)						
	Claim Assessments and Evaluation Process	**Strongly Agree(5)**	**Agree(4)**	**Neutral(3)**	**Not agree(2)**	**Strongly not agree(1)**
25	Engineer lack of construction knowledge to assess the claim	☐	☐	☐	☐	☐
26	So Many Documents /Engineer requests excessive details	☐	☐	☐	☐	☐
27	Partiality of Engineer during assessment	☐	☐	☐	☐	☐
28	Much higher bargaining power of the employers	☐	☐	☐	☐	☐
29	Contractors' Delays in Response to Claims clarification	☐	☐	☐	☐	☐
30	Unsatisfactory evidence to convince other party	☐	☐	☐	☐	☐
31	Failure of the contractor to submit claim chronological order	☐	☐	☐	☐	☐
32	There is a tendency to protect own interest	☐	☐	☐	☐	☐
33	Poorly submission by contractor/lack of details and particulars	☐	☐	☐	☐	☐
Other (Please specify)						

7. How often the following delay claim analysis method used for substantiation and/or assessments process in federal road project?

Methods	Never	Rare	Sometime	Often	Always
As-planned vs. As-Built	☐	☐	☐	☐	☐
Impacted As-Planned	☐	☐	☐	☐	☐
Time Impact Analysis	☐	☐	☐	☐	☐
Window analysis	☐	☐	☐	☐	☐
Collapsed As-Built	☐	☐	☐	☐	☐

8.What challenges faced during delay analysis?

challenges	Strongly Agree(5)	Agree(4)	Neutral(3)	Not agree(2)	Strongly not agree(1)
Lack of adequate project information	☐	☐	☐	☐	☐
Unrealistic base line program	☐	☐	☐	☐	☐
Lack of properly updated program	☐	☐	☐	☐	☐
Lack of skill	☐	☐	☐	☐	☐
High cost involved in usage of methods	☐	☐	☐	☐	☐
Difficulties in using the technique	☐	☐	☐	☐	☐

Other (Please specify)

……....

9. How often the following disruption claim/loss of productivity/ analysis method used in federal road project?

Methods	Never	Rare	Sometime	Often	Always
Estimated Versus Actual Man-hour Expenses	☐	☐	☐	☐	☐
Earned Value Analysis	☐	☐	☐	☐	☐
Construction Programme Analysis	☐	☐	☐	☐	☐
Measured Mile Analysis	☐	☐	☐	☐	☐
Baseline productivity analysis	☐	☐	☐	☐	☐

Other (Please specify)

……....

SECTION 3: Improvement Mechanisms for Contractor's Claim Handling Process

No	Claim Handling Process Improvement Mechanisms	Level of agreement				
		Strongly agree	**Agree**	**Neutral**	**Not agree**	**Strongly not agree**
1	Having well organized claim management procedures	☐	☐	☐	☐	☐
2	Assign staff which have good claim "claims consciousness," familiarity and Awareness of potential claim situations	☐	☐	☐	☐	☐
3	Having good knowledge on terms and condition of contract document	☐	☐	☐	☐	☐
4	Create Good communication among stakeholders	☐	☐	☐	☐	☐
5	Notice the claim earlier as soon as possible	☐	☐	☐	☐	☐
6	Develop good record keeping system	☐	☐	☐	☐	☐
7	Establishing Claim Settlement team	☐	☐	☐	☐	☐
8	Preparation of Claim Standard Forms/format	☐	☐	☐	☐	☐
9	Early Recording of Details of Claim leading Events	☐	☐	☐	☐	☐
10	Take proactive claim management measure	☐	☐	☐	☐	☐
Other (Please specify)						

Please kindly check no points are escaped!

Thank you very much for your time!

Interview Questions

Question 1. What are the processes or procedures used to settle the contractor's claim on a federal road project?

Question 2. Do you think the contractors identify and notify the claims properly and timely? If not, what are the challenges?

Question 3. What are the challenges during notification and identification of claims?

Question 4. What are the documents used to substantiate and analyze the claims?

Question 5.What types of challenges or problems faced during claim substantiation and assessments?

Question 6. Do you think the engineer will consult and give you a timely response to the claim? If no, what are the problems with failing to give the response timely?

Question 7. How do we improve the claim handling process in federal road projects?