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# Jimma Institute of Technology

## Department of Civil and Environmental Engineering

## Postgraduate Program: construction Engineering & Management

Time, Program, Cost and Cost Overrun: Its Regulation and Management Under MDB-FIDIC (2010) and PPA (2011) Condition of Contract and the Applicable Law; Special Emphasis to Delay and Disruption Claim

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***Abstract: Construction projects are characterized by business relationships and commitments that are spread over wide time horizons. Such construction Contracts are usually formulated based on the provisions of General and Particular Conditions prepared by professional associations, financiers, and institutions or as is the case in Ethiopia, by regulatory bodies. The most prevalent forms of such General Conditions are those prepared by Fédération Internationale des Ingénieurs-Conseils (FIDIC), IEC Conditions, Ministries (for example, Ministry of Works and Urban Development), and the like.***

***This paper includes the written assignment on the main parameters of construction industry which are Time, Program, Cost And Cost Overrun:, Its Regulation And Management Under MDB-FIDIC (2010) And PPA (2011) Condition Of Contract And The Applicable Law; Special Emphasis To Delay And Disruption Claim, and also the above parameters try to imply the effects of these parameters on the construction industry with special emphasis to Delay & Disruption Claims.***

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**Abbreviations**

**FIDIC** – Fédération Internationale des Ingénieurs-Conseils
**PPA** – Public Procurement Agency
**CCE** – Civil Code of Ethiopia
**EOT** – Extension of time
**CPM** – Critical Path method
**GCC** – General Condition of Contract
**LD** – Liquidated Damage
**MDB** – Multilateral Development Banks
**SBD** – Standard Bidding Document
**SSC** – Special condition of contract
ERA – Ethiopian Roads Authority

## I. INTRODUCTION

### *A. General*

Construction projects are characterized by business relationships and commitments that are spread over wide time horizons. Large-scale engineering projects have distant time horizons and require significant up-front commitments, while posing large potential downside losses. (Floricel S, Miller R., 2001)

Such construction Contracts are usually formulated based on the provisions of General and Particular Conditions prepared by professional associations, financiers, and institutions or as is the case in Ethiopia, by regulatory bodies. The most prevalent forms of such General Conditions are those prepared by Fédération Internationale des Ingénieurs-Conseils (FIDIC), IEC Conditions, Ministries (for example, Ministry of Works and Urban Development), and the like.

The competitive bidding system forces contractors to price their work in a way that will give them the best opportunity to be the low bidder. Sometimes, too much attention is placed on getting the work and not enough attention is given to how the work can be done profitably.

The construction process typically involves parties from different disciplines temporarily joining together to deliver a construction project. Each party's responsibility within the construction process is intertwined with others, either as a prerequisite for another party's work or as an integral part of such work. When one of the parties in the construction process fails, the others are adversely affected. When a problem faced by one party in the construction process is ignored or recognized late, the problem may escalate into disputes and claims. Disputes and claims are detrimental to all parties.

1) *Project Management:* Project management, as defined in Wikipedia, "is the discipline of planning, organizing, securing, managing, leading, and controlling resources to achieve specific goals" (Wikipedia). Its function is to assure the accomplishment of project objectives, in other words, to assure project profits (Nielsen, 2006). The purpose of project management is to predict as many dangers and problems as possible to insure a successful project (Lock,2004).
2) *Programmes:* Programmes describe the sequence in which tasks must be carried out so that a project (or part of a project) can be completed on time. Contracts may require that the contractor provides a master programme for the construction of the works as soon as possible after the execution of the contract, if it has not been previously provided.
3) *Delays and Disruptions:* Delay as referred in construction is prolonged construction period and disruptions are events that disturb the construction programme. Delays and disruptions are among the challenges faced in the course of executing construction projects. Delays as well as disruptions are sources of potential risks that current studies are looking into ways to manage.
4) *Role of Engineer in the Claims Process:* Considering the engineer intimate involvement with a typical project from beginning to end, it is not surprising that engineers become very involved in the claims process. The claims process refers to the process whereby the construction contractor requests additional compensation or other benefits under the contract from the project owner.

*B. Goal the project*

Discusses and compare about Time, Program, Cost and Cost Overrun under MDB-FIDIC (2010) And PPA (2011) Condition of Contract and specifies the role of engineer.

*C. Objectives*

*1) General Objective*

*a)* Discusses and compare about Time ,Program, Cost And Cost Overrun ; Its Regulation And Management Under MDB-FIDIC (2010) And PPA (2011) Condition Of Contract And The Applicable Law with Special Emphasis To Delay And Disruption Claim

*b)* Determine the role of engineer on above stated concept.

*2) Specific Objective*

*a) Background Related*

*i)* to define time from construction project management perspective;
*ii)* to define program from construction project management perspective;
*iii)* to discuss time & program in general including the relevant management tools to that effect;
*iv)* to define & discuss commencement date; completion date; how & where (under which contract document) to be defined and why? the role of construction program, if any?
*v)* to define & discuss duration of the project; which constitutes the time scale for the progress of the construction project;
*vi)* to discuss the effect of having no time in a given construction project; discuss the concept of time at large; factors contributing to or causing time at large; legal effects of time at large on the contractor & on the employer; and so forth;
*vii)* to define & discuss cost in general & construction cost in particular;
*viii)* to identify & discuss each categories of cost; the rationale behind such category of cost;
*ix)* to discuss the contractual & legal importance or implications of categorizing costs as related to claims;
*x)* to discuss how cost being established in the different phases of a construction project;

*b) Delay Related*

*i)* To define & discuss the very concept of delay;
*ii)* To identify & discuss categories/types of delay;
*iii)* To identify & discuss the causes for delay;
*iv)* To identify & discuss method of analysis of delay;
*v)* To identify & discuss contractual and/or legal effects of delay on the contractor, if the delay were caused by the contractor;
*vi)* To identify & discuss the contractual and/or legal effects of delay on the employer, if the delay were caused by the employer;
*vii)* To discuss delay claims of the employer & the contractor; what constitutes such respective claim for the employer & the contractor? claims procedure for delay by the contractor & the employer, if any;

*viii)* To discuss in case of liquidated damages or delay damages the assessment of same with respect to sectional completion & works (total) completion;
*ix)* To discuss the concept & management of concurrent delay;

*c) Disruption Related*

*i)* To define the very concept of disruption;
*ii)* To identify & discuss categories/types of disruption;
*iii)* To identify & discuss the causes for disruption;
*iv)* To discuss the role of construction program, if any, in any construction project, as related to disruption;
*v)* To define & discuss duration of the project; which constitutes the time scale for the progress of the construction project under consideration;
*vi)* To define disruption; treating & analyzing the legal & contractual effects of disruption on the contracting parties i.e. on the employer or the contractor or both, if any;
*vii)* To discuss method of analysis of disruption by the contractor, what factors to be considered? What constitutes disruption claims of the contractor? Whether or not time alone; cost alone or both time & cost and the reasons or justification for it?

### *D. Problem Statement*

The starting point in any research is the definition of the research issue or the problem statement (Nick Moore, 2000). Or, the first issue is to find a problem to investigate (Burns, 2000). However, this was the most difficult task, specifically, working towards getting the focus of the research.

Powers et al, 1985 quoted in Kumar 1999 stressed that potential research questions may occur to us on a regular basis, but the process of formulating them into a meaningful way is not an easy task.

This study had also passed through the same way. That is, there were fuzzy situations where the ideas were unclear, several doubts meandered, and most of all, there were events considered totally blurred.

This was mainly due to my ambitions to capture the whole and enable to create a better map that thought me the necessity of inter-disciplinary research works for such studies.

Generally there is some confusion in determining the existence of claim focusing sepecialy on time and the role of engineer in MDB-FIDIC (2010) And PPA (2011) Condition of Contract.

### *E. Research Questions*

*1)* What are the claims arising from time related in the construction industry?
*2)* Which condition of contract is stated clearly?
*3)* Who is responsible for setting/pertaining or managing the occurrences of claim?

### *F. Methodology*

*1)* It more of referring the Condition of Contracts like:-
*a)* MDB-FIDIC (2010) and PPA (2011)
*2)* Literature review concerning the concepts of Time, program**,** its Regulation & Management in the construction projects is conducted.
*3)* Gathering from different books, construction trade journals and various web sites.
*4)* If possible Analysis of case studies related to the subject matter
*a)* For contextual concept development.

## II. LITERATURE REVIEW

### *A. Time*

Time is a dimension and measure in which events can be ordered from the past through the present into the future, and also the measure of duration of events and interval between them.

At quantify to measure how long it takes for something to happen or for someone to do something (Cambridge Advanced Learner's Dictionary) “Commencement Date” means the date notified under Sub-Clause 8.1 [Commencement of Works]. (FIDIC MDB 2010 clause 1.1.3.2) is given in the Special Conditions of Contract. It is the latest date when the Contractor shall commence execution of the Works; (PPA 2011 clause 1.2/hh ["Start Date”])

„Time for completion means the time for completing the work or section (as the case may be) under sub clause 8.2 [time for completion], as stated in the contract data (with any extension under sub clause 8.4 [extension of time for completion]), calculated from the commencement date.“ (FIDIC MDB 2010 clause 1.1.3.3) is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Special Conditions of Contract. The Intended Completion Date may be revised only by the Engineer by issuing an extension of time or an acceleration order; (PPA 2011 clause 1.2/U ["Intended Completion Date"])

*a)* *Sectional Completion:* If the intention of the parties is that the contract work should be completed and handed over in phases, it is essential that the contract documents make proper provision for this, each with its own time for completion and own related contractual issues (such as insurance, retention, defect liabilities and so on). (FIDIC MDB 2010 clause 10.2) and PPA 2011 provision for partial acceptance: Clause 86 Partial Acceptance

*b)* *Final Completion:* As per, Clause 8.2 of MDB FIDIC 2010. Besides, MDB FIDIC 2010 provides tests on completion to be done for the final acceptance (Clause 9). And PPA 2011 also provide such tests to be conducted on completion (Clause 85)

For Example: Most of Ethiopian Roads Authority (ERA) projects provide such provisions of sectional/ partial completion (sectional hand over).

*1)* *Time Management Of Construction Projects:* Time management is the process of organizing and implementing a strategy related to the time required for work activities on a project. Effective time management is essential to successfully and efficiently meeting budget and programme targets, as well as achieving profitability.

Projects can risk incurring unnecessary costs and delays as a result of ineffective time management, either by failing to allow for the full complexity of a project, or by failing to effectively manage scheduled work or unexpected events.

On large projects, the client may appoint a programme consultant to prepare a detailed programme for the project including an outline programme for construction if a contractor has not been appointed. Once the contractor is appointed, they will take responsibility for programming the construction works, but the programme consultant may continue to develop an overall programme for the client.

During the planning stage, all work activities should be properly understood, and planned in detail to optimize the allocation of resources and reduce the potential for ‘unknowns’. Estimates can then be made of how long each activity will take. This is critical to the setting of milestones and deadlines, for allocation of resources, and for determining the pricing of contracts and cash flow requirements. The concept of 'float' describes the time that an activity can be delayed without changing the overall project duration. The float is obtained by subtracting the duration of activities from the available time. The critical path is determined by all activities were the total float is zero.

The critical activities have to be carried out without delay, any modification in their duration results in change in the project’s duration. The duration of an activity can sometimes be reduced by adding additional resources, but this will also increase its cost.

*B. Programme*

Programmes describe the sequence in which tasks must be carried out so that a project (or part of a project) can be completed on time.

*1)* *Programme For Building Design And Construction*

Programmes will often identify

*a)* Dates and durations allocated to tasks.

*b)* A critical path (the sequence of critical tasks upon which the overall duration of the programme is dependent).

*c)* Tasks which can only be carried out after other tasks have been completed.

*d)* Tasks which can be carried out simultaneously.

Preparing a programme should not be a paper exercise that simply records what has already happened or what is likely to happen. For a programme to be effective, it must be used as a tool to help plan activities, monitor progress and identify where additional resources may be required.

Programmes can be prepared for a number of different purposes

*i)* The client's overall programme, which may include more than one project, activities leading up to the appointment of consultants, works outside the scope of the main contract (such as the supply of equipment), migration strategy, and an ongoing programme for operation and evaluation once the development is complete.

*ii)* A design programme scheduling tasks from the appointment of the consultant team to the appointment of the contractor. This might be a simple gantt chart incorporating each consultants planned resources for each stage which is then monitored and reported to the client.

*iii)* Information release schedules, setting out when the consultant team should issue production information to the contractor in order for the works to progress and when information produced by the contractor (or their sub-contractors) should be issued to the consultant team for comment and integration into the overall design.

A design programme defining deliverables might be incorporated into consultant's agreements, however, this is difficult to enforce (due in part to activities of third parties outside the consultant's control such as planning authorities, client or stakeholder actions, consultation processes, etc.), and generally, the only recourse the client has is to threaten termination for non-performance in the event of consistent programme failure

*2)* *Programmes of Works And Construction Contracts:* Most construction contracts require the contractor to produce a programme of works. This can be a non-contractual reference point for how work will be carried out or it can impose obligations to deliver the works in a certain way and by certain dates. If the programme of works is included in the list of contract documents it will become binding on the parties. There are benefits and risks associated with doing that.

*a)* *Incorporating The Programme As A Contract Document:* There is no set form that a construction programme must take. As a minimum the programme should specify the commencement date, the order in which the contractor plans to carry out the contract works and the planned completion date. The contract may stipulate other information to be included in the programme. The programme is not usually listed as a contract document and is therefore not considered binding on the parties. In this case the programme will be used as an indicative tool for the parties, suppliers and consultants for administering the progress of the works. Where the contract lists the programme as a contract document, the programme will be binding on the parties. Any departure from it will constitute a breach of contract entitling the aggrieved party to compensation if they can prove they have incurred additional costs or delay. Employers primarily concerned with completing stages of the works by precise dates may be tempted to include the programme in the list of contract documents. The advantage for the employer is that it will afford him greater control over the manner and order in which the contractor will carry out the works. It will allow him to specify the works that are a priority and oblige the contractor to priorities the same matters. The advantage for the contractor is that he will be aware of what is expected of him from the outset. The same applies to third parties, such as suppliers and consultants, who are often ignorant or left in limbo as to the timing of their own contributions to the works. Where this approach is adopted, the contract should clearly set out which part or parts of the programme are binding. It could be that only the key milestone dates are binding. Conversely, it could be that all dates, the order of the works and the methods employed by the contractor are obligatory

*b)* *Disadvantages Of Making The Programme A Contract Document***:** Including the programme in the list of contract documents is not without its pitfalls. It could mean:

*i)* additional obligations for both parties;

*ii)* an increase to the contractor's price;

*iii)* an increase in claims;

*iv)* delay to the commencement date;

*v)* Delays during the construction period.

If the programme is binding it is not just the contractor who assumes additional responsibilities. The employer will have to ensure he provides the contractor with the facilities to complete the works in accordance with the programme. In practice, this means providing the contractor with site access, design documents and decisions on time to allow the contractor to commence the next phase of the works.

If the employer fails to facilitate the progress of the works the contractor will be entitled to compensation for any resulting lost time and money. This could get particularly complicated in a multi-party project involving numerous contractors. For example, a failure by one contractor to complete a task or to vacate the site on time could mean that the employer is in breach of its obligations under all contracts associated with the project.

It is easy to see how a binding programme could increase the number of claims and counter-claims exchanged between the parties. Contractors faced with a binding programme should specify the timing and other details of the documents and access rights needed from the employer to meet the dates in the programme. Employers should also be clear on what needs to be provided by them and when to reduce this risk.

Being bound by the programme will reduce considerably the flexibility of the contractor's operations on site and will expose him to the risk of additional claims for breach of contract. Employers insisting on including the programme as a contract document should expect this additional risk to be reflected in the contractors' price. Contractors should clarify whether or not the programme is a contract document as early as possible during the tender stage and in any event before naming their price.

A good programme can be complicated and time-consuming to produce.

Creating a contractually binding programme out of something that has traditionally been used as a project management tool will add to this complexity. Conceiving a programme that is to be contractually binding in isolation and before the project has commenced will raise additional challenges. Consequently, the parties should expect a prolonged pre-contract negotiation period and a potential delay to the commencement date.

An early issue that the parties will face is the question of who is best placed to draft the plan. Lawyers will need to be closely involved to ensure that the programme and any accompanying documents are consistent with the contract. However, lawyers may not have the technical expertise to compile many elements of the programme so it is advisable to allow those who do possess such expertise to own the document. Suppliers and any other interfacing third parties will also need to review the programme to ensure their input is compatible with the requirements of the programme. Again, this could delay the start of the works.

Programmes are usually treated as live documents that are continuously updated in response to events occurring on-site or elsewhere on the project. Amending a contractually binding programme will be an additional administrative burden and could further delay the progress of the works during the construction period.

*3)* *Contractor's Master Programme:* Contracts may require that the contractor provides a master programme for the construction of the works as soon as possible after the execution of the contract, if it has not been previously provided. However, as it is produced after the execution of the contract, the programme does not impose any obligation on the contractor beyond those obligations imposed by the contract documents. For clarity, the contract documents should specify the level of detail required by the contractor's master programme, which may include critical paths and other information allowing the contract administrator to interrogate the programme and properly assess its implications. The contract administrator may comment on the contractor's master programme but should not approve it, as approval might be considered to relieve the contractor of liability for programming the works in such a way as to achieve the completion date. In making any comments, the contract administrator may wish to consider whether the master programme properly reflects the requirements of the contract (such as the inclusion of the appropriate milestones), whether it contains errors and whether it will make unrealistic demands on the consultant team to produce or comment on information. The programme may be used as the baseline for a claim for an extension of time by the contractor, and the contractor is generally required to update the master programme as the works proceed to reflect any extensions of time that have been granted.

NB: The completion date indicated on the contractor's master programme may be earlier than the completion date entered into the contract.

### *C. Liquidated Damages*

Regulating, in advance, the potential damages that either of the contracting party may suffer, as the consequence of the other party‟s failure to perform its contractual obligations, is the order of the day in the construction industry. The contracting parties address this by incorporating a „the Liquidated Damages Clause‟ to that effect. It is believed that the Liquidated Damages Doctrine is used widely in Common Law Countries. Nowadays, however, the Doctrine has received a welcoming arm in the construction contracts including in the Civil Law Countries. In Ethiopia, for example, it is now fully being put in use in all government construction contracts. The Doctrine might have made its entry into the Ethiopian Construction Laws via the FIDIC (Red Book/MDB FIDIC) Form.

Nevertheless, it does not mean that the Civil Law Countries do not have a counterpart doctrine whereby the contracting parties to a contract regulate the amount of damages that will accrue to either of the parties should the other party fail to perform its contractual obligations. It is g

Thus, let us see what the two doctrines look like. A certain author defined „Liquidated Damages‟ as:

… a sum fixed up in advance, which is a fair and genuine pre-estimate of the probable loss that is likely to result from the breach.

The same author, „Penalty‟ as follows:

… a sum fixed up in advance, which is extravagant and unconscionable in amount in comparison with the greatest loss that could conceivably be proved to have followed from the breach.

Prof. Kuchaal states that courts in England usually allow „liquidated damages" stipulated in the contract without any regard to the actual loss sustained. He also adds that "Penalty clauses, however, are treated as invalid and the courts in that case calculate damages according to the ordinary principles and allow only reasonable compensation." India gives its own treatment to the concepts.

In our country, whilst the penalty clause is regulated under the Civil Code Articles 1889-1894, there is no rule, directly or indirectly, regulating the doctrine of liquidated damages clauses. As it has been indicated earlier, the doctrine of Liquidated Damages Clause is generally recognized and applied in the Common Law System. Recent developments in Ethiopia, however, witness that in all major Government Construction Contracts, the liquidated damages clause is incorporated. Therefore, the doctrine is particularly relevant and merits due attention.

Thus, in practice, as the contractor is obliged to produce 10% of the contract price as a performance bond to the Procuring Entity, then, for each day of delay on the part of the contractor in completing the work, 0.1% of the contract price is meted out against the contractor as a penalty until the penalty amounts to 10% of the contract price; that being the Performance Bond. Thus, when the penalty amounts to 10% of the contract price, the employer terminates the contract in addition to the appropriation of the performance bond.

In Ethiopia, it is evident that parties provide for an extremely exaggerated amount of penalty if one of the parties fails to discharge its contractual obligations. Be this as it may, should the courts nullify a liquidated damages clause that slaps an exaggerated amount of money as damages to the non-performing party, considering it as contrary to Ethiopian public policy?

As it can be easily gathered from the Civil Code Article 1889 cum 1892, penalty clauses are not consistent with the idea of applying the liquidated damages clause, in Common Law as a genuine pre-estimate of the loss that may be suffered by the creditor. Articles 1889 and 1892 provide thus:

Art. 1889. — Penalty.

The parties may fix the amount of damages which will be due, should a party fail to discharge his obligations or to discharge them completely and in due time.

Art. 1892. — Actual damage.

*1)* The penalty shall be due notwithstanding that no actual damage was caused to the creditor.

*2)* Damages may not be claimed above the amount of the penalty unless non-performance is due to the debtor's intention to cause damage or to his gross negligence or grave fault.

Article 1893 of the Civil Code is also worth mentioning here in light of the discussion above.

Art. 1893. — Variation of penalty.

The agreed amount of the penalty due for non-performance may not be reduced by the court unless partial performance has taken place.

*D. Cost*

Before taking up any construction work for its execution, the owner or builder should have a thorough knowledge about the volume of work that can be completed within the limits of his fund or the probable cost that may be required to complete the contemplated work. It is therefore necessary to prepare the probable cost or estimate for the intended work from its design plan and specifications. Otherwise it may so happen that the work has to be stopped before its completion due to shortage of funds and or materials.

There are many costs associated with construction projects. Some are not directly associated with the construction itself but are important to quantify because they can be a significant factor in whether or not the project goes forward and feasible. These include the initial capital cost and the subsequent operation and maintenance costs. Each of these major cost categories consists of a number of cost components:

*a)* Land acquisition, including assembly, holding and improvement
*b)* Planning and feasibility studies
*c)* Architectural and engineering design
*d)* Construction, including materials, equipment and labor
*e)* Field supervision of construction
*f)* Construction financing including overhead costs
*g)* Insurance and taxes during construction
*h)* Owner's general office overhead
*i)* Equipment and furnishings not included in construction

*j)* Inspection and testing

The operation and maintenance cost in subsequent years over the project life cycle includes the following expenses:

*a)* Land rent, if applicable
*b)* Operating staff
*c)* Labor and material for maintenance and repairs
*d)* Periodic renovations
*e)* Insurance and taxes and Financing costs
*f)* Utilities and Owner's other expenses

*1) Definitions and Terminology for Cost*

*a) Construction Costs:* valued consumption of goods /material/ and performance /labor work/ of different kind and amount for the purpose of the production.
*b) Depreciation/ Depletion Costs:* Costs of goods/equipment/ or plant distributed for the whole useful life to compensate its deterioration to the work. Although a nonlinear relationship exists, a linear or a straight line method is often preferred.
*c) Interest Value/Rate:* Value of goods foregone by not using resources at their best allocation. E.g. Opportunity Cost. An interest rate is accounted for cash deposited in any bank being a compensation granted for not using the money at its best allocation. (e.g. Investment)
*d) All-in Material Rate:* A rate which includes the cost of material delivered to site, waste, unloading, handling, storage and preparing for use.
*e) Basic Material Price/Index:* Unit price of the material including transportation, unloading, waste, handling, storage and preparing for use.
*f) All-in Labor Rate:* A compounded rate which includes payment to operatives and the costs which arise directly from the employment of labor.
*g) All-in Plant Rate:* A compounded rate which includes the costs originating from the ownership or hire of plant together with operating costs.
*h) Direct Costs:* Costs directly rendered to the production of the work. It includes, all-in material costs, all-in labor costs and all-in plant costs.
*i) Overhead Costs:* Costs incurred not to the direct itemized works but indirectly to the overall production and performance of the work.

Such as:-

1. Secretarial services,
2. Transportation facilities,
3. Administrative works,
4. Utility provisions: energy, water, communication, sanitation

*2) Estimating Methods*

There are four primary methods used to estimate construction costs. Those methods are known as:

*a) Project Comparison Estimating or Parametric Cost Estimating:* Is often used in early planning stages when little information is known about the program other than overall project parameters. This method is sometimes called a " preliminary " or "ballpark" estimate and has no better than 15% to 25% accuracy. Project comparison estimating uses historical information on total costs from past projects of similar building type. For example, the number of beds in a hospital, or number of spaces in a parking garage, or number of courtrooms in a courthouse can form the basis of a project comparison estimate by comparing them to similar scope projects recently done in the same geographic region.
*b) Square Foot & Cubic Foot Estimates:* Are another method of developing both preliminary and intermediate budgets based on historical data. This method is effective in preparing fairly accurate estimates if the design is developed enough to allow measurement and calculation of floor areas and volumes of the proposed spaces. There are several historical databases available to support this method of estimating providing unit costs that are adjusted annually and many of the large estimating firms maintain their own databases. More accurate estimates made with this method make adjustments and additions for regional cost

indices, local labor market rates, and interpolation between available cost tables. Further adjustments may be made to account for other unique aspects of the design such as special site conditions or design features being planned. In addition, the estimate can develop overall "core and shell" costs along with build-out costs of different space types, allowing for relative ease of determining the impact of changes to the program. Estimates made with this method can be expected to be within 5% to 15% of accurate.

*c)* *Assembly & Systems Estimates:* Are intermediate level estimates performed when design drawings are between 10% and 75% complete. Assemblies or systems group the work of several trades or disciplines and/or work items into a single unit for estimating purposes. For example, a foundation usually requires excavation, formwork, reinforcing, and concrete— including placement and finish— and backfill. An Assembly & Systems estimate prices all of these elements together by applying values available in assemblies cost data guides. Estimates made with this method can be expected to be within 10% of accurate.

*d)* *Unit Price and Schedule Estimating:* The work is divided into the smallest possible work increments, and a "unit price" is established for each piece. That unit price is then multiplied by the required quantity to find the cost for the increment of work. This calculation is often called "extending". Finally, all costs are summed to obtain the total estimated cost. For example, the cost to erect a masonry wall can be accurately determined by finding the number of bricks required and estimating all costs related to delivering, storing, staging, cutting, installing, and cleaning the brick along with related units of accessories such reinforcing ties, weep-holes, flashings and the like. This method of estimating provides the most accurate means of projecting construction costs, beyond which accuracy is more likely to be affected by supply and demand forces in the current market.

*3)* *Cost Control In Building Design And Construction:* A development budget study is undertaken to determine the total costs and returns expected from the project. A cost plan is prepared to include all construction costs, all other items of project cost including professional fees and contingency.

All costs included in the cost plan will also be included in the development budget in addition to the developer's returns and other extraneous items such as project insurance, surveys and agent's or other specialist advisers' fees.

The purpose of the cost plan is to allocate the budget to the main elements of the project to provide a basis for cost control. The terms budget and cost plan are often regarded as synonymous. However, the difference is that the budget is the limit of expenditure defined for the project, whereas the cost plan is the definition of what the money will be spent on and when.

The cost plan should, therefore, include the best possible estimate of the cash flow for the project and should also set targets for future running costs. The cost plan should cover all stages of the project and will be the essential reference against which the project costs are managed.

The method used to determine the budget will vary at different stages of the project, although the degree of certainty should increase as project elements become better defined. The budget should be based on the client's business case and should change only if the business case changes. The aim of cost control is to produce the best possible building within the budget

The cost plan provides the basis for a cash flow plan, allocating expenditure and income to each period of the client's financial year. The expenditures should be given at a stated base-date level and at out-turn levels based upon a stated forecast of inflation.

The objective of cost control is to manage the delivery of the project within the approved budget. Regular cost reporting will facilitate, at all times, the best possible estimate of:

*a)* Established project cost to date.
*b)* Anticipated final cost of the project.
*c)* Future cash flow.
*d)* In addition cost reporting may include assessments of:
*i)* Ongoing risks to costs.
*ii)* Costs in the use of the completed facility.
*iii)* Potential savings.

Monitoring expenditure to any particular date does not exert any control over future expenditure and, therefore, the final cost of the project. Effective cost control is achieved when the whole of the project team adopts the correct attitude to cost.

Effective cost control will require the following actions to be taken:

1. Establishing that all decisions taken during design and construction are based on a forecast of the cost implications of the alternatives being considered, and that no decisions are taken whose cost implications would cause the total budget to be exceeded.

2. Encouraging the project team to design within the cost plan at all stages and follow the variation/change and design development control procedures for the project. It is generally acknowledged that 80% of cost is determined by design and 20% by construction. It is important that the project team is aware that no member of the team has the authority to increase costs on its section or element of the work. Increased costs on one item must always be balanced by savings on another.
3. Regularly updating and reissuing the cost plan and variation orders causing any alterations to the brief.
4. Adjusting the cash flow plan to reflect alterations in the target cost, the master schedule or the forecast of inflation.
5. Developing the cost plan in liaison with the project team as design and construction progress. At all times it should comprise the best possible estimate of the final cost of the project and of the future cash flow. Adherence to design freezes will aid cost control. Developing the cost pan also involves adding detail as more information about the work is assembled, replacing cost forecasts with more accurate forecasts or actual costs whenever better information can be obtained.
6. Reviewing contingency and risk allowances at intervals and reporting the assessments is an essential part of risk management procedures. Developing the cost plan should not involve increasing the total cost.
7. Checking that the agreed change management process is strictly followed at all stages of the project. The procedure should only be carried out retrospectively, and then only during the construction phase of the project, when it can be demonstrated that otherwise significant delay, cost or danger would have been incurred by awaiting responses.
8. Arranging for the contractor to be given the correct information at the correct time in order to minimise claims. Any anticipated or expected claims should be reported to the client and included in the regular cost reports.
9. Contingency provisions are based on a thorough evaluation of the risks and are available to pay for events which are unforeseen and unforeseeable. It should not be used to cover; changes in the specification, changes in the client's requirements or variations resulting from errors or omissions. Should the consultants consider that there is no alternative but to exceed the budget, a written request must be submitted to the client and the correct authorization received?

This must include the following:

1. Details of variations leading to the request.
2. Confirmation that the variations are essential.
3. Confirmation that compensating savings are not possible without having an unacceptable effect on the quality or function of the completed project.
4. Submitting regular, up-to-date and accurate cost reports to keep the client well informed of the current budgetary and cost situation.
5. Ensuring that all parties are clear about the meaning of each entry in the cost report. No data should be incorrectly entered into the budget report or any incorrect deductions made from it.
6. Ensuring that the project costs are always reported back against the original approved budget. Any subsequent variations to the budget must be clearly indicated in the cost reports.

*E. Cost Overruns in Construction*

In construction, cost overruns are relatively common, occurring when the costs being incurred are in excess of the amounts that have been budgeted for.

There are a number of possible reasons for this:

*a)* Construction contracts are often tendered and won on the basis of the lowest cost bid. Costs can then increase as contractors attempt to claw back some profit.
*b)* Construction projects are complex, involving a large number of different parties, components, requirements and so on.
*c)* They can last a long time, during which costs may change.
*d)* Deficiencies and inaccuracies in design.
*e)* Poor project management.
*f)* Changes in client requirements.
*g)* Unforeseen costs that only become apparent as the works progress.
*h)* Poor communication between project team members.
*i)* Tools and equipment and plant being unavailable, in poor condition, and so on.
*j)* Skilled workers being unavailable.
*k)* Inaccurate cost information that leads to incorrect pricing (e.g. material prices).
*l)* Adverse site or ground conditions.

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*m)* Late or withheld payments.
*n)* Scope creep.

The different ways in which cost overrun can be described include:

*a)* As a percentage of the total cost.
*b)* As a total percentage including the original budget and the overrun amount.
*c)* As a percentage of the cost overruns to the original budget.

In order to address and manage cost overruns, it is important to identify what the root cause is. While specific events such as extreme weather conditions can cause delays or damage which may result in cost overruns, cost overruns are often the result of more complex project management issues that can be difficult to untangle.

The largest cost overruns tend to occur due to a change in requirements. If, for example, the client needs a space to be 20% larger than originally anticipated, then the cost is likely to increase by at least 20%. It is very important therefore to ensure that the project brief is comprehensive and that all project stakeholders accept it and agree on the specific scope of work and performance requirements.

Pre-construction estimates and careful project planning are then vital in terms of ensuring accuracy and confidence in the project costings, particularly if the project is complex and has the potential to change.

Design and construction issues can be mitigated in some cases by using project-wide project management, cost control software or building information modelling (BIM) as a way of ensuring all stakeholders are using the same up-to-date design information, as well as being able to make real-time adjustments.

Change orders may also be a reason for costs overrunning. A change order is work that is added to or deleted from the original scope of work of a contract, which alters the original contract amount and/or completion date.

If the one of the parties to a contract fails to perform as required by the contract, and these results in costs overrunning, this may constitute a breach of contract. A breach of contract may entitle the innocent party to make a claim for damages for the losses it has suffered. Construction contracts will generally provide for the contractor to claim direct loss and/or expense as a result of the progress of the works being materially affected by relevant matters for which the client is responsible.

1) *Causes off Cost Overrun:* Angelo and Reina, (2002), stated that cost overrun is a major problem in both developed and developing countries. Several studies of major projects show that cost overruns are common. The causes of cost overrun in construction projects are varied, some are not only hard to predict but also difficult to manage [Morris and Hough, 1991]. According to a study made in Turkey by Arditi, et al, (1985), the important sources for cost overruns were found to be inflationary pressures, increases in material prices and workmen's wages, difficulties in obtaining construction materials, construction delays, deficiencies in cost estimates prepared by public agencies and unexpected sub soil conditions were the most important sources for cost overruns.

In the following section of this research, factors which affect the cost of a construction
Project will be dealt in detail.

*a)* Poor Project Management
*b)* Unexpected Ground Conditions
*c)* Shortage of Construction Material’s
*d)* Change in Foreign Exchange Rates
*e)* Inappropriate//Inexperienced Contractors
*f)* Force Majeure
*g)* Construction Cost Underestimation
*h)* Change Orders or Variations Orders
*i)* Inflation

In our project case we try to discuss mostly on Change Orders or Variations Orders Change orders are common in all types of construction projects [O’Briien,, 1998;; Ibbs ett all,, 2001].. Changes in construction projects can cause substantial adjustment to the contract duration and construction cost [Ibbs ett all,, 1998].. Changes can be deleterious in any project and can cause cost overrun,, if not considered collectively by all project participants [Ibbs ett all,, 2001].

Changes can be originated from numerous factors pertinent to the construction projects.

According to O’Brien, (1998), causes of change orders include the following:

*i)* Additions and/or enhancement required by owners
*ii)* Accident or damage
*iii)* Force Majeure
*iv)* Unforeseen conditions
*v)* Change in Plans and/or specifications
*vi)* Value engineering
*vii)* Acceleration
*viii)* Delay on completion Time and Delay on Payments

*2)* *Provision of Clauses in FIDIC and PPA Standard Conditions of Contract Related to Cost:* The following FIDIC 2010 and PPA 2011 standard conditions of contract clauses are related to costs,, they can consequentially alter the construction cost of projects unless and otherwise they are deleted or replaced by some other sentences in the particular condition of the contract for the specific construction projects.

*a)* *MDB FIDIC 2010 Clauses.*

*i)* Cost incurred by the contractor due to delay of drawings and//or instructions for which notice has been given by the Contractor in accordance with Sub Clause 1.9
*ii)* Errors in setting out which are based on incorrect written data supplied by the Engineer (Clause 4.7)
*iii)* Fossils or discovery of things of geological or archeological interest (Clause 4.24)
*iv)* Suspension of work ordered by the Engineer (Clause 8.8)
*v)* Additional costs due to variations works (Clause 13)

*b)* *PPA 2011 Clauses*

*i)* Errors in setting out which are based on incorrect written data supplied by the Engineer (Clause 49)
*ii)* Suspension of work ordered by the Engineer (Clause 20)

*F. Time Extension*

Construction contracts generally allow the construction period to be extended where there is a delay that is not the contractor's fault. In the United States, this is described as a time extension. The UK equivalent is an extension of time (EOT).

When it becomes reasonably apparent that there is, or that there is likely to be, a delay that could merit a time extension, the contractor gives written notice to the contract administrator identifying the relevant event that has caused the delay. Time extensions are granted based on the contractor being able to demonstrate that the delay was caused by events beyond their control. The contract guidelines typically specify the provision of time extension requests.

There are various circumstances in which time extension requests will be valid, including:

Delays are caused by the owner changing the design.

*a)* A delayed start to the works by request of the owner.
*b)* Site conditions (e.g. sub-surface conditions) that differ from the project plans.
*c)* Exceptionally adverse weather.
*d)* Variations to the original scope or contract required by the owner.
*e)* Force majeure.
*f)* Legal issues that affect project completion or the contractor’s performance.
*g)* The supply of materials and goods by the owner.

There are various circumstances in which time extension requests will be deemed invalid, including:

*a)* Delays are caused by subcontractors.
*b)* When the workforce is insufficient.
*c)* The contractor underperforms, i.e. by procuring long-lead items.
*d)* Delays caused by normal adverse weather conditions.
*e)* Where there is inadequate evidence that irrecoverable delays have not been caused by the contractor.

In order for a time extension to be granted it is important that the contractor is transparent and communicative in their dealings with the owner and the project team. The project manager must be informed at the earliest opportunity and, if they deem it valid, they will submit a formal time extension request. For further information, see what should be included in a time extension request?

*a)* Common refusals of extensions of time.

*b)* Concurrent delay.
*c)* Completion date.
*d)* Culpable delay.
*e)* Delay damages.
*f)* Extension of time.
*g)* How to prepare a claim for an extension of time.
*h)* Practical completion.
*i)* Relevant event.
*j)* Variations.

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

*a)* *Extension of Intended Completion Date as per PPA 2011 (Clause 73):* 73.1 The Contractor may request an extension of the Intended Completion Date if he is or will be delayed in completing the contract by any of the following causes:

*i)* Exceptional weather conditions in the Federal Democratic Republic of Ethiopia;
*ii)* Artificial obstructions or physical conditions which could not reasonably have been foreseen by an experienced Contractor;
*iii)* Compensation Event occurs or a change order for modification is issued which makes it impossible for completion to be achieved by the Intended Completion Date;
*iv)* Administrative orders affecting the date of completion other than those arising from the Contractor's default;
*v)* Failure of the Public Body to fulfill his obligations under the Contract;
*vi)* Any suspension of the works which is not due to the Contractor's default;
*vii)* Force majeure;
*viii)* Any other causes referred to in these GCC which are not due to the Contractor's default.

*b)* *Compensation Events for Allowing Time Extension (PPA2011 Clause 74):* 74.1 The following shall be Compensation Events allowing for time extension:

*i)* The Public Body does not give access to a part of the Site by the Site Possession Date stated in the Contractor's approved work program;
*ii)* The Public Body modifies the Schedule of other Contractors in a way that affects the work of the Contractor under the Contract;
*iii)* The Engineer orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time;
*iv)* The Engineer instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects;
*v)* The Engineer unreasonably does not approve a subcontract to be let;
*vi)* The Engineer gives an instruction for dealing with an unforeseen condition, caused by the Public Body, or additional work required for safety or other reasons.
*vii)* Other Contractors, public authorities, utilities, or the Public Body do not work within the dates and other constraints stated in the Contract, and they cause delay;
*viii)* The advance payment is delayed;
*ix)* The Engineer unreasonably delays issuing Interim Payment Certificates; Other Compensation
*x)* Events described in the SCC or determined by the Public Body and force majeure.

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

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

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

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

b) *As per civil code of the Empire of Ethiopia (1960)*

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

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

*G. Time at Large (Completion of the Work Within a Reasonable Time)*

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

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

1) *As per Standard Conditions of Contract (PPA 2011):* Within 21 days from receipt of the Contractor's detailed particulars of the request, the Engineer shall, by written notice to the Contractor after due consultation with the Public Body and, where appropriate, the Contractor, grant such extension of the Intended Completion Date as may be justified, either prospectively or retrospectively, or inform the Contractor that he is not entitled to an extension.(PPA, 2011 Clause 73.3)

2) *As per civil code of the Empire of Ethiopia (1960):* Time: 1. Principle.

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

*H. Delay in Construction*

Delay on construction projects is a universal phenomenon. They are almost always accompanied by cost and time overruns. Construction project delays have a debilitating effect on all parties (owner, contractor, consultant) to a contract in terms of; growth in adversarial relationships, distrust, litigation, arbitration, cash-flow problems and a general feeling of apprehension towards each other.

1) *Definition:* A 'real' delay may be defined as a period during which a contractor cannot employ his men or machines or staff at their normal intended output, having regard to the nature and amount of work which is available under the agreed program of working or under any rearrangement or that program. "Construction period is the time gap between the commencement date and the completion date" In most construction contracts the contractor is working to a programme for the works, an agreed contract sum and/or an associated set of contract rates, and a set of tender documents upon which these are based.

*I. Disruption*

Disruption describes loss due to inefficient productivity. It is extremely difficult to assess. Often the most effective approach is to localize the claim to a specific area of breach. Then compare individuals productivity prior to and after the disruption occurred against the productivity during the period of disruption. Generic claims based on statements such as 'this was the tender price and this is the outturn cost' are unlikely to succeed.

1) *Loss of Profit/Opportunity Costs:* This is only valid when the claimant can prove breaches of contract directly prevented it making a profit elsewhere. Deductions must be made for additional profit that has been paid on the project as a result of extra work instructed and priced within the final account.

## III. DELAY AND DELAY CLAIMS MANAGEMENT

### *A. Delay Definition*

Delay in contraction contracts can be simply defined as a late action in performing contractual obligations. Claim/ Disputes frequently arise in respect of delays. Most construction contracts make provision for extending the time for completion, financial compensation of both. Besides, delay damages are provided in most construction contracts (MDB FIDIC 2010 and PPA 2011).

Delay in construction contracts is not an uncommon occurrence, but even the existence of it is not always apparent unless someone is alert to the existence of the situation and it is constantly monitoring progress against program. Failure to issue a drawing after it has been requested, failure to nominate a sub contractor by required date, the impact of variation order altering work actually in progress all these are relatively obvious. With most jobs of any size there are usually periodic progress meeting at which substantive delay maybe apparent but it must not be forgotten that it is necessary to translate instances of delay into terms of

*1)* whose responsibility they are,

*2)* Their impact on the work, before one can determine whether a claim is likely to be involved or not. [http/www.com.edu (pdf) publication delay%20]

### *B. Time Delays and Overruns*

Time delays can occur in components of a project or trades of works, but when their cumulative effect makes the actual completion time beyond the contract completion time, it is called time overrun. Contractors in some instances accelerate projects in order to avoid liquidated damages. In this case, though part of the project did delay; it is compensated which makes the delay irrelevant. However, contractors will lose some profit if they depend on accelerating options most often.

### *C. Classification of Delay*

Based on effect in the completion of projects Delays can be divided in to broad categories (a) delay to completion of contract itself, resulting from a delay to work which is on the critical path of the construction program (b) delay to a part of a work which doesn't cause delay to overall completion. I.e. non-critical delay. Obviously extension of time are concerned with the first type of delay.

Based on how they operate contractually

Generally, Time delays can be classified into the following three categories:

*1)* *Classic Delays:* Classic delay occurs "when a period of idleness or uselessness is imposed upon contractual work". A classic delay can result from a contractor who is not prepared to accomplish work as planned at a given time, by an owner who has not eliminated all barriers contractually required for a contractor to proceed, or by an outside force which neither party can control.

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

*3)* *Serial Delays:* Serial delay is a "linkage" or series of delays one after the other, created by one original delay. This is also referred to as the "ripple effect" of construction delays.

*a)* *Justifiable and Non - Justifiable Delays*

*i)* Justifiable delays are delays that occurred due to causes which are beyond the control of project doer. If delays are caused by project owners, the contractor or the consultant or the supplier is directly justified for the effects on delay of the project. Force Majeur will also be one of the causes for justifiable delay.

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

While Justifiable delays can be either compensable or non compensable; Non - justifiable delays will cause remedial rights (Section 5.3.3) for the project owners.

*b)* *Compensable and Non – Compensable Delays*

Delay damages can involve additional costs incurred by the contractor as a result of the extended duration of its performance. These typically include costs of idle laborers and equipment, higher costs of performance during the later period of time and extended general conditions. Examples of the type of additional costs associated with delays include:

1. Extended or Increased management / supervisory costs
2. Additional payment / performance bond premiums
3. Additional liability insurance premiums
4. Extended equipment / trailer rental costs
5. Materials escalation costs
6. Unanticipated weather protection
7. Idle labor / equipment charges

The other component of delay damages is the unabsorbed overhead associated with the delay period. Overhead expenses are not usually charged to a particular project, but rather, are combined and deducted from income produced from all of the company's projects throughout the year. These costs are often referred to as "Eichlaey" damages, which is the name of the formula most commonly used to calculate the Overhead expenses portion of a delay claim.

One of the first factors for determining whether you can assert a valid claim for delay damages is your contract. Unfortunately, many contractors often waive or severely limit their rights to recover delay damages before even getting out to the project, through their contracts. For example, contract clauses can be in line with:

1. No Damage for Delay, or
2. Conditional Recovery,
3. Additional Time and Compensation for Delays

The first view expressly prohibits recovering of additional costs incurred as a result of delay, regardless of the cause in creating the delay. The second view limits ability to recover or make a claim for delay or impact damages, so that the recovery is very much dependent on causes of delay and their CPM Network. This obviously excludes recovery for any unjustified delay damages. The third view does not inhibit or limit rights to recover due to delay damages. By waiving your rights to delay damages before your work begins, you could be putting your company at significant financial risk if a long unforeseeable delay or other schedule impact causes you to incur unanticipated costs. Be aware of these provisions, and protect your right to make a delay claim, if needed. Contractual provisions are not the only factor to consider when determining whether to make a delay claim. Certainly, the amount of compensable damages and your ability to prove them are also a part of the decision.

In Evaluating delay claims, five aspects must be taken into account:

1. The effective duration of delay
2. The effect of delay on work intended to be done
3. The costs attributable to the delay
4. The nature of costs / expenses
5. The resources and acceleration / expediting measures

Generally, the method for calculating the claim or damages is based on the type of claim or theory of liability. There are two basic theories of liability: Contract or Tort. A breach of contract can be material, total or partial. The extent of the breach determines the measure of damages. A tort is generally a civil wrong which entitles compensation for damages. A claim that a contractor was negligent in performing a certain act can be the basis for a tort liability.

*D. Typical Project Owner Delay Claim Components Include*

When the contractor delays the project, the owner can recover one of two types of damages: liquidated damages or actual damages. Liquidated damages are typically used when a determination of actual damages would be difficult if not impossible to ascertain. The amount of and application of liquidated damages are normally set forth in the contract. Some subcontracts incorporate the liquidated damage clauses in the prime contract. The liquidated damage amount for a specific time period are determined before the breach occurred. In California liquidated damages are generally enforceable. Some contracts attempt to include both liquidated damages and actual damage clauses. When both clauses are included in the contract the liquidation damage clause maybe invalid. If the owner caused the delay the liquidated damages provision will not be enforced. If there are concurrent causes to delay which are attributable to the owner and the contractor the courts will generally not enforce the clause. However, there are cases where the court has attempted to apportion the damages.

When there is no liquidated damage provision in the contract the owner will be able to collect its actual damages. If the owner has any direct involvement in the project its actual damages can include: (1) additional supervisorial expenses, (2) other additional expenses actually caused by the delay, (3) overhead expenses incurred during the delay period, (4) if project is intended to be leased reasonable value of loss of use and the lost rents which could not have been reasonably avoided, (5) if the project is not intended to

be leased reasonable value of loss of use, interest expense, interest expense during the delay period and (6) any other reasonably foreseeable damages the owner may have incurred including lost profits from a business.

*E. Typical Contractors Delay Damage Components Include*

The components of a contractors delay claim include: (1) indirect costs that occurred during the extended performance period, (2) home office overhead that was incurred during the extended performance period, (3) increased (material escalation) material direct costs that occur during the delay (4) lost productivity caused by the delay and (5) other damages directly related to and attributable to the delay.

Indirect costs include job site overhead (e.g. project supervision costs), extended general conditions or extended or unabsorbed overhead, job shack, portable toilet, telephone, insurance, and job site power and water.

Home office overhead for the extended performance period can be calculated using several formulas. The Eichleay formula is one method for calculating overhead. The Eichleay formula resulted from a federal Board of Contract Appeal case against the Eichleay Corporation. The formula is calculated as follows:

Overhead allocable to the contract equals contract billings divided by total billings for the contract period time's total company overhead for the contract period. Daily contract overhead equals allocable overhead divided by days of performance. Amount of company overhead equals daily contract overhead times number of delay days.

The formula cannot be applied to every claim. There are cases which limit its application when there is not a total suspension of work. The formula is best used where home office overhead incurred and other jobs did not absorb the overhead. Other methods include modified versions of the Eichleay formula which are modified to fit the contractors particular delay circumstance such as: (1) segmenting costs to the delayed project, (2) using the same overhead percentage as that included in the bid and (3) applying industry published overhead averages.

Direct costs include: (1) Equipment rental costs and equipment ownership expenses (measured through rate manuals, depreciation, taxes and insurance) during the delay period (2) Field labor if the scope of work is increased as a direct result of the delay or if the hourly labor rate increases during the delay period (e.g demobilization and re-mobilization expenses), and (2) Increased material costs if the scope of work is increased or if the material cost increases during the delay period the contractor will be entitled to that increased cost.

Delay damages can also include a contractors' increased labor hours resulting from a loss of the on-site labors efficiency. Disruption occurs when a contractor cannot achieve the productivity that was originally anticipated. Productivity can also be impacted by a delays ripple effect. Loss of productivity can be calculated using several methods. Generally, a productivity claim seeks the increased labor cost. Typically, each area of lost productivity is determined by comparing the bid to the actual cost. Once, the area of lost productivity is determined the damages are calculated for each individual item of work or task where productivity is lost. Some contractors attempt to calculate the claim on a total overrun cost basis, but such an approach is disfavored. It is thus very important to keep detailed time record when the project is disrupted. The increased labor factors can be obtained through the following: Use of learning curves and other similar models, time motion studies, expert witnesses, scientific models, and comparisons to industry unit pricing standards.

Other damages that may be recovered include: (1) interest on the claim, (2) lost profits on other jobs if it can be established that due to the delay the contractor couldn't get other jobs during the delay period, typically, this occurs when a contractor bonding capacity restricts further contracts until the existing work is completed.

Attorney fees are not recoverable unless there is an applicable attorneys fees provisions. If there is an attorney's fees provision the prevailing party recovers the fees, but in discretion of the judge. AIA documents attorney's fees provisions may not always allow the prevailing party to recover attorney's fees.

If the party who has been damaged fails to mitigate damages it may not be able to recover those damages which could have been mitigated. Thus it is important for the contractor to make reasonable efforts to minimize the damages it sustains as a result of a delay. Delay claims require significant documentation.

*F. Causes of Construction Delay*

One of the most important problems in the construction industry is delay. Delay occurs in every construction project and magnitude of these delays varies considerably from project to project. Some projects are only a few days behind the schedule; some are delayed over a year so; it is essential to define the actual causes of delay in order to minimize and avoid the delays in any construction project. There are two kinds of causes for delay in construction projects; external and internal causes. Internal causes of delays

include the causes, which come from four parties involved in that project. These parties include the owner, designers, contractors and consultants.

Other delays, which do not come from these four parties, are based on external causes for instance from the government, material suppliers or weather. [http/www.com.edu(pdf)publication delay%20]

The most frequent causes of valid delay claims are two. The first is where one contractor working for the employer fails to complete his work in time and so delays another contractor.

Change Orders, Stop Orders or Suspensions and Force Majeure

Project Owner or Representative; Project Provider; Neither and Both

*a)* *Project Owner or Representative:* When causes are due to Project Owner(s) or their representatives; project doers are entitled to time extension and compensations if warranted. Such causes can be related to …..

*b)* *Project Provider:* When causes are due to Project Providers or their sub contractors; project doers are not entitled to both time extensions and compensations, but are liable for delay damages which will be payable to the project owner. Such causes can be related to …

*c)* *Neither:* When causes are due to neither the project owners or their representatives, nor the project providers; project doers are served with only time extensions without any entitlement for compensations and delay damages. Such causes can be related to ….

*d)* *Both:* When causes are due to both the project owners or their representatives and the project providers; project doers are are only entitled for time extensions without any provisions for compensations and delay damages. Such causes can be related to ….

*1)* *Contractors:* Contractors and subcontractors should avoid unmerited and exaggerated claims which in extreme cases can lead to personal prosecution on charges of criminal fraud. Claims must be properly constituted and documented:

*a)* Proper legal entitlement must be established.

*b)* Cause and effect must be clearly demonstrated by contemporaneous records.

*c)* Additional costs must be backed up by full supporting documents.

Claimants should avoid unnecessary optimism when reporting settlement figures to managers and should be willing to accept a reasonable offer of settlement without recourse to expensive legal action, which occupies management resources that would be better utilised elsewhere There is no guarantee of success in court.

*2)* *Tender documentation:* A number of strategies can be used in the preparation of tender documentation to help avoid claims:

Avoid dealing with items post tender. Statements such as ‘to be agreed’ can lead to dispute without the leverage of competition.

Phrases such as ‘to suit the contractor’s programme’ are open ended.

Setting a conditional date such as, ‘in accordance with the architect’s instruction’ creates uncertainty for tendering contractors. It is not possible to enforce an ‘agreement to agree’.

Avoid ambiguity in design responsibility, such as ‘the contractor shall complete any design required after the consultants have finalized the drawings provided for tender purposes’.

Ensure that programmes, resource charts and method statements supplied by contractors with their tenders are provided for tender assessment only and are not adopted as contract documents or as the basis for variations.

If possible avoid ‘letters of intent’ as they encourage arguments over details in the contract not covered in the letter of intent. There are many cases where disputes have gone to Court with no signed contract in place. At the very least a letter of intent should limit activity to pre-construction activity, such as engineering design and pre-ordering of long-delivery items of manufacture. It is also beneficial to define payment terms in a letter of intent as this can be one of the most contentious matters of legal disputes. There is no exact legal definition of Quantum Merritt, and so a letter of intent should describe how overheads, profit and indirect costs are to be treated.

*3)* *Design:* Many claims are based on delays resulting from design consultants issuing schedules, drawings and specifications after construction has begun. Conflict can then arise due to arguable deficiencies in that information:

*a)* Missing, or not produced.

*b)* Late.

*c)* Incorrect.

*d)* Insufficient to order or build.

*e)* Impractical.

*f)* Unclear or conflicting.

*g)* Inconsistent with pricing information.
*h)* Inappropriate or not fit for purpose.
*i)* Uncoordinated with other information.

Some flexibility is allowed by standard traditional contracts for the design team to issue further drawings and details reasonably necessary either to explain or amplify the contract drawings.

There can be an onus on the contractor to raise any queries on newly received information within 28 days of its receipt or forfeit their right to additional payment.

| consultants | contractors | Design |
|---|---|---|
| ✓ Delay in performing inspection and testing<br>✓ Delay in approving major changes in the scope of work<br>✓ Poor communication/coordination between contractor and other parties<br>✓ Late in reviewing and approving design documents<br>✓ Conflicts between consultant and design engineer<br>✓ Inadequate experience of consultant<br>✓ Inadequate design-team experience<br>✓ Delay in performing final inspection and certification by a third party<br>✓ Frequent change of sub-contractors because of their inefficient work | ✓ Inadequate contractor's work<br>✓ Poor qualification of the contractor's technical staff<br>✓ Ineffective planning and scheduling of project by contractor<br>✓ Conflicts in sub-contractors schedule in execution of project<br>✓ Low level of equipment-operator's skill<br>✓ Low productivity and efficiency of equipment<br>✓ Lack of high-technology mechanical equipment<br>✓ Shortage of labors<br>✓ Unqualified workforce<br>✓ Improper construction methods implemented by contractor<br>✓ Low productivity level of labors<br>✓ Effects of subsurface conditions (e.g., soil, high water table, etc.)<br>✓ Delay in obtaining permits from municipality<br>✓ Unavailability of utilities in site (such as, water, electricity, telephone, etc.)<br>✓ Traffic control and restriction at job site<br>✓ Accident during construction<br>✓ Differing site (ground) conditions<br>✓ Delay in providing services from utilities (such as water, electricity) | ✓ Lack of usage of advance engineering software<br>✓ Misunderstanding of owner‟s requirements by design engineer<br>✓ Mistakes and discrepancies in design documents<br>✓ Delays in producing design documents<br>✓ Unclear and inadequate details in drawings<br>✓ Complexity of project design<br>✓ Insufficient data collection and survey before design Inflexibility (rigidity)<br>✓ Changes in material types and specifications during construction<br>✓ Delay in manufacturing special building materials |

| Others | owner |
|---|---|
| ✓ effect of social and cultural factors<br>✓ Hot weather effect on construction activities<br>✓ Rain effect on construction activities<br>✓ Original contract duration is so short<br>✓ Legal dispute between various parts<br>✓ Change in government regulation and law | ✓ Delay in progress payments by owner<br>✓ Delay to furnish and deliver the site to the contractor by the owner<br>✓ Change orders by owner during construction<br>✓ Poor communication and coordination by owner and other parties<br>✓ Slowness in decision making process by owner<br>✓ Conflicts between joint-ownership of the project<br>✓ Suspension of work by owner<br>✓ Inadequate definition of substantial completion<br>✓ Ineffective delay penalties<br>✓ Type of project bidding and award (negotiation, lowest bidder.) |

Table 1 Cause of delay by the parties

*G. Delay responsibility*

The issue of delay responsibilities is related to whether the contractor is awarded off if liable for costs and additional time to complete the project.

1) *Delays For Which The Client Is Responsible:* If delay occurs for which the client is responsible, then the contractor will be entitled to an extension of time. If as a consequence, the contractor incurs extra costs then he will be entitled, in general, to reimbursement of those extra costs.
2) *Delays For Which The Client Is Not Responsible:* If delay occurs for which the client is not responsible, then the contractor will not be entitled to compensation although he may be entitled to an extension of time. He may be entitled to an extension of time in cases of strikes, bad weather, etc. He would not be entitled to an extension of time because of his own incompetence, or break down of his plant since these are supposed to be within his control.

The categories of responsibilities are:

*a)* Owner (agent) responsible: contractor will be granted time extension and additional cost (indirect), where warranted.
*b)* Contractor (subcontractor) responsible: contractor will not be granted time or costs and may have to pay damages/penalties.
*c)* Neither party (e.g. act of God) responsible: contractor will receive additional time to complete the project but no costs will be granted and no damages / penalties assessed.
*d)* Both parties responsible: contractor will receive additional time to complete the project but no costs will be granted and no damages/penalties assessed

*H. Remedial Rights*

Remedial rights are provisions entitled for non performances of the contractual obligation by the contracting parties. Such rights can be entertained considering the efforts sustained by the contracting parties in lieu of their duty to mitigate the non – performances. Unless otherwise contracting parties can prove their effort for their duty to mitigate the occurrences of non performances, remedial rights are not directly entitled.

The following remedial rights are well known in construction contracts:

1) *Time Extension:* Time extension is a provision for justified time delays. Time extensions may or may not be entitled for compensations. Using CPM, it is only justified delays that occur on the critical path that is compensable. In none of the Conditions of Contract, the extension of time clauses do not make any provisions of payment; and nor do delay and disruption clauses make entitlement of extension of time a condition precedent to entitlement to compensation. Therefore, entitlement of compensation due to time extension is strongly associated with causes of delay and whether it is on critical activities or beyond floats in the case for non critical activities. The primary effect of time extension is to relieve liabilities of delay damages such as liquidated damages. However, if found justified for compensation, it will also bring in entitlements for monetary claims.
2) *Liquidated Damage and / or Compensations:*

*a)* *Acceleration:* When projects delay or when projects are required to be completed before its time, project doers are obliged to accelerate their services or works to satisfy the requirements. The project doer is entitled to compensation and time extension, if and only if delays are justified and at the same time compensable. Otherwise, the acceleration of projects will only serve to relieve project doers from liabilities they should cover to the project owners.

Process: Notification; Justifications; Time Impact Analysis; Submission; Review and Approval

The second is a change of design, which, though it is issued before construction commences on the altered portion of the work, nevertheless causes upset and delay to the contractor's work.

*I. Valid Delay Claims*

Contractors delayed from completion time; who ever employers also present claims for late completion, frequently present claims. Dr En Wubishet Jakele tries to put five points to be taken in to account by contracting parties before they present their claims: -

1) The effective duration of delay
2) The effect of delay on work intended to be done
3) The costs attributable to the delay
4) The nature of costs/expenses
5) The resources and acceleration/expending measures

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Having concern the above five points the parties can present their claims. All claims may not be valid but availed delay claim must comply with all three of the following conditions [Wubishet Jakele Dr.ing.2005].

The delay must have been real The causes of the delay must be outside the contractor's liabilities and risks The delay must have caused loss or extra expenditure to the contractor, which has not been made good to him elsewhere under the contract. [Wubishet Jakele Dr.ing.2006].

## IV. DISRUPTION AND DISRUPTION CLAIMS MANAGEMENT

### *A. Disruption Definition*

Disruption describes loss due to inefficient productivity. It is extremely difficult to assess.

Often the most effective approach is to localise the claim to a specific area of breach. Then compare individuals productivity prior to and after the disruption occurred against the productivity during the period of disruption. Generic claims based on statements such as 'this was the tender price and this is the outturn cost' are unlikely to succeed.

*1)* *Loss of Profit/Opportunity Costs:* This is only valid when the claimant can prove breaches of contract directly prevented it making a profit elsewhere. Deductions must be made for additional profit that has been paid on the project as a result of extra work instructed and priced within the final account.

*2)* *Finance Charges and Interest:* Finance charges and interest on extra capital required to fund costs arising from breaches in the contract are recoverable providing:

*a)* Interest rates are proven and reasonable (e.g. market rates prevailing during the period of breach).

*b)* If financed within the corporate group, the rate will be that received from monies it has placed on deposit.

### *B. Disruption Claims in Construction*

In construction contracts, the term 'disruption' refers to a loss of productivity due to a hindrance or interruption of the progress of the construction works which reduces the rate of efficiency.

If disruption is caused by the employer, the contractor may have grounds to seek compensation. Disruption, and claims arising to try and recoup losses incurred from it, are common on construction projects, particularly on larger and more complex projects.

The difference between disruption and delay is that the latter relates to lateness rather than productivity, although they can often be related. Delays can cause disruptions, and vice versa. Despite their inter-relation, they require a different approach to assessing claims.

When evaluating claims for delay, the terms of the specific contract are the usual starting point, and evidence is required that certain circumstances caused the delay. The terms of the contract are less useful when evaluating disruption claims. Instead, the contractor must provide reasonable evidence that:

*1)* Progress of the works has been disrupted.

*2)* Which element of the works and which trades have been disrupted, why losses occurred, and so on.

*3)* The disruption incurred additional costs.

*4)* The cause of the disruption constitutes a breach of contract.

Evidence will normally take the form of documented records demonstrating that disruption caused losses. However, this can prove difficult as the contractor can often not detect disruption until after it has occurred. In addition, isolating the loss of productivity to the cause of the disruption can be difficult as it may coincide with several other factors, and the effect of the disruption may be hidden by other issues.

Several methods can be used to estimate loss in relation to disruption, including:

*a)* Measured mile analysis: Compares actual labour performance between two periods – a normal measured mile period and an impacted period.

*b)* Baseline productivity analysis: A more conservative estimate used when an unimpacted section of the works is too difficult to isolate.

*c)* Earned value analysis: Compares the amount and cost of work that was planned to have been done by a particular stage with the amount that has actually been done and what it has actually cost.

NB The term 'disruption' can also refer to the impact of new technologies and techniques on an industry. For more information, see Construction is an industry ripe for tech disruption.

*C. Claims*

Claims commonly arise between the parties to construction contracts. This can be as a result of problems such as; delays, changes, unforeseen circumstances, insufficient information, and conflicts.

1) *Definition and Types:* Construction projects may not go smoothly as planned due to uncertainties about events in the future. Delays, which are the major causes of, claims may occur due to unforeseen site conditions, increase in scope of work and others. As a result disagreement can rise regarding contractual matters. [Ismael Ibrahim 1996] A clam is mostly concerned with entitlements and liabilities arising under, or as a result of a locally valid contract. (Hughes and barber,1992) Claims for construction projects are demands for payment of additional compensation, adjustment of parties respective contractual, or any other change with regard to the contractual conditions or terms. [Wubishet Jakele Dr.ing 2005] Claims might be made for loss and expense, extension of time, liquidated damages, and so on. The contract should set out what can constitute a claim and how it should be dealt with. There may also be claims associated with the appointment of consultants.

Claims can be associated with three major categories that can be understood as the different types of claims. These are

*a)* *Time Related Claims:* Claims associated with delay or in time completion of projects where either of the following six Entitlements or Penalties are subjected to:

*i)* Time Extension only
*ii)* Liquidated Damages only
*iii)* Time Extension and Cost Compensation
*iv)* Concurrent Compensations
*v)* Bonus
*vi)* Reliving of Obligation

*b)* *Cost Related Claims:* Claims associated with monetary compensation where either of the following entitlements or penalties are entertained:

*i)* Additions requiring rate adjustments
*ii)* Price Changes
*iii)* Provisional sum adjustments

*c)* *Default by Contracting Parties:* Claims associated with non performances of contractual obligations such as:

*i)* Delay in Payment Certificates
*ii)* Suspensions and Terminations

2) *Causes Of Claims:* The causes of claims on construction projects are many generally deviation from performance requirement among contractual stakeholders, whether it is related to complication time or construction lost, or the fulfillment of its quality and its intended purpose or safety, health and environmental consequences can trigged claims in construction contracts. Some of the causes are mentioned the in introduction part of the review. Those causes can be in to three categorizes. [Wubishet Jakele Dr. ing 2005].

*a)* Changed condition
*b)* Additional works and
*c)* Delay for cost overruns and time extension.

3) *Valid Claims:* Valid claims refers to those claims that the contractor is entitled to all parties involved to the contract (particularly owners) should be aware of valid claims. This will help to avoid claims or if it happens resolve without disputes, some of the causes of valid claims are; untimely payment, design changes/extras, delay caused by owner.

*a)* Owner's failure to approve drawings
*b)* Untimely payment affects the progress of work due to shortage of cash.
*c)* Design changes/extras may result in change of scope of the work.

Delays are major causes of claims. To make a valid claim by either of the parties they should know requirements for a valid claim. [Wubishet Jakele Dr. ing 2006].

4) *Claim Administration Processes:* Claim administration process is understood as the process for the compensation of any damage, and/or changes resulted during the implementation of Construction projects which are called entitlements with quantum. This is because claims require to establish both the liabilities as well as the damages incurred in any construction contract. Construction contracts allow that all contracting parties will be entitled to make claims. The claim administration process is then understood as the process starting from a willful act of the claimant through *claim notification* by either of the contracting parties up to and including claims approval and acceptance by both the Contracting parties for agreed or enforced compensations or otherwise called *claim enforcement.* Either the Contractor or the Employer can initiate the claim administration process. And, in some instances, the Engineer can also advice on a reasonable incorporation of claims, on behalf of both the contracting parties, if the engineer believed that without the treatment of such claims, the successful performance of the project will considerably be affected. This is an obligation in the case of the Employer, but in no case, used to accrue advantages only to the contractor. Following the above interpretations for the word claim, accepted national and international procedures, and findings from a research conducted recently, claim administration process can generally fall into three major functions (Figure …). These included Claim Submittal, Claim Processing and Claim Enforcement

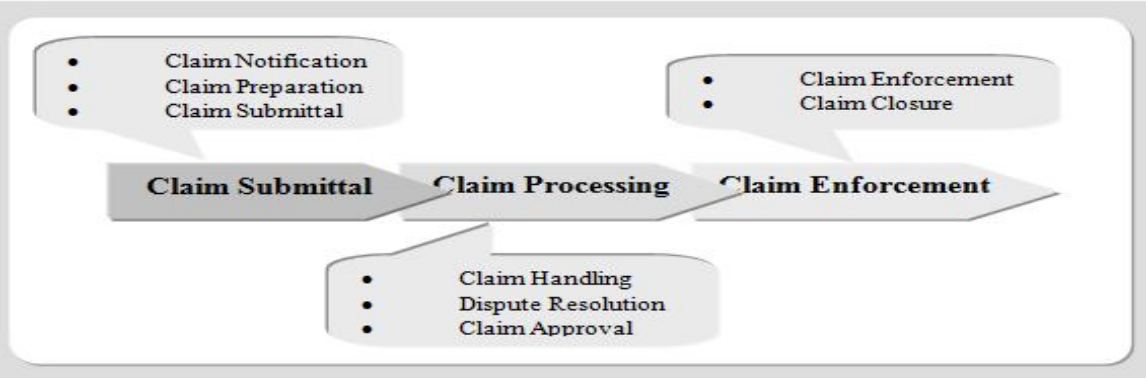


Figure 1 Claim Administration Process

*a)* *Claim Submittal*: This is a process by which the claimant is obliged to claim within a reasonable period of time (28 – 30 days in most contracts) followed by her/his preparation for all substantial documents and legal aspects supporting hers/his entitlements for an official submittal. This constituted that a claim has been filed for its consideration if all these three sub processes called *Claim Notification*, *Claim Preparation* and *Claim Submittal* are fully undertaken by the claimant.

*b)* *Claim Processing*: This process initiates checking of the claim whether, it is legally or contractually supported or not; documents provided are valid and reliable to substantiate the claim for consideration or not; and overall procedural requirements have been followed or not. After verifying the validity of the claim proper computations and evaluations will be carried out to present the proposed compensation for the contractual parties the claim is applicable to. Generally the sub process that undertakes these requirements is termed as *Claim Handling.*

*c)* *Claim Enforcement*: This is a stage where the approved claim is enforced and finally becomes a closure therefore two sub processes are included. The claim enforcement process will entertain the inclusion of the approved claim into payment certificates where their enforcement is due.

Once this compensation or entitlement is due in accordance to the approved claim and its enforcement requirements, then it is concluded for its closure. In order to account for such an administration process contracts provide claim clauses with in their provisions in their conditions of contract.

## V. RELATIONSHIP BETWEEN DELAY AND DISRUPTION CLAIMS

### *A. Delay and Disruption*

Delay and disruption on any project can quickly result in a disaster for any contractor; increasing time related costs and risking liability for liquidated damages to the principal.

Delays are lateness whereas disruptions are a reduction in productivity. That‘s not to say the two aren‘t related. Delays can cause disruptions, disruptions can cause delays and often the two go hand-in-hand. There is, however a clear distinction between the two and each requires a different approach to assessing the validity and extent of the claims (Robert, 2016). Generally;

*1)* Delays are lateness
*2)* Disruptions are a reduction in productivity

But we cannot say that the disruptions and delays aren‘t related. Delays can cause disruptions, disruptions can cause delays and often the two go hand-in-hand. There is, however a clear distinction between the two and each requires a different approach to assessing the validity and extent of the claims.

### *B. Understanding Delay And Disruption Claims*

Delay and disruption claims are both commonplace on construction projects. As projects become increasingly large and complex, we see clients passing on as much risk as possible to the head contractor; risks that a contractor may find difficult to manage and/or costly in terms of time and money should they eventuate. It is hardly surprising that when critical path activities are delayed or disrupted as a result of labour, scheduling, site and/or construction issues, disputes arise over who (client or contractor) should bear the additional costs incurred as a result. One of the most common questions we hear from clients is “my project has been delayed and possibly disrupted; what additional costs have I incurred and how can they be recovered?” To start, let’s look at the difference between the two. Put simply, delays are a lateness whereas disruptions are a reduction in productivity. That’s not to say the two aren’t related. Delays can cause disruptions, disruptions can cause delays and often the two go hand-in-hand. There is, however a clear distinction between the two and each requires a different approach to assessing the validity and extent of the claims.

1) *Evaluating Delay Claims:* The starting point for evaluating delay claims is the terms of the particular contract in question. Most contracts will recognize that a delay in itself isn’t enough to give the contractor reasonable grounds on which to make a delay claim; it depends on the circumstances that cause the delay. The circumstances under which a contractor may make a delay claim are usually stated in the contract but the list may vary from contract to contract. Whatever the terms of the contract, determining a contractor’s right to make a claim can still be a complex process. Two common bones of contention which often send delay claims to court are a) Whether the delay impacts critical path activities or not and the contractor’s right to claim for costs as a result of those delays; and b) the extent to which contractors can claim for both costs incurred during the period of delay as well as those incurred as a consequence of the delay.
2) *Evaluating Disruption Claims:* As indicated earlier, disruption claims are essentially productivity related, arising as a result of events that hinder planned or actual progress which in turn reduces the output of construction resources.

Unlike delay claims, the terms of the specific contract are less useful when evaluating disruption claims. Instead, the onus is on the contractor to provide reasonable evidence that a) the work has been interrupted; b) the disruption caused them to incur additional costs; and c) the cause for the disruption constitutes a breach of contract by the employer or an action for which the contract provides for the reimbursement of extra costs.

Providing evidence to support disruption claims can be challenging. Again, the onus is on the contractor to identify that losses have occurred, which element of work was disrupted, which trades were disrupted and to provide evidence in the way of documented records that explain why the losses have occurred. Consider also that a disruption is not usually detected by the contractor until after it occurs; the loss of productivity can have multiple causes and the effect of the disruption can be masked by other project issues. It is therefore easy to see why the root cause of disruptions is often disputed between the client and the contractor and why proving disruption claims becomes difficult. Difficult, but not impossible. In relation to delay, apart from the direct additional construction costs, the disputed costs frequently include site overheads, often referred to as preliminaries and indirect job costs, offsite/head office overheads, loss of profit, and finance and interest charges. In relation to disruption, there are various methods used to estimate loss which include the measured mile analysis, baseline productivity analysis, comparison methods, earned value analysis, system dynamic modeling, industry studies and total cost. Your quantum expert is best placed to determine the most appropriate method of estimating in each case, taking into consideration the advantages and disadvantages of each method, how the disruption occurred and the records available to support the claim. And it is important to get it right; the selection of the best method for the circumstances can be the difference between success or failure of a claim or defense.

### *C. Similarities Between Delay and Disruption*

Events that cause disruption during a construction project are very similar to those which are associated with delay and might include, for example, the employer stopping and starting the project, late design information, differing site conditions, delayed or un

co-ordinate instructions for variations, employer instructed out-of-sequence work, overzealous inspections or testing, the presence of other contractors, damage caused to the works by other con- tractors, delayed or hindered access and late issue of or inaccurate drawings.

*D. Difference Between Delay And Disruption*

Delays are specific, singular events of conditions that result in the project completion and/or work actively starting or completing later than originally planned.

Disruptions include the effects of individual or multiple delays, as well as interruptions to the planned method, manner, sequence, and duration of work activities directly and/or indirectly associated with the impacting event. Disruptions usually affect labor productivity and can cause significant cost overrun variances in labor budgets. Disruptions are often contributing causes to a project delay when the delay-related impacts ripple throughout the project to both the work activities directly changed and the unchanged work not directly affected.

Delay, as it sounds, is being late. Disruption on the other hand, is a change to the planned working method. It is generally accepted that for a contractor to be entitled to an extension of time for completion of works, an event for which the client is responsible must have had an impact on the critical path of the works — in so far as it requires that the date for completion be amended or that activities are accelerated to meet deadlines.

A disruption has been suffered where the work is carried out less efficiently than it would have otherwise been, had the disrupting event not have occurred Delay and disruption also differ in the way they are compensated. A contractor who suffers a delay to the completion date due to the client may claim for prolongation — a longer time on site. These costs will necessarily be time-related costs: those which are incurred on the basis of the time they occurred at; for example, the daily or weekly cost of plant or site facilities, home office overheads, and supervision staff.

## VI. ROLE OF ENGINEER

*A. The Role Of Engineer In Construction Overview*

The Civil Code of Ethiopia in Chapter 4. Hiring of intellectual work the Engineer referred as "Intellectual" - (Ref: **Art. 2632 - 2638** of Civil Code).

1) *PPA 2011 Clause 1.2 (n) Defines:* The “Engineer” is the person named in the Special Conditions of Contract (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Engineer) who is responsible for supervising the execution of the Works and administering the Contract.
2) *MDB FIDIC 2010 sub-clause 1.1.2.4 Defines:* “**Engineer**” means the person appointed by the Employer to act as the Engineer for the purposes of the Contract and named in the Contract Data, or other person appointed from time to time by the Employer and notified to the Contractor under Sub-Clause 3.4 [Replacement of the Engineer].
3) *According to MDB FIDIC 2010 clause 3 sub clause 3.1:* The Employer shall appoint the Engineer who shall carry out the duties assigned to him in the Contract. The Engineer’s staff shall include suitably qualified engineers and other professionals who are competent to carry out these duties.

The Engineer shall have no authority to amend the Contract.

The Engineer may exercise the authority attributable to the Engineer as specified in or necessarily to be implied from the Contract. If the Engineer is required to obtain the approval of the Employer before exercising a specified authority, the requirements shall be as stated in the Particular Conditions. The Employer shall promptly inform the Contractor of any change to the authority attributed to the Engineer. However, whenever the Engineer exercises a specified authority for which the Employer’s approval is required, then (for the purposes of the Contract) the Employer shall be deemed to have given approval.

Except as otherwise stated in these Conditions:

*a)* Whenever carrying out duties or exercising authority, specified in or implied by the Contract, the Engineer shall be deemed to act for the Employer;
*b)* The Engineer has no authority to relieve either Party of any duties, obligations or responsibilities under the Contract;
*c)* Any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test, or similar act by the Engineer (including absence of disapproval) shall not relieve the Contractor from any responsibility he has under the Contract, including responsibility for errors, omissions, discrepancies and non-compliances; and
*d)* Any act by the Engineer in response to a Contractor’s request except as otherwise expressly specified shall be notified in writing to the Contractor within28 days of receipt.

The following provisions shall apply:

The Engineer shall obtain the specific approval of the Employer before taking action under the following Sub-Clauses of these Conditions:

i) *Sub-Clause 4.12:* Agreeing or determining an extension of time and/or additional cost.
ii) *Sub-Clause 13.1:* Instructing a Variation, except;
1. In an emergency situation as determined by the Engineer, or
2. If such a Variation would increase the Accepted Contract Amount by less than the percentage specified in the Contract Data.

iii) *Sub-Clause 13.3:* Approving a proposal for Variation submitted by the Contractor in accordance with Sub-Clause 13.1 or 13.2.
iv) *Sub-Clause 13.4:* Specifying the amount payable in each of the applicable currencies.

Notwithstanding the obligation, as set out above, to obtain approval, if, in the opinion of the Engineer, an emergency occurs affecting the safety of life or of the Works or of adjoining property, he may, without relieving the Contractor of any of his duties and responsibility under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. The Contractor shall forthwith comply, despite the absence of approval of the Employer, with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 13 and shall notify the Contractor accordingly, with a copy to the Employer.

According to PPA 2011 clause 12: Engineers and Engineer representative

Sub clause

1. 12.1Except where otherwise specifically stated and subject to any restriction in the SCC, any action required or permitted to be taken, and any document required or permitted to be executed, under this Contract by the Public Body or the Contractor may be taken or executed by the Engineers named in the SCC. Except as expressly stated in the SCC, the Engineer shall not have authority to relieve the Contractor of any of his obligations under the Contract.
2. 12.2 Any notice, information or communication given to or made by an Engineer shall be deemed to have been given or made by the Public Body.
3. 12.3The Engineer may delegate any of his duties and responsibilities to Engineer's representative after notifying the Contractor, and may cancel any delegation after notifying the Contractor.
4. 12.4The role of the Engineer's representative shall be to supervise and inspect works and to test and examine the materials employed and the quality of workmanship. Under no circumstances will the Engineer's representative be empowered to relieve the Contractor of his obligations under the contract or – except where express instructions to that effect are given in the SCC – order works resulting in an extension of the period of performance or additional costs to be paid by the Public Body or introduce variants in the nature or scale of the works.
5. 12.5 Any communication given by the Engineer's representative to the Contractor in accordance with the terms of such delegation shall have the same effect as though it had been given by the Engineer, provided that: Any failure on the part of the Engineer's representative to disapprove any work, materials or plant shall not prejudice the authority of the Engineer to disapprove such work, materials or plant and to give the instructions necessary for the rectification thereof; The Engineer shall be at liberty to reverse or vary the contents of such communication.12.6 Instructions and/or orders issued by the Engineer shall be by way of administrative orders. Such orders shall be dated, numbered and entered by the Engineer in a register, and copies thereof delivered by hand, where appropriate, to the Contractor's representative.

***B.*** *General Role of Engineers*

Generally Engineers have role of:

1) *Construction Supervision:* With respect to Construction supervision, once work starts on the project, to supervise or to Inspect the work carried out by the contractor in order to ensure conformity with the design requirements.
2) *Contract Administrator:* Especially the role of the consultant as contract administrator divided in to the following distinct role.
1) *Agent Role*

i) (Power of agency-Agent Role derived from Art. 2179 of Civil Code)
ii) Power: - Variation – Clause 13.1 MDB FIDIC 2010
   a. -Supervision – Clause 8.8 MDB FIDIC 2010
iii) Function: -Advising – Clause 3.1-3.5 MDB FIDIC 2010
iv) Quantity Surveying – Clause 3.1-3.5 MDB FIDIC 2010
v) Testing – Clause 3.1-3.5 MDB FIDIC 2010
vi) Inspection – Clause 3.1-3.5 MDB FIDIC 2010

*2) Professional Role*

*i)* Design: - designs, drawings, and related – Clause 3 MDB FIDIC 2010
- Information – Clause 3.1-3.5 MDB FIDIC 2010

*ii)* Certification: -Payments – Clause 3.1-3.5 MDB FIDIC 2010
- Events (taking over's, defects liability) – Clause 3.1-3.5 MDB FIDIC

*iii)* Determination: -Claims – Clause 3.1-3.5 MDB FIDIC 2010
- Other Maters– Clause 3.1-3.5 MDB FIDIC 2010

***C.*** *Engineer's Role in the Claims Process*

Considering the engineers intimate involvement with a typical project from beginning to end, it is not surprising that engineers become very involved in the claims process. The claims process refers to the process whereby the construction contractor requests additional compensation or other benefits under the contract from the project owner.

The engineer's responsibilities during the construction phase make it almost inevitable that the engineer will get involved in claims situations. Many construction contracts recognize this reality and specifically delineate a certain role for the engineer. This section examines the role of the engineer in the claims process.

*1) Engineer As Agent Of The Owner:* If the engineer is given responsibilities during the construction phase of the project, the engineer carries out those responsibilities as the agent of the owner. This is a crucial factor, as the agency relationship has a number of legal ramifications. A construction contractor has the right to rely on the words and actions of the engineer if the engineer is acting within its actual or apparent authority on the project.

An owner cannot designate an engineer as an on-site representative and then disown the remarks or directives of that representative. The law recognizes this by holding that the project owner, as principal, will be bound by the acts of its agent, the engineer.

Engineers must constantly keep this in mind during the construction phase. Every directive and every interpretation must be consistent with the terms of the contract the construction contractor agreed to. If the engineer directives are inconsistent with the terms of the contract, the contractor may very well be entitled to additional compensation or some other remedy under the contract. The owner will pay for this remedy, as the owner is bound by its agent actions.

Conversely, any information that comes to the attention of the engineer during the construction process will be imputed to the project owner. If a contractor points out a differing physical condition at the site to the engineer or informs the engineer of a problem that is delaying progress, the engineer has a duty to promptly inform their principal, the owner. Even if the engineer fails to transmit this information to the owner, the knowledge will still be imputed to the owner because of the agency relationship. The contractor has the right to assume that anything said or given to the owner designated representative will be transmitted to the owner.

The legal impact of this agency doctrine is significant. An engineer, as agent of the owner, has the ability to inadvertently waive contract rights possessed by the owner or grant certain contractual remedies to the contractor.

It is crucial that any change in the legal relationship between owner and contractor result from a thoughtful, deliberate decision which the project owner has expressly authorized. An owner who discovers that their engineer has inadvertently waived certain contractual rights will not be pleased.

In order to protect themselves and their client (the owner), an engineer must be thoroughly familiar with the construction contract. This includes not only the technical aspects of the contract but the general provisions and other e legal aspects as well. If the engineer is not familiar with the rights and responsibilities of each party, how can they appreciate the ramifications of their actions or directives? While discussing agency, it is necessary to note the importance of the scope of the engineer authority. Frequently, the engineer is not designated as the owner on-site representative. The engineer construction phase responsibilities may be limited to monthly inspections and a final certificate of completion.

The engineer agreement with the owner should make this clear. So should the construction contract. There is nothing worse for an engineer or an owner than working with a construction contract which implies the engineer has broad job site authority when in fact the owner has given the engineer very little authority. All the contract documents should accurately reflect the engineer scope of authority. All parties will know where they stand, and there will be no problem with the contractor relying on apparent authority which the engineer actually does not possess.

***D.*** *Assessment of Claim By the Engineer*

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

1) *Is the Claim Valid in Principle?:* If yes, then
2) *Is the Evaluation and Quantification Correct?:* Contractual claims must be based on contract document .It is important to see what the contract says-not what one thinks it ought to say or what one would have liked it to say, or even what one thinks is fair. The contract was agreed between both parties to the contract and it is taken to be a statement of the terms of the contract. if the contract states that the contractor is to be responsible for something, then the contractor is responsible however unfair it may seem later.

Claims are usually requested for:

*a)* An extension of time for completion of the work or,
*b)* Extra payment, or
*c)* An extension in time and extra payment

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

***E.*** *Engineer As Arbitrator*

It is common for construction contracts to state that any claim for a price increase or extension of time must first be presented to the engineer for a decision. When presented with such a request, the engineer is expected to make an independent judgment as a professional, not a parochial decision based on the engineer loyalty to the project owner.

This is a difficult task, as the engineer is being asked to function simultaneously as agent of the owner and as a neutral arbitrator. Furthermore, the engineer may be faced with a direct conflict of interest if the claim relates to the sufficiency or accuracy of the engineer work product. For instance, where a contractor claims that the drawings inaccurately portrayed site conditions or failed to address the fit of particular components, the sufficiency of the engineer professional work product is called into question. It is difficult for the engineer to be entirely objective, knowing that a favorable recommendation on the contractor claim will raise questions from its client, the project owner. Nonetheless, the engineer has an obligation to make an objective determination and give the contractor that which it is entitled to under the contract. The effects of this conflict are mitigated by the fact that when the engineer functions as an arbitrator during construction, it is usually just dispensing a preliminary administrative remedy. The contractor must, under the terms of the contract, seek the engineer decision first, but it is not ultimately bound by that decision.

Typically, the decision can be appealed to an administrative board or a court. Frequently, an arbitration clause calls for formal, binding arbitration of the dispute. This is separate from the engineer arbitration role during the construction phase, and the engineer would never serve on a panel of arbitrators if they had been involved in the project.

In the past, some public contract documents purported to give the engineer final authority to resolve all claims. These so-called engineer decision clauses stated that there could be no appeal from the engineer decision on a claim.

Courts were hostile toward these clauses, recognizing the inequity of allowing the owner agent or employee to make unappealable decisions. Although the clauses were considered enforceable, courts were resourceful at finding ways to limit their effect. Today, engineer decision clauses are rare in public construction contracts. Most jurisdictions have established administrative boards to decide contractor claims.

While the engineer opinions and the engineer initial response to the claim will certainly be considered, the board will have authority to make independent findings of fact, rulings of Law, and a decision on the claim.

## VII. CASE STUDY

*A. Case Study one*

The claim submission letter

Covering letter from **XY engineers** Ltd (the contractor) to **AB** (the architect or consultant):

Date -------- March ---------

Dear Sir,

Re: ABC Company

Further to our letter of --August ------requesting a review of extensions of time, our letter of ----September ---- giving particulars of loss and/or expense.

Our claim is for further extensions of time and for reimbursement of loss and/or expense and/or damages for the amount.

Your early response would be appreciated.

Yours faithfully

For and on behalf of XY Ltd

*General*

*1) The Parties*

*a)* The employer is ABC Company.

*b)* The architect or consultant is AB architects

*c)* The contractor is XY engineers

*2) The Works*

The works of constructing stores buildings.

*3) The Tender And The Contract Sum*

*a)* The contractor submitted his tender on **30 marches 1993** for the sum of **Birr 6,047,883.90**.

*b)* The employer unconditionally accepted the contractor's tender by letter dated **10 April 1993**.

*c)* Project was signed on **April 12, 1993** with the contract sum for a cost of Birr **6,047,883.90**.

*d)* The Employer has to pay within 30 Cal. days all payment certificates after approval by the consultant and is liable for every days of delay to pay within such periods to compensate the contractor the unpaid sum as per the Bank's Saving account interest which is 6% per annum compounded semi - annually.

*e)* The project is completed and provisional acceptance was made on January 2, 1996.

*f)* ICB(international competitive bidding)

*g)* DBB delivery method depend on FIDIC 2010 /PPA ICB 2011 version.

Executed with the following conditions;

*i)* Handing over of site is made on.....Sept. 21, 1993.

*ii)* Mobilization time..... 30 Cal. days.

*iii)* Completion time ..... 660 Cal. days.

*iv)* Liquidated damages equals 1/1000 per unjustified delay of Cal. days of that part of contract price limited to 15% of the contract price.

*v)* The Contractor executed Site clearance and some parts of bulk excavation amounting Birr 201,465.56 during the time of removing the minimum interference of obstructions by the Employer.

The following components of the project costs are as follows;

*1.* The following variations and Excess in quantities are executed;

| Description of works | Variation works/ additions | Excess in Quantities | Variation works/ omissions |
|---|---|---|---|
| Cost | 140,496.08 | 87,631.80 | 69,760.28 |

Table 2 shows variations and Excess in quantities

*2.* The following change orders are given during execution;

| Description of work | Requested by | Approved by | Remarks |
|---|---|---|---|
| Workshop roof truss | Employer | Consultant | Design is changed |
| Workshop wall | Contractor | Employer | Masonry to bricks |
| All down pipes | Contractor | Employer | PVC to GS sheets |

Table 3 shows change orders

*3.* The following payment certificates are paid to the contractor as given in the table below;

| Payment Certificate Nos. | Amount approved | Consultant Approval date | Employer pay date | Work executed amount during payment delay |
|---|---|---|---|---|
| P.C.N. 05 | 500,000 | Oct. 2, 1994 | Jan. 09, 1995 | 285,000 |
| P.C.N. 07 | 325,000 | Feb. 5, 1995 | Mar. 2, 1995 | 500,000 |
| P.C.N. 08 | 268,345 | Apr. 11, 1995 | Jun. 13, 1995 | 368,945 |

Table 4 specify payment certificates

The contractor claims for Time Extensions as below
Summary of Facts

*1)* Due to Variation order amount of Birr 140,496.08
*2)* Due to Excess in quantities amount of Birr 59,633.45
*3)* Design change to relocate buildings and roads to insure minimum interference with existing trees, electric high tension lines, water supply and sewerage lines, etc.
*a)* Requested by the Contractor dated Oct. 20, 1993 and approval by the consultant and Employer was made on Oct. 30, 1993. And the minimum interference was removed by the Employer, with the consultation and approval of all public works authority for the regulations proper, on Nov. 20, 1993.
*4)* Design change for two components of the buildings, namely Dining hall and Hay burn
*a)* Requested by the Contractor dated Nov. 20, 1993 and Design changed and approved by the consultant and Employer was made on Dec. 22, 1993 for Dinning hall and Dec. 18, 1993 for Hay burn.
*5)* Design change for the roof truss of workshop building.
*a)* Requested by the Contractor dated May. 4, 1994 and Design changed and approved by the consultant and Employer was made on May. 19, 1994
*6)* Change in walling material for Workshop building
*a)* Requested by the Contractor dated Apr. 4, 1993 and acceptance by the Employer was made on May. 13, 1994.
*7)* Change in down pipes material for all buildings.
*a)* Requested by the Contractor dated Aug. 9, 1994 and acceptance by the Employer was made on Aug. 25, 1994.
*8)* Fire break out in lecture hall producing factory
*a)* Agreement made on Nov. 2, 1994 to complete within 120 Cal. days. Fire breakout on Jan. 20, 1994. Another order was made to another factory and lecture hall seats completed on May 2, 1995.
*9)* EELCO Transformer installation
*a)* Request made to EELCO dated Jun. 5, 1994 and Estimate from EELCO obtained on Aug. 4, 1994.
*10)* Change in working days from 6 days a week to 5 days a week
*11)* Due to bad weather condition during the two rainy seasons in the construction period.
*a)* the effect extends itself on the project by 20%
*12)* Permission delay from Municipality for the construction of External roads and connection to the existing Municipal sewer point.
*a)* Request made to Municipality dated Feb. 8, 1994 and permission granted on Mar. 22, 1994.
*13)* Delay in Payment certificate No. 5 and 8.
*14)* The following table gives information on Changes in cost due to the inflation of Economy to compute price variations compensations;

| Material | Quantity | | | | Unit rate of material | | | |
|---|---|---|---|---|---|---|---|---|
| | Contract Document | Total Executed | Executed before Increase | Executed after Increase | Based for bid | Rate before increase | Highest of Based for bid and Rate before increase | Rate after increase |
| Cement (Qts.) | 250,000 | 908.57 | 125.33 | 783.24 | 24.14 | 37.35 | 37.35 | 42.22 |
| Coarse aggregate ($M^3$) | 34,788.18 | 126.43 | 17.44 | 108.99 | 38.00 | 40.00 | 40.00 | 65.00 |
| Timber ($M^3$) | 932.79 | 3.39 | 0.47 | 2.92 | 500.00 | 1500.00 | 2000.00 | 500.00 |
| Steel Reinforcement (Kg) | 237,541 | 863.20 | 119.07 | 744.13 | 3.00 | 3.15 | 3.15 | 4.20 |
| 8mm thick Chipwood ($M^2$) | 520 | 518.44 | None | 518.44 | 8.65 | 14.65 | 14.65 | 17.95 |
| Seco profile Windows and doors (Kg) | 2610 | 2608.06 | None | 2608.06 | 5.00 | 5.10 | 5.10 | 8.50 |
| Asphalt (Drum) | 270 | 269.95 | None | 269.95 | 110.00 | 285.75 | 285.75 | 475.00 |

Date coverage = Jan. 26, 1995 - Aug. 08, 1995
Date price changed = Apr. 01, 1995
Over all contractor “EOT” requests.

*b)* As per the contractor asked the following Claimed dates for the above 13 causes respectively.

| Fact no | Claimed dates |
|---|---|
| 1 | 16 Cal. days |
| 2 | 7 Cal. days |
| 3 | 30 Cal days |
| 4 | 32 Cal. days |
| 5 | 15 Cal. days |
| 6 | 23 cal. days |
| 7 | 16 Cal days |
| 8 | 92 Cal. days |
| 9 | 60 Cal days |
| 10 | 44 Cal. days |
| 11 | 48 Cal. days |
| 12 | 31 Cal. days |
| 13 | 104 Cal. days |

Table 5 over all contractor “EOT” request

Our Determinations and Recommendations

*1)* Regarding to bad weather condition during the two rainy seasons in the construction period

According to sub clause 19.1 of MDB-FIDIC (2010) and also in clause 18 of PPA 2011 stated that:-

In this Clause, “Force Majeure” means an **exceptional event** or circumstance:

*a)* which is beyond a Party's control,
*b)* which such Party could not reasonably have provided against before entering into the Contract,
***c)*** which, having arisen, such Party could not reasonably have avoided or overcome,

Generally the contractor assumed as having enough information about that season, so that there is no extension of time for this reason arise from contractor

*i)* Number of days granted as a result of "bad weather condition during the two rainy seasons in the construction period." is Zero (0).

*2)* Regarding to Change in working days from 6 days a week to 5 days a week

According to sub clause 8.3 of MDB-FIDIC (2010) and also in clause 41 of PPA 2011 stated that:-

If, at any time, the Engineer gives notice to the Contractor that a programme fails (to the extent stated) to comply with the Contract or to be consistent with actual progress and the Contractor's stated intentions, the Contractor shall submit a revised programme to the Engineer in accordance with this Sub-Clause.

An update of the program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.

Generally The contract time is based on Cal. days, therefore changes in working days has no effect on the project.

*a)* Number of days granted as a result of "Change in working days from 6 days a week to 5 days a week" is Zero (0).

*3)* Regarding to Change in walling material for Workshop building and Change in down pipes material for all buildings.(value engineering)

According to sub clause 13.2of MDB-FIDIC (2010) stated that:-

If a proposal, which is approved by the Engineer, includes a change in the design of part of the Permanent Works, then unless otherwise agreed by both Parties:

*a)* The Contractor shall design this part,
*b)* Sub-paragraphs (a) to (d) of Sub-Clause 4.1 [*Contractor's General Obligations*] shall apply, and
*c)* If this change results in a reduction in the contract value of this part, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine a fee, which shall be included in the Contract Price.

This fee shall be half (50%) of the difference between the following amounts:

*i.* Such reduction in contract value, resulting from the change, excluding adjustments under Sub-Clause 13.7 [*Adjustments for Changes in Legislation*] and Sub-Clause 13.8 [*Adjustments for Changes in Cost*], and
*ii.* The reduction (if any) in the value to the Employer of the varied works, taking account of any reductions in quality, anticipated life or operational efficiencies.

However, if amount (i) is less than amount (ii), there shall not be a fee.

Generally The Change in walling material for Workshop building and Change in down pipes material for all buildings.

Since Changes are initiated and requested by the contractor for cost advantage and easy availability with construction, and could he execute as per contract if reply delayed, therefore; such delays are not justifiable

*1.* Number of days granted as a result of "in walling material for Workshop building and Change in down pipes material for all buildings" is Zero (0).

*4)* Regarding to Change in cost compensation

According to sub clause 13.8 of MDB-FIDIC (2010) and also in clause 62 of PPA 2011 stated that:-

If this Sub-Clause applies, the amounts payable to the Contractor shall be adjusted for rises or falls in the cost of labour, Goods and other inputs to the Works, by the addition or deduction of the amounts determined by the formulae prescribed in this Sub-Clause. To the extent that full compensation for any rise or fall in Costs is not covered by the provisions of this or other Clauses, the Accepted Contract Amount shall be deemed to have included amounts to cover the contingency of other rises and falls in costs. MDB-FIDIC (2010)

All prices shall be firm unless the Contractor has provided claim for price adjustment. The Contractor may invoke this provision at any time during the Contract by notice in writing to the Engineer.

The Public Body can increase or decrease the Contract Price amount as described by this Clause.

Price Adjustment shall be applicable as payable in full for the original scheduled completion period.

Generally The Change in material will be played for the contractor as un paid sum

Delay analysis

Determination of contractor EOT claim

*1)* Identifying total project delay to evaluate the claim of EOT

Total delay of the project

Contract Date = April 12, 1993.

Handing over site Date = September 21, 1993 = Commencement Date

Mobilization Time = 30 Cal. days.

Starting Date = Commencement Date + Mobilization Time.

= Sept. 21, 1993 + 30 Cal. days. = Oct. 21, 1993.

Contract Time = 660 Cal. days.

Completion Date as per the contract = Starting Date + Contract Time.

= Oct 21, 1993 + 660 Cal. days.= **Aug. 12, 1995**.

Actual Completion Date = Jan. 2, 1995.

Total delay of the project = Actual Completion Date - Completion Date as per the contract.

= Jan. 2, 1995 - Aug. 13, 1995. = 143 Cal. Day

Justified delay of the project

| No. | Description of Claims | Determination | Computations | Justified delay |
|---|---|---|---|---|
| 1. | Due to Variation order amount of Birr 140,496.08 | (140,496.08 / 6,047,883.90) * 660 = 15,33 days | Variation + Excess in quantities - Omissions = 140,496.08 + 87,631.80 - 69, 760.28 = 158,367.60. Delay justified = (158,367.60 / 6,047,883. 90) * 660 = 17 Cal. days. | 17 Cal. days |
| 2. | Due to Excess in quantities amount of Birr 59,633.45 | (59,633.45 / 6,047,883.90) * 660 = 6.51 days | | |
| 3. | Design change to relocate buildings and roads to insure minimum interference with existing trees, electric high tension lines, water supply and sewerage lines, etc. | Requested by the Contractor dated Oct. 20, 1993 and approval by the consultant and Employer was made on Oct. 30, 1993. And the minimum interference were removed by the Employer, with the consultation and approval of all public works authority for the regulations proper, on Nov. 19, 1993. | Delay to be claimed is From Oct. 20, 1993 to Nov. 19, 1993 = 30 Cal. days. But during this period the contractor executed works amounting 201,465.56 which saves (201,465.56 / 6,047,883.90) * 660 = 22 Cal. days. Therefore, delay to be justified should be = 30 - 22 = 8 Cal. days | 8 Cal days |
| 4. | Design change for two components of the buildings, namely Dining hall and Hay burn | Requested by the Contractor dated Nov. 20, 1993 and Design changed and approved by the consultant and Employer was made on Dec. 22, 1993 for Dinning hall and Dec. 18, 1993 for Hay burn. | Dinning hall: Completion time as per contract = (Component Cost / Contract price) * contract time = (563.291.81/ 6,047,883.90) * 660 = 62 Cal. days. Completion time as per schedule is 150 Cal. days. Therefore; Completion time for the dining hall will be 150 Cal. days. Delay to be claimed is From Nov. 20, 1993 to Dec. 22, 1993 = 33 Cal. days which is a proportion of the total work; ie, 33 / 660 = 0.05. Therefore delay to be justified should be = 0.05 * 150 = 7.5 Cal. days. Similarly for Hay burn, justified delay should be 4 Cal. days. Since both components are scheduled parallely, the total justified delay is taken to be 7.5 Cal. days | 7. 5 Cal. days |
| 4. | Design change for the roof truss of workshop building. | Requested by the Contractor dated May. 4, 1994 and Design changed and approved by the consultant and Employer was made on May. 19, 1994. | Completion time as per contract = (Component Cost / Contract price) * contract time = (58,916/ 6,047,883.90) * 660 = 7 Cal. days. Completion time as per schedule is 10 Cal. days. Therefore; Completion time for the roof truss of the workshop will be 10 Cal. days. Delay to be claimed is From May. 4, 1994 to May. 19, 1993 = 15 Cal. days which is a proportion of the total work; ie, 15 / 660 = 0.023. Therefore delay to be justified should be = | 0.23 Cal. days |

| | | | | |
|---|---|---|---|---|
| | | | 0.023 * 10 = 0.23 Cal. days. | |
| 6. | Change in walling material for Workshop building | Requested by the Contractor dated Apr. 4, 1994 and acceptance by the Employer was made on May. 13, 1994 | Since Changes are initiated and requested by the contractor for cost advantage and easy availability with construction, and could he execute | |
| 7. | Change in down pipes material for all buildings. | Requested by the Contractor dated Aug. 9, 1994 and acceptance by the Employer was made on Aug. 25, 1994. | as per contract if reply delayed, therefore; such delays are not justifyable. | - |
| 8. | Fire break out in lecture hall producing factory | Agreement made on Nov. 2, 1994 to complete within 120 Cal. days. Fire breakout on Jan. 20, 1994. Another order was made to another factory and lecture hall seats completed on May 2, 1995. | Completion time as per contract = (Component Cost / Contract price) * contract time = (229,500 / 6,047,883.90) * 660 = 25.05 Cal. days. Completion time as per schedule is 30 Cal. days. Therefore; Completion time for the lecture hall seats will be 30 Cal. days. Delay to be claimed is From Nov. 2, 1994 to May. 2, 1995 = 92 Cal. days which is a proportion of the total work; ie, 92 / 660 = 0.1394. Therefore delay to be justified should be = 0.1394 * 30 = 4.2 Cal. days. | 5 Cal. days |
| 9. | EELCO Transformer installation | Request made to EELCO dated Jan. 5, 1994 and Estimate from EELCO obtained on Aug. 4, 1994. | Completion time as per contract = (Component Cost / Contract price) * contract time = (90,015.83 / 6,047,883.90) * 660 = 9.82 Cal. days. Completion time as per schedule is 10 Cal. days. Therefore; Completion time for the transformer installation will be 10 Cal. days. Delay to be claimed is From Jan. 5, 1994 to Aug. 4, 1994 = 60 Cal. days which is a proportion of the total work; ie, 60 / 660 = 0.091. Therefore delay to be justified should be = 0.091 * 10 = 1 Cal. days. | 1 Cal days |
| 10. | Change in working days from 6 days a week to 5 days a week | 660 / 30 = 22, then 22 * 4 * 0.5 = 44 Working days | The contract time is based on Cal. days, therefore changes in working days has no effect on the project. | - |
| 11. | Due to bad weather condition during the two rainy seasons in the construction period. | Assuming the effect extends itself on the project by 20%, then 120 * 2 * 0.20 = 48 Cal. days. | Weather conditions shall be considered in the contract time. Unless adverse and unexpected weather conditions pertain to delay the project, no delays shall be justified with this regard. | - |
| 12 | Permission delay from Municipality for the construction of External roads and connection to the existing Municipal sewer point. | Request made to Municipality dated Feb. 8, 1994 and permission granted on Mar. 22, 1994. | Completion time as per contract = (Component Cost / Contract price) * contract time = (205,368.00 / 6,047,883.90) * 660 = 22.41 Cal. days. Completion time as per schedule is 90 Cal. days. Therefore; Completion time for the transformer installation will be 90 Cal. days. Delay to be claimed is From Feb. 8, 1994 to Mar. 22, 1994 = 31 Cal. days which is a proportion of the total work; ie, 31 / 660 = 0.047. Therefore delay to be justified should be = 0.047 * 90 = 4.23 Cal. days. | 5 Cal. days |
| 13. | Delay in Payment certificate No. 5 and 8. | See table above | Delay to be claimed From table above = 104 Cal.days. However, the contractor executes work amounting 285,000 + 368,945 = 653,945 which is a proportion of the total work; ie, 653,945 / 6,047,883.90 = 0.108. Therefore, justified delay would be 104 - (0.108 * 660) = 33 Cal. days | 33 Cal. days |

Table 6 process of justified delay analysis

= 98.73 Say 99 Cal. days.

*1) Unjustified delay of the project*

Unjustified delay = Total delay - Justified delay
= 143 – 99 = 44 Cal. days.

*2) Liquidated Damages*

The liquidated damage will be applicable for unjustified delays, therefore; the delay to be considered for this part is 44 Cal. days.
Liquidated damage = 1/ 1000 per unjustified delay of that part of the contract price.
Unjustified delay = 44 Cal. days.
The part of the contract price included in the unjustified delay is:
= (44 / 660) * 6,047,883.90= 403,192.26
Liquidated damage = (1/ 1000) * 44 * 403,192. 26 = 17,740.46
Limit of liquidated damage = 10% (6,047,883.90)
= 604,788.39. > 17,740.46
LD= Birr 17,740.46.

*3) Unpaid sum Compensation*

Amount of delayed payment certificate and delayed days:
P.C.N. 05 = Birr 500,000 and delayed for 103 - 30 = 73 Cal. days.
P.C.N. 08 = Birr 268,345 and delayed for 64 - 30 = 34 Cal. days.
Unpaid sum compensation for P.C.N. 05 is computed as:
= 500,000 * (73 / 365) * (6 / 100) = 6000.
Unpaid sum compensation for P.C.N. 08 is computed as:
= 268,345 * (34 / 365) * (6 / 100)
The total unpaid sum = 6000 + 149. 50

**= Birr 6149.50.**

Change in cost compensation

| Material | Quantity | Unit Rate of Material | | | |
|---|---|---|---|---|---|
| | Executed after Increase | Highest of Based for bid and Rate before increase | Rate after increase | Unit rate used for changes in cost compensations | |
| Cement (Qts.) | 783.24 | 37.35 | 42.22 | 4.87 | 3,814.38 |
| Coarse aggregate ($M^3$) | 108.99 | 40.00 | 65.00 | 25.00 | 2,724.75 |
| Timber ($M^3$) | 2.92 | 2000.00 | 5000.00 | 3000.00 | 8,940.00 |
| Steel Reinforcement (Kg) | 744.13 | 3.15 | 4.20 | 1.05 | 781.34 |
| 8mm thick Chipwood ($M^2$) | 518.44 | 14.65 | 17.95 | 3.31 | 1,716.04 |
| Seco profile Windows and doors (Kg) | 2608.06 | 5.10 | 8. 50 | 3.40 | 8,867.40 |
| Asphalt (Drum) | 269.95 | 285.75 | 475.00 | 189.25 | 51,088.04 |

Table 7 Change in cost compensation

## VIII. COMPARATIVE TABLE & ANALYSIS

Comparison Table of MDB- FIDIC (2010), PPA (2011) Condition of construction contract and applicable laws in delay and disruption claims management

| General Conditions of Contract | Description | Clause number | Remark |
|---|---|---|---|
| Engineer | | | |
| MDB-FIDIC(2010) | means the person appointed by the Employer to act as the Engineer for the purposes of the Contract and named in the Contract Data, or other person appointed from time to time by the Employer and notified to the Contractor under Sub-Clause 3.4 [Replacement of the Engineer]. | 1.1.2.4 | |
| PPA (2011) | means a person named in the Special Conditions of Contract or appointed as such by the Public Body and notified in writing to the Contractor to act as the representative of the Public Body to supervise and inspect works and to test and examine the materials employed and the quality of workmanship, including any authorized representative of such person; | 1.2 | |
| ` Delayed Drawings or Instructions | | | |
| MDB-FIDIC(2010) | The Contractor shall give notice to the Engineer whenever the Works are likely to be delayed or disrupted if any necessary drawing or instruction is not issued to the Contractor within a particular time, which shall be reasonable. The notice shall include details of the necessary drawing or instruction, details of why and by when it should be issued, and the nature and amount of the delay or disruption likely to be suffered if it is late.<br>If the Contractor suffers delay and/or incurs Cost as a result of a failure of the Engineer to issue the notified drawing or instruction within a time which is reasonable and is specified in the notice with supporting details, the Contractor shall give a further notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:<br>(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and<br>(b) Payment of any such Cost plus profit, which shall be included in the Contract Price.<br>After receiving this further notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.<br>Instructions<br>However, if and to the extent that the Engineer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the Contractor's Documents, the Contractor shall not be entitled to such extension of time, Cost or profit. | 1.9 | |
| PPA (2011) | | | No room |
| Right of Access to the Site | | | |
| MDB-FIDIC(2010) | The Employer shall give the Contractor right of access to, and possession of, all parts of the Site within the time (or times) stated in the Contract Data. The right and possession may not be exclusive to the Contractor. If, under the Contract, the Employer is required to give (to the Contractor) possession of any foundation, structure, plant or means of access, the Employer shall do so in the time and manner stated in the Specification. However, the Employer may withhold any such right or possession until the Performance Security has been received.<br>If no such time is stated in the Contract Data, the Employer shall give the Contractor right of access to, and possession of, the Site within such times as required to enable the Contractor to proceed without disruption in accordance with the programme submitted under Sub-Clause 8.3 [Programme].<br>If the Contractor suffers delay and/or incurs Cost as a result of a failure by the Employer to give any such right or possession within such time, the Contractor shall | 2.1 | |

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| | give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:<br>(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and<br>(b) Payment of any such Cost plus profit, which shall be included in the Contract Price.<br>After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.<br>However, if and to the extent that the Employer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the Contractor's Documents, the Contractor shall not be entitled to such extension of time, Cost or profit. | | |
| PPA (2011) | The Public Body shall, in due time and in conformity with the progress of the works, place the site and access thereto at the disposal of the Contractor in accordance with the program of implementation of tasks referred to in these GCC. If possession of a part is not given by the date stated in the approved work program, the Public Body will be deemed to have delayed the start of the relevant activities, and this will be a Compensation Event. | 31.1 | |
| Employer's Claims | | | |
| MDB-FIDIC(2010) | If the Employer considers himself to be entitled to any payment under any Clause of these Conditions or otherwise in connection with the Contract, and/or to any extension of the Defects Notification Period, the Employer or the Engineer shall give notice and particulars to the Contractor. However, notice is not required for payments due under Sub-Clause 4.19 [ Electricity, Water and Gas], under Sub-Clause 4.20 [Employer's Equipment and Free-Issue Materials], or for other services requested by the Contractor. The notice shall be given as soon as practicable and no longer than 28 days after the Employer became aware, or should have become aware, of the event or circumstances giving rise to the claim. A notice relating to any extension of the Defects Notification Period shall be given before the expiry of such period.<br>The particulars shall specify the Clause or other basis of the claim, and shall include substantiation of the amount and/or extension to which the Employer considers himself to be entitled in connection with the Contract. The Engineer shall then proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine<br>(i) the amount (if any) which the Employer is entitled to be paid by the Contractor, and/or<br>(ii) the extension (if any) of the Defects Notification Period in accordance with Sub-Clause 11.3 [Extension of Defects Notification Period]. | 2.5 | |
| PPA (2011) | If the Contractor has failed to give early notification of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date. | 73.4 | No specific clause stated as employer claim in PPA |
| Setting Out | | | |
| MDB-FIDIC(2010) | The Contractor shall set out the Works in relation to original points, lines and levels of reference specified in the Contract or notified by the Engineer. The Contractor shall be responsible for the correct positioning of all parts of the Works, and shall rectify any error in the positions, levels, dimensions or alignment of the Works.<br>The Employer shall be responsible for any errors in these specified or notified items of reference, but the Contractor shall use reasonable efforts to verify their accuracy before they are used.<br>If the Contractor suffers delay and/or incurs Cost from executing work which was necessitated by an error in these items of reference, and an experienced contractor could not reasonably have discovered such error and avoided this delay and/or Cost, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub- Clause 20.1 [Contractor's Claims] to(a) an extension of time for any such delay, if completion is | 4.7 | |

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| | or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and (b) payment of any such Cost plus profit, which shall be included in the Contract Price.<br>After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) whether and (if so) to what extent the error could not reasonably have been discovered, and (ii) the matters described in sub-paragraphs (a) and (b) above related to this extent. | | |
| PPA (2011) | If, at any time during the execution of the Works, any error appears in the position, levels, dimensions or alignment of any part of the Works, the Contractor, shall, if the Engineer so requires, at the Contractor's cost, rectify such error to the satisfaction of the Engineer, unless such error is based on incorrect data supplied by the Engineer, in which case the Public Body shall be responsible for the cost of rectification | 49.2 | |
| Commencement of Work | | | |
| MDB-FIDIC(2010) | Except as otherwise specified in the Particular Conditions of Contract, the Commencement Date shall be the date at which the following precedent conditions have all been fulfilled and the Engineer's notification recording the agreement of both Parties on such fulfillment and instructing to commence the Work is received by the Contractor:<br>(a) signature of the Contract Agreement by both Parties, and if required, approval of the Contract by relevant authorities of the Country;<br>(b) delivery to the Contractor of reasonable evidence of the Employer's Financial arrangements (under Sub-Clause 2.4 [ Employer's Financial Arrangements]);<br>(c) except if otherwise specified in the Contract Data, effective access to and possession of the Site given to the Contractor together with such permission(s) under (a) of Sub-Clause 1.13 [ Compliance with Laws ] as required for the commencement of the Works;<br>(d) Receipt by the Contractor of the Advance Payment under Sub-Clause 14.2 [ Advance Payment ] provided that the corresponding bank guarantee has been delivered by the Contractor.<br>If the said Engineer's instruction is not received by the Contractor within 180 days from his receipt of the Letter of Acceptance, the Contractor shall be entitled to terminate the Contract under Sub-Clause 16.2 [ Termination by Contractor ]. The Contractor shall commence the execution of the Works as soon as is reasonably practicable after the Commencement Date, and shall then proceed with the Works with due expedition and without delay. | 8.1 | |
| PPA (2011) | a) The Public Body shall fix the Start Date on which execution of the Works is to commence in the SCC or by administrative order issued by the Engineer.<br>b) The Start Date for commencing execution of the Works shall be not later than 120 days following notification of award of contract unless agreed otherwise by the parties. | 71 | |
| Time for Completion | | | |
| MDB-FIDIC(2010) | The Contractor shall complete the whole of the Works, and each Section (if any), within the Time for Completion for the Works or Section (as the case may be), including:<br>(a) achieving the passing of the Tests on Completion, and<br>(b) Completing all work which is stated in the Contract as being required for the Works or Section to be considered to be completed for the purposes of taking over under Sub-Clause 10.1 [Taking Over of the Works and Sections]. | 8.2 | |
| PPA (2011) | a. The period of execution of Works shall commence on the Start Date fixed in accordance with GCC Clause 71.1 and shall be as laid down in the SCC, without prejudice to extensions of the period which may be granted under GCC Clause 73.<br>b. The Contractor shall carry out the Works in accordance with the Program of implementation of tasks submitted by the Contractor, as updated with the approval of the Engineer, and complete them by the Intended Completion Date.<br>c. If provision is made for distinct periods of implementation for separate lots, in cases where one Contractor is awarded more than one lot per contract, the periods | 72 | No specific clause but,stated as Period of Execution of Works in PPA |

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| | of implementation for the separate lots will not be accumulated. | | |
| Programme | | | |
| MDB-FIDIC(2010) | The Contractor shall submit a detailed time programme to the Engineer within 28 days after receiving the notice under Sub-Clause 8.1 [Commencement of Works]. The Contractor shall also submit a revised programme whenever the previous programme is inconsistent with actual progress or with the Contractor's obligations. Each programme shall include:<br>(a) the order in which the Contractor intends to carry out the Works, including the anticipated timing of each stage of design (if any), Contractor's Documents, procurement, manufacture of Plant, delivery to Site, construction, erection and testing,<br>(b) each of these stages for work by each nominated Subcontractor (as defined in Clause 5 [Nominated Subcontractors],<br>(c) the sequence and timing of inspections and tests specified in the Contract, and<br>(d) a supporting report which includes:<br>i. a general description of the methods which the Contractor intends to adopt, and of the major stages, in the execution of the Works, and<br>ii. details showing the Contractor's reasonable estimate of the number of each class of Contractor's Personnel and of each type of Contractor's Equipment, required on the Site for each major stage. Unless the Engineer, within 21 days after receiving a programme, gives notice to the Contractor stating the extent to which it does not comply with the Contract, the Contractor shall proceed in accordance with the programme, subject to his other obligations under the Contract. The Employer's Personnel shall be entitled to rely upon the programme when planning their activities.<br>The Contractor shall promptly give notice to the Engineer of specific probable future events or circumstances which may adversely affect the work increase the Contract Price or delay the execution of the Works. The Engineer may require the Contractor to submit an estimate of the anticipated effect of the future event or circumstances, and/or a proposal under Sub-Clause 13.3 [Variation Procedure].<br>If, at any time, the Engineer gives notice to the Contractor that a programme fails (to the extent stated) to comply with the Contract or to be consistent with actual progress and the Contractor's stated intentions, the Contractor shall submit a revised programme to the Engineer in accordance with this Sub-Clause. | 8.3 | |
| PPA (2011) | Completing the work program given as part of the Bid, the Contractor shall within the time stated in the SCC provide the Engineer with a program of implementation of the tasks, broken down by activity and by month and include the following information:<br>the order in which the Contractor proposes to carry out the works;<br>the time limits within which submission and approval of the drawings are required;<br>an organization chart containing the names, qualifications and curricula vitae of the staff responsible for the Site,<br>a general description of the method including the sequence, by month and by nature which the Contractor proposes to carry out the works;<br>a plan for the setting out and organization of the Site, and<br>such further details and information as the Engineer may reasonably require.<br>The Engineer shall return these documents to the Contractor with his approval or any relevant remarks within ten days of receipt, except where the Engineer, within those ten days, notifies the Contractor of his wish for a meeting.<br>An update of the program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.<br>The Contractor shall submit to the Engineer for approval an updated program at intervals | 41 | |

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| | no longer than the period stated in the SCC. If the Contractor does not submit an updated Program within this period, the Engineer may withhold the amount stated in the SCC from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted.<br><br>The approval of the program by the Engineer shall not relieve the Contractor from any of his obligations under the contract. The Contractor may revise the program and submit it to the Engineer again at any time. A revised program shall show the effect of modifications and Compensation Events. | | |
| Extension of Time for | | | |
| MDB-FIDIC(2010) | The Contractor shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to an extension of the Time for Completion if and to the extent that completion for the purposes of Sub-Clause 10.1 [Taking-Over of the Works and Sections] is or will be,delayed by any of the following causes:<br>(a) a Variation (unless an adjustment to the Time for Completion has been agreed under Sub-Clause 13.3 [Variation Procedure]) or other substantial change in the quantity of an item of work included in the Contract,<br>(b) a cause of delay giving an entitlement to extension of time under a Sub-Clause of these Conditions,<br>(c) exceptionally adverse climatic conditions,<br>(d) Unforeseeable shortages in the availability of personnel or Goods caused by epidemic or governmental actions, or<br>(e) any delay, impediment or prevention caused by or attributable to the Employer, the Employer's Personnel, or the Employer's other contractors. Completion<br>If the Contractor considers himself to be entitled to an extension of the Time for Completion, the Contractor shall give notice to the Engineer in accordance with Sub-Clause 20.1 [Contractor's Claims]. When determining each extension of time under Sub-Clause 20.1, the Engineer shall review previous determinations and may increase, but shall not decrease, the total extension of time. | 8.4 | |
| PPA (2011) | The Contractor may request an extension of the Intended Completion Date if he is or will be delayed in completing the contract by any of the following causes:<br>a) Exceptional weather conditions in the Federal Democratic Republic of Ethiopia;<br>b) Artificial obstructions or physical conditions which could not reasonably have been foreseen by an experienced Contractor;<br>c) Compensation Event occurs or a change order for modification is issued which makes it impossible for completion to be achieved by the Intended Completion Date;<br>d) Administrative orders affecting the date of completion other than those arising from the Contractor's default;<br>e) Failure of the Public Body to fulfill his obligations under the Contract;<br>f) Any suspension of the works which is not due to the Contractor's default;<br>g) Force majeure;<br>h) Any other causes referred to in these GCC which are not due to the Contractor's default.<br><br>The Contractor shall, within 15 days of becoming aware that delay may occur, notify the Engineer of his intention to make a request for extension of the Intended Completion Date to which he may consider himself entitled, and shall, unless otherwise agreed between the Contractor and the Engineer, within 21 days from the notification deliver to the Engineer full and detailed particulars of the request, in order that such request may be investigated at the time.<br><br>Within 21 days from receipt of the Contractor's detailed particulars of the request, the | 73 | |

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| | Engineer shall, by written notice to the Contractor after due consultation with the Public Body and, where appropriate, the Contractor, grant such extension of the Intended Completion Date as may be justified, either prospectively or retrospectively, or inform the Contractor that he is not entitled to an extension.<br><br>If the Contractor has failed to give early notification of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date. | | |
| Delays Caused by Authorities | | | |
| MDB-FIDIC(2010) | If the following conditions apply, namely:<br>(a) the Contractor has diligently followed the procedures laid down by the relevant legally constituted public authorities in the Country,<br>(b) these authorities delay or disrupt the Contractor's work, and<br>(c) the delay or disruption was Unforeseeable, then this delay or disruption will be considered as a cause of delay under subparagraph<br>(b) of Sub-Clause 8.4 [Extension of Time for Completion]. | 8.5 | |
| PPA (2011) | | | No room |
| Rate of Progress | | | |
| MDB-FIDIC(2010) | If, at any time:<br>(a) actual progress is too slow to complete within the Time for Completion, and/or<br>(b) progress has fallen (or will fall) behind the current programme under Sub-Clause 8.3 [Programme],<br>other than as a result of a cause listed in Sub-Clause 8.4 [Extension of Time for Completion], then the Engineer may instruct the Contractor to submit, under Sub- Clause 8.3 [Programme], a revised programme and supporting report describing the revised methods which the Contractor proposes to adopt in order to expedite progress and complete within the Time for Completion.<br>Unless the Engineer notifies otherwise, the Contractor shall adopt these revised methods, which may require increases in the working hours and/or in the numbers of Contractor's Personnel and/or Goods, at the risk and cost of the Contractor. If these revised methods cause the Employer to incur additional costs, the Contractor shall subject to notice under Sub-Clause 2.5 [Employer's Claims] pay these costs to the Employer, in addition to delay damages (if any) under Sub-Clause 8.7 below. Additional costs of revised methods including acceleration measures, instructed by the Engineer to reduce delays resulting from causes listed under Sub-Clause 8.4[ Extension of Time for Completion ] shall be paid by the Employer, without generating, however, any other additional payment benefit to the Contractor. | 8.6 | |
| PPA (2011) | 1) When the Public Body wants the Contractor to finish before the Intended Completion Date, the Engineer will obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Public Body accepts these proposals, the Intended Completion Date will be adjusted accordingly and confirmed by both the Public Body and the Contractor.<br><br>2) If the Contractor's priced proposals for acceleration are accepted by the Public Body, they are incorporated in the Contract Price and treated as a modification. | 75 | It stated as acceleration |
| Delay Damages | | | |
| MDB-FIDIC(2010) | If the Contractor fails to comply with Sub-Clause 8.2 [Time for Completion], the Contractor shall subject to notice under Sub-Clause 2.5 [Employer's Claims] pay delay damages to the Employer for this default. These delay damages shall be the sum stated in the Contract Data, which shall be paid for every day which shall elapse between the relevant Time for Completion and the date stated in the Taking-Over Certificate. However, the total amount due under this Sub-Clause shall not exceed the maximum amount of delay damages (if any) stated in the Contract Data. These delay damages shall be the only damages due from the Contractor for such default, other than in the event of termination under Sub-Clause 15.2 [Termination by Employer] prior to completion of | 8.7 | |

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| | the Works. These damages shall not relieve the Contractor from his obligation to complete the Works, or from any other duties, obligations or responsibilities which he may have under the Contract. | | |
| PPA (2011) | Except as provided under GCC Clause 18, if the Contractor fails to carry out any or all of the Works within the period specified in the Contract, the Public Body may without prejudice to all its other remedies under the Contract, deduct from the Contract Price, as liquidated damages the following:<br>1) A penalty of 0.1% or 1/1000 of the value of undelivered Service for each day of delay until actual delivery or performance,<br>2) The cumulative penalty to be paid by the Contractor shall not exceed 10% of the contract price.<br>If the delay in performing the contract affects its activities, the Public Body may terminate the contract by giving advance notice to the Contractor pursuant to GCC Clause 21 without any obligation to wait until the penalty reaches 10% of the value of the Contract.<br>3) If the Intended Completion Date is extended after liquidated damages have been paid, the Engineer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. | | It stated as Liquidated Damages |
| Suspension of Work | | | |
| MDB-FIDIC(2010) | The Engineer may at any time instruct the Contractor to suspend progress of part or all of the Works. During such suspension, the Contractor shall protect, store and secure such part or the Works against any deterioration, loss or damage.<br>The Engineer may also notify the cause for the suspension. If and to the extent that the cause is notified and is the responsibility of the Contractor, the following Sub- Clauses 8.9, 8.10 and 8.11 shall not apply. | 8.8 | |
| PPA (2011) | 1) The Contractor shall, on the order of the Engineer, suspend the progress of the works or any part thereof for such time or times and in such manner as the Engineer may consider necessary.<br>2) During the period of suspension, the Contractor shall take such protective measures as may be necessary to safeguard the works, plant, equipment and site against any deterioration, loss or damage. Additional expenses incurred in connection with such protective measures shall be added to the contract price, unless such suspension is:<br>a) otherwise provided for in the contract; or<br>b) necessary by reason of some default of the Contractor; or<br>c) necessary by reason of normal climatic conditions on site; or<br>d) necessary for the safety or the proper execution of the works or any part thereof insofar as such necessity does not arise from any act or default by the Engineer or the Public Body or from any of the exceptional risks referred to in GCC Clause 44.<br>3) The Contractor shall not be entitled to such additions to the contract price unless he notifies the Engineer, within 30 days after receipt of the order to suspend the works, of his intention to make a claim for them.<br>4) The Engineer, after consultation with the Public Body and the Contractor, shall determine such extra payment and/or extension of the period of performance to be made to the Contractor in respect of such claim as shall, in the opinion of the Engineer, be fair and reasonable.<br>5) If the period of suspension exceeds 120 days and the suspension is not due to the | 20 | |

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| | Contractor's default, the Contractor may, by notice to the Engineer, request permission to proceed within thirty (30) days or terminate the contract. | | |
| Consequences of Suspension | | | |
| MDB-FIDIC(2010) | If the Contractor suffers delay and/or incurs Cost from complying with the Engineer's instructions under Sub-Clause 8.8 [Suspension of Work] and/or from resuming the work, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:<br>(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and<br>(b) payment of any such Cost, which shall be included in the Contract Price. After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.<br>The Contractor shall not be entitled to an extension of time for, or to payment of the Cost incurred in, making good the consequences of the Contractor's faulty design, workmanship or materials, or of the Contractor's failure to protect, store or secure in accordance with Sub-Clause 8.8 [Suspension of Work]. | 8.9 | |
| PPA (2011) | | | Put in general form /its included under clause 20 |
| Prolonged Suspension | | | |
| MDB-FIDIC(2010) | If the suspension under Sub-Clause 8.8 [Suspension of Work] has continued for more than 84 days, the Contractor may request the Engineer's permission to proceed. If the Engineer does not give permission within 28 days after being requested to do so, the Contractor may, by giving notice to the Engineer, treat the suspension as an omission under Clause 13 [Variations and Adjustments] of the affected part of the Works. If the suspension affects the whole of the Works, the Contractor may give notice of termination under Sub-Clause 16.2 [Termination by Contractor]. | 8.11 | |
| PPA (2011) | | | Put in general form /its included under clause 20 |
| Delayed Tests | | | |
| MDB-FIDIC(2010) | If the Tests on Completion are being unduly delayed by the Employer, Sub-Clause 7.4 [Testing ] (fifth paragraph) and/or Sub-Clause 10.3 [ Interference with Tests on Completion] shall be applicable. If the Tests on Completion are being unduly delayed by the Contractor, the Engineer may by notice require the Contractor to carry out the Tests within 21 days after receiving the notice. The Contractor shall carry out the Tests on such day or days within that period as the Contractor may fix and of which he shall give notice to the Engineer.<br><br>If the Contractor fails to carry out the Tests on Completion within the period of 21 days, the Employer's Personnel may proceed with the Tests at the risk and cost of the Contractor. The Tests on Completion shall then be deemed to have been carried out in the presence of the Contractor and the results of the Tests shall be accepted as accurate. | 9.2 | |
| PPA (2011) | | | No room |
| Variation Procedure | | | |
| MDB-FIDIC(2010) | If the Engineer requests a proposal, prior to instructing a Variation, the Contractor shall respond in writing as soon as practicable, either by giving reasons why he cannot comply (if this is the case) or by submitting:<br>(a) a description of the proposed work to be performed and a programme for its | 13.3 | |

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| | execution,<br>(b) the Contractor's proposal for any necessary modifications to the programme according to Sub-Clause 8.3 [Programme] and to the Time for Completion, and<br>(c) the Contractor's proposal for evaluation of the Variation.<br>The Engineer shall, as soon as practicable after receiving such proposal (under Sub-Clause 13.2 [Value Engineering] or otherwise), respond with approval, disapproval or comments. The Contractor shall not delay any work whilst awaiting a response.<br>Each instruction to execute a Variation, with any requirements for the recording of Costs, shall be issued by the Engineer to the Contractor, who shall acknowledge receipt. | | |
| PPA (2011) | | | No room |
| Value Engineering | | | |
| MDB-FIDIC(2010) | The Contractor may, at any time, submit to the Engineer a written proposal which (in the Contractor's opinion) will, if adopted, (i) accelerate completion, (ii) reduce the cost to the Employer of executing, maintaining or operating the Works, (iii) improve the efficiency or value to the Employer of the completed Works, or (iv) otherwise be of benefit to the Employer. The proposal shall be prepared at the cost of the Contractor and shall include the items listed in Sub-Clause 13.3 [*Variation Procedure*].<br>If a proposal, which is approved by the Engineer, includes a change in the design of part of the Permanent Works, then unless otherwise agreed by both Parties:<br>(a) the Contractor shall design this part,<br>(b) sub-paragraphs (a) to (d) of Sub-Clause 4.1 [*Contractor's General Obligations*] shall apply, and<br>(c) if this change results in a reduction in the contract value of this part, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine a fee, which shall be included in the Contract Price. This fee<br>shall be half (50%) of the difference between the following amounts:<br>(i) such reduction in contract value, resulting from the change, excluding adjustments under Sub-Clause 13.7 [*Adjustments for Changes in Legislation*] and Sub-Clause 13.8 [*Adjustments for Changes in Cost*], and<br>(ii) the reduction (if any) in the value to the Employer of the varied works, taking account of any reductions in quality, anticipated life or operational efficiencies.<br>However, if amount (i) is less than amount (ii), there shall not be a fee. | `13.2 | |
| PPA (2011) | | | No room |
| Delayed Payment | | | |
| MDB-FIDIC(2010) | If the Contractor does not receive payment in accordance with Sub-Clause 14.7 [Payment], the Contractor shall be entitled to receive financing charges compounded monthly on the amount unpaid during the period of delay. This period shall be deemed to commence on the date for payment specified in Sub-Clause 14.7 [Payment], irrespective (in the case of its sub-paragraph (b)) of the date on which any Interim Payment Certificate is issued.<br>Unless otherwise stated in the Particular Conditions, these financing charges shall be calculated at the annual rate of three percentage points above the discount rate of the central bank in the country of the currency of payment, or if not available, the interbank offered rate, and shall be paid in such currency.<br>The Contractor shall be entitled to this payment without formal notice or certification, and without prejudice to any other right or remedy. | 14.8 | |
| PPA (2011) | 1) Once the time-limit referred to in GCC Clause 59.3 has expired, the Contractor – unless the Contractor is a public body which is partly or wholly financed by the Federal Government Budget – shall upon demand, submitted within two months of receiving late payment, be entitled to late-payment interest at the rediscount rate applied by the National bank of Ethiopia on the first day of the month in which the time-limit expired, plus three and a half percentage points. The interest shall be payable for the time elapsed between the expiry of the payment deadline and the date on which the Public Body's account is debited. . | 67 | |

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| | 2) Any default in payment of more than 120 days from the expiry of the period laid down in GCC Clause 67.1 shall entitle the Contractor either not to perform the Contract or to terminate it. | | |
| Definition of Force Majeure | | | |
| MDB-FIDIC(2010) | In this Clause, "Force Majeure" means an exceptional event or circumstance:<br>(a) which is beyond a Party's control,<br>(b) which such Party could not reasonably have provided against before entering into the Contract,<br>(c) which, having arisen, such Party could not reasonably have avoided or overcome, and<br>(d) which is not substantially attributable to the other Party.<br>Force Majeure may include, but is not limited to, exceptional events or circumstances of the kind listed below, so long as conditions (a) to (d) above are satisfied:<br>(i) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,<br>(ii) rebellion, terrorism, sabotage by persons other than the Contractor's Personnel, revolution, insurrection, military or usurped power, or civil war,<br>(iii) riot, commotion, disorder, strike or lockout by persons other than the Contractor's Personnel,<br>(iv) munitions of war, explosive materials, ionising radiation or contamination by radio-activity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity, and<br>(v) natural catastrophes such as earthquake, hurricane, typhoon or volcanic activity | 19.1 | |
| PPA (2011) | 1) For the purposes of the Contract, "Force Majeure" shall mean an event or events which are beyond the reasonable control of a Contractor, and which makes a Contractor's performance of its obligations hereunder impossible or so impractical as reasonably to be considered impossible in the circumstances, and includes:<br>(a) An official prohibition preventing the performance of a contract,<br>A natural catastrophe such as an earthquake, fire, explosion, storm, floods, or other adverse weather conditions, or<br>International or civil war, or<br>Other instances of Force Majeure identified as such by the civil code.<br>2) The following occurrences shall not be deemed to be cases of Force Majeure:<br>(b) A strike or lock-out taking of a party or affecting the branch of business in which he carries out his activities where such strikes, lockouts or other industrial action are within the power of the Party invoking Force Majeure to prevent, or<br>An increase or reduction in the price of raw materials necessary for the performance of the contract, or<br>The enactment of new legislation where by the obligations of the debtor becomes more onerous, or<br>Any event which is caused by the negligence or intentional action of a Contractor or such Contractor's Sub-Contractors or agents or employees; or<br>Any event which a diligent Party could reasonably have been expected to both:<br>Take into account from the effective date of the Contract; and<br>Avoid or overcome in the carrying out of its obligations; or<br>Insufficiency of funds or failure to make any payment required hereunder.<br>3) The failure of a Contractor to fulfill any of its obligations hereunder shall not be | 18 | |

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| | considered to be a breach of, or default under, the Contract insofar as such inability arises from an event of Force Majeure, provided that the Contractor affected by such an event has taken all reasonable precautions, due care and reasonable alternative measures, all with the objective of carrying out the terms and conditions of the Contract.<br>4) A Party affected by an event of Force Majeure shall take all reasonable measures to<br>(c) Remove such Party's inability to fulfill its obligations hereunder with a minimum of delay; and<br>Minimize the consequences of any event of Force Majeure.<br>5) A Contractor affected by an event of Force Majeure shall notify the Public Body of such event as soon as possible, and in any event not later than fourteen (14) days following the occurrence of such event, providing evidence of the nature and cause of such event, and shall similarly give notice of the restoration of normal conditions as soon as possible.<br>6) Any period within which a Contractor shall, pursuant to this Contract, complete any action or task, shall be extended for a period equal to the time during which such Party was unable to perform such action as a result of Force Majeure.<br>7) During the period of their inability to carry out the Works as a result of an event of Force Majeure, the Contractor, upon instructions by the Public Body, shall either:<br>(d) Demobilize, in which case the Contractor shall be reimbursed for additional costs they reasonably and necessarily incurred, and, if required by the Public Body, in reactivating the Works; or<br>Continue to perform his obligations under the Contract to the extent possible, in which case the Contractor shall continue to be paid under the terms of this Contract and be reimbursed for additional costs reasonably and necessarily incurred.<br>8) Not later than thirty (30) days after the Contractor, as the result of an event of Force Majeure, has become unable to carry out the Works, the Parties shall consult with each other in good faith and use all reasonable endeavors to agree appropriate terms to mitigate the effects of the Force Majeure Event and facilitate the continued performance of the Contract.<br>9) In the case of disagreement between the Parties as to the existence or extent of Force Majeure, the matter shall be settled according to GCC Clause 26. | | |
| Contractor's Claims | | | |
| MDB-FIDIC(2010) | If the Contractor considers himself to be entitled to any extension of the Time for Completion and/or any additional payment, under any Clause of these Conditions or otherwise in connection with the Contract, the Contractor shall give notice to the Engineer, describing the event or circumstance giving rise to the claim. The notice shall be given as soon as practicable, and not later than 28 days after the Contractor became aware, or should have become aware, of the event or circumstance.<br>If the Contractor fails to give notice of a claim within such period of 28 days, the Time for Completion shall not be extended, the Contractor shall not be entitled to additional payment, and the Employer shall be discharged from all liability in connection with the claim. Otherwise, the following provisions of this Sub-Clause shall apply.<br>The Contractor shall also submit any other notices which are required by the Contract, and supporting particulars for the claim, all as relevant to such event or circumstance.<br>The Contractor shall keep such contemporary records as may be necessary to substantiate any claim, either on the Site or at another location acceptable to the Engineer. Without admitting the Employer's liability, the Engineer may, after receiving | 20.1 | |

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| | any notice under this Sub-Clause, monitor the record-keeping and/or instruct the Contractor to keep further contemporary records. The Contractor shall permit the Engineer to inspect all these records, and shall (if instructed) submit copies to the Engineer.<br>Within 42 days after the Contractor became aware (or should have become aware) of the event or circumstance giving rise to the claim, or within such other period as may be proposed by the Contractor and approved by the Engineer, the Contractor shall send to the Engineer a fully detailed claim which includes full supporting particulars of the basis of the claim and of the extension of time and/or additional payment claimed.<br>If the event or circumstance giving rise to the claim has a continuing effect:<br>(a) this fully detailed claim shall be considered as interim;<br>(b) the Contractor shall send further interim claims at monthly intervals, giving the accumulated delay and/or amount claimed, and such further particulars as the Engineer may reasonably require; and<br>(c) the Contractor shall send a final claim within 28 days after the end of the effects resulting from the event or circumstance, or within such other period as may be proposed by the Contractor and approved by the Engineer.<br>Within 42 days after receiving a claim or any further particulars supporting a previous claim, or within such other period as may be proposed by the Engineer and approved<br>by the Contractor, the Engineer shall respond with approval, or with disapproval and detailed comments. He may also request any necessary further particulars, but shall nevertheless give his response on the principles of the claim within the above defined time period.<br>Within the above defined period of 42 days, the Engineer shall proceed in accordance with Sub-Clause 3.5 [ Determinations ] to agree or determine (i) the extension (if any) of the Time for Completion (before or after its expiry) in accordance with Sub-Clause 8.4 [ Extension of Time for Completion ], and/or (ii) the additional payment (if any) to which the Contractor is entitled under the Contract.<br>Each Payment Certificate shall include such additional payment for any claim as has been reasonably substantiated as due under the relevant provision of the Contract.<br>Unless and until the particulars supplied are sufficient to substantiate the whole of the claim, the Contractor shall only be entitled to payment for such part of the claim as he has been able to substantiate.<br>If the Engineer does not respond within the timeframe defined in this Clause, either Party may consider that the claim is rejected by the Engineer and any of the Parties<br>may refer to the Dispute Board in accordance with Sub-Clause 20.4 [ Obtaining Dispute Board's Decision ].<br>The requirements of this Sub-Clause are in addition to those of any other Sub-Clause which may apply to a claim. If the Contractor fails to comply with this or another Sub-Clause in relation to any claim, any extension of time and/or additional payment shall take account of the extent (if any) to which the failure has prevented or prejudiced proper investigation of the claim, unless the claim is excluded under the second paragraph of this Sub-Clause. | | |
| PPA (2011) | | | No specific clause but, stated in clause 69 Claims for Additional Payment |
| Taking Over of the Works and Sections | | | |
| MDB-FIDIC(2010) | Except as stated in Sub-Clause 9.4 [ Failure to Pass Tests on Completion], the Works shall be taken over by the Employer when (i) the Works have been completed in accordance with the Contract, including the matters described in Sub-Clause 8.2 [Time for Completion] and except as allowed in sub-paragraph (a) below, and (ii) a Taking- | 10.1 | |

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| | Over Certificate for the Works has been issued, or is deemed to have been issued in accordance with this Sub-Clause.<br>The Contractor may apply by notice to the Engineer for a Taking-Over Certificate not earlier than 14 days before the Works will, in the Contractor's opinion, be complete and ready for taking over. If the Works are divided into Sections, the Contractor may similarly apply for a Taking-Over Certificate for each Section.<br>The Engineer shall, within 28 days after receiving the Contractor's application:<br>(a) issue the Taking-Over Certificate to the Contractor, stating the date on which the Works or Section were completed in accordance with the Contract, except for any minor outstanding work and defects which will not substantially affect the use of the Works or Section for their intended purpose (either until or whilst this work is completed and these defects are remedied); or<br>(b) reject the application, giving reasons and specifying the work required to be done by the Contractor to enable the Taking-Over Certificate to be issued. The Contractor shall then complete this work before issuing a further notice under this Sub-Clause.<br>If the Engineer fails either to issue the Taking-Over Certificate or to reject the Contractor's application within the period of 28 days, and if the Works or Section (as the case may be) are substantially in accordance with the Contract, the Taking- Over Certificate shall be deemed to have been issued on the last day of that period. | | |
| PPA (2011) | 1) Verification of the works by the Engineer with a view to provisional or final acceptance shall take place in the presence of the Contractor. The absence of the Contractor shall not be a bar to verification on condition that the Contractor has been summoned in due form at least 30 days prior to the date of verification.<br>2) Should exceptional circumstances make it impossible to ascertain the state of the works or otherwise proceed with their acceptance during the period fixed for provisional or final acceptance, a statement certifying such impossibility shall be drawn up by the Engineer after consultation, where possible, with the Contractor. The verification shall take place and a statement of acceptance or rejection shall be drawn up by the Engineer within 30 days following the date on which such impossibility ceases to exist. The Contractor shall not invoke these circumstances in order to avoid his obligation to present the works in a state suitable for acceptance. | | No specific clause but, stated in clause 84 General Principles |
| Engineer's Duties and Authority | | | |
| MDB-FIDIC(2010) | The Employer shall appoint the Engineer who shall carry out the duties assigned to him in the Contract. The Engineer's staff shall include suitably qualified engineers and other professionals who are competent to carry out these duties.<br>The Engineer shall have no authority to amend the Contract.<br>The Engineer may exercise the authority attributable to the Engineer as specified in or necessarily to be implied from the Contract. If the Engineer is required to obtain the approval of the Employer before exercising a specified authority, the requirements shall be as stated in the Particular Conditions. The Employer shall promptly inform the Contractor of any change to the authority attributed to the Engineer.<br>However, whenever the Engineer exercises a specified authority for which the Employer's approval is required, then (for the purposes of the Contract) the Employer shall be deemed to have given approval.<br>Except as otherwise stated in these Conditions:<br><br>(a) whenever carrying out duties or exercising authority, specified in or implied by the Contract, the Engineer shall be deemed to act for the Employer;<br>(b) the Engineer has no authority to relieve either Party of any duties, obligations or responsibilities under the Contract;<br>(c) any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test, or similar act by the Engineer (including absence of disapproval) | 3.1 | |

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| | shall not relieve the Contractor from any responsibility he has under the Contract, including responsibility for errors, omissions, discrepancies and non-compliances; and<br>(d) any act by the Engineer in response to a Contractor's request except as otherwise expressly specified shall be notified in writing to the Contractor within 28 days of receipt. | | |
| PPA (2011) | 1) Except where otherwise specifically stated and subject to any restriction in the SCC, any action required or permitted to be taken, and any document required or permitted to be executed, under this Contract by the Public Body or the Contractor may be taken or executed by the Engineers named in the SCC. Except as expressly stated in the SCC, the Engineer shall not have authority to relieve the Contractor of any of his obligations under the Contract.<br>2) Any notice, information or communication given to or made by an Engineer shall be deemed to have been given or made by the Public Body.<br>3) The Engineer may delegate any of his duties and responsibilities to Engineer's representative after notifying the Contractor, and may cancel any delegation<br>4) after notifying the Contractor.<br>Instructions and/or orders issued by the Engineer shall be by way of administrative orders. Such orders shall be dated, numbered and entered by the Engineer in a register, and copies thereof delivered by hand, where appropriate, to the Contractor's representative | 12 | |
| | Provisional Sums | | |
| MDB-FIDIC(2010) | Each Provisional Sum shall only be used, in whole or in part, in accordance with the Engineer's instructions, and the Contract Price shall be adjusted accordingly. The total sum paid to the Contractor shall include only such amounts, for the work, supplies or services to which the Provisional Sum relates, as the Engineer shall have instructed.<br>For each Provisional Sum, the Engineer may instruct:<br>(a) work to be executed (including Plant, Materials or services to be supplied) by the Contractor and valued under Sub-Clause 13.3 [*Variation Procedure*]; and/or<br>(b) Plant, Materials or services to be purchased by the Contractor, from a nominated Subcontractor (as defined in Clause 5 [*Nominated Subcontractors*] or otherwise; and for which there shall be included in the Contract Price:<br>(i) the actual amounts paid (or due to be paid) by the Contractor, and<br>(ii) a sum for overhead charges and profit, calculated as a percentage of these actual amounts by applying the relevant percentage rate (if any) stated in the appropriate Schedule. If there is no such rate, the percentage rate stated in the Contract Data shall be applied.<br>The Contractor shall, when required by the Engineer, produce quotations, invoices, vouchers and accounts or receipts in substantiation. | 13.5 | |
| PPA (2011) | 1. The works shall be taken over by the Public Body when they have satisfactorily passed the tests on completion and a certificate of provisional acceptance has been issued or is deemed to have been issued.<br>2. The Contractor may apply, by notice to the Engineer, for a certificate of provisional acceptance not earlier than 15 days before the works, in the Contractor's opinion, are complete and ready for provisional acceptance. The Engineer shall within 30 days after the receipt of the Contractor's application either:<br>(e) issue the certificate of provisional acceptance to the Contractor with a copy to the Public Body stating, where appropriate, his reservations, and, inter alia, the date on which, in his opinion, the works were completed in | 87 | |

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| | accordance with the Contract and ready for provisional acceptance; or<br>reject the application giving his reasons and specifying the action which, in his opinion, is required of the Contractor for the certificate to be issued.<br>3. If the Engineer fails either to issue the certificate of provisional acceptance or to reject the Contractor's application within the period of 30 days, he shall be deemed to have issued the certificate on the last day of that period. The certificate of provisional acceptance shall not be deemed to be an admission that the works have been completed in every respect. If the works are divided by the contract into sections, the Contractor shall be entitled to apply for separate certificates for each of the sections.<br>4. Upon provisional acceptance of the works, the Contractor shall dismantle and remove temporary structures as well as materials no longer required for use in connection with the performance of the contract. He shall also remove any litter or obstruction and redress any change in the condition of the Site as required by the contract.<br>Immediately after provisional acceptance, the Public Body may make use of all the works as completed. | | |
| | Adjustments for Changes in Cost | | |
| MDB-FIDIC(2010) | In this Sub-Clause, "table of adjustment data" means the completed table of adjustment data for local and foreign currencies included in the Schedules. If there is no such table of adjustment data, this Sub-Clause shall not apply.<br>If this Sub-Clause applies, the amounts payable to the Contractor shall be adjusted for rises or falls in the cost of labour, Goods and other inputs to the Works, by the addition or deduction of the amounts determined by the formulae prescribed in this Sub-Clause. To the extent that full compensation for any rise or fall in Costs is not covered by the provisions of this or other Clauses, the Accepted Contract Amount shall be deemed to have included amounts to cover the contingency of other rises and falls in costs. | 13.8 | |
| PPA (2011) | 1. Adjustments of contract prices shall be allowed after twelve (12) months from the effective date of the Contract where it is verified that the performance of the contract requires more than 18 months.<br>2. Request for price adjustment in relation to a particular work items under this Contract may be filed by the Contractor after twelve (12) months from the effective date of the Contract where it is verified that the performance of the contract requires more than 18 months, which adjusted price takes effect as the new Contract Price in relation to that work item on the expiration of 30 days from the date on which the Public Body receives notification of that adjusted price from the Contractor, unless another date is agreed in writing between the Parties.<br>3. All prices shall be firm unless the Contractor has provided claim for price adjustment. The Contractor may invoke this provision at any time during the Contract by notice in writing to the Engineer.<br>4. The Public Body can increase or decrease the Contract Price amount as described by this Clause.<br>5. Price Adjustment shall be applicable as payable in full for the original scheduled completion period.<br>6. In the event the completion of contract exceeds the original scheduled period:<br>In case of default on the part of the Contractor causing delay in original scheduled completion, the rate of Price original scheduled date of completion; however Price Adjustment will be applicable till actual completion. While computing Price Adjustment beyond the scheduled completion period, in the event the rate is reduced, then that reduced rate will be applied. | 62 | |

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| | The Price Adjustment will be payable in full for the extended period if the Contractor has been granted an extension of time for no fault on the part of the Contractor, duly approved by the Public Body.<br>7. Unless specifically stated otherwise in the Contract, the basis for compensation will be only those categories of inputs, which are specifically listed as specified items in the SCC.<br>8. An adjustment of the Contract Price, depending of selected categories of contract price, shall be limited to an amount which takes account of price indexes or price indicators issued by Ethiopian Central Statistical Agency or Public Procurement and Property Administration Agency.<br>9. Notwithstanding the provision of GCC Sub-Clause above, price information available from a renowned local producer or competent foreign institution may be used in case the Ethiopian Central Statistical Agency or Public Procurement and Property Administration Agency are not in a position to issue current price indexes,<br>10. Contractor shall submit to the Public Body for review and approval all calculations and supporting information necessary to determine the price adjustment.<br>11. Adjustments in compensation may be either plus or minus depending on the differences between the Benchmark Price Index and the Monthly Price Index<br>Table 8 Comparison Table of MDB- FIDIC (2010), PPA (2011) Condition of construction contract and applicable laws in delay and disruption claims management | | |

## IX. CONCLUSION AND RECOMMENDATION

### *A. Conclusions*

Financial resources are so scarce in developing countries like Ethiopia, hence, cost related issues in the Ethiopian construction industry are sensitive issues. Therefore, carrying out a research in this area will have a paramount importance.

Time and program have some cases that disturb the planned time frame for completing the project not to complete as per the planned. These cases are called delay and disruption due to time and program.

Therefore, based on the results the following major conclusions were derived and summarized in accordance with the objectives of the research:

*1)* The study has tried to clearly address the concept of time related issues such as, delay, disruption program, commencement date, project duration & progress, completion date. Luck of understanding and improper managements of those matters initiate loss of productivity by disrupting the progress and at the end creating delay on the completion of the projects; In general and under MDB-FIDIC 2010, PPA 2011 and Applicable laws

*2)* Also we tried to explain the importance of time and program for construction industries. Since time is one of natural available resource its management is also very important. Unless improper management of it will bring loss of other resource financial crisis to the employer and contractor and its implication goes further.

In general, a better understanding of time with respect to delay and disruption claims; and their appropriate managements in accordance with conditions of contract and applicable laws are found to be mandatory. These help all stakeholders to play great roles for the successful completion of construction projects.

### *B. Recommendations*

Due to many uncertainties it is difficult to eliminate construction delays; however it is possible to minimize the causes and effects of construction delays.

The timely availability of construction material and spare parts is essential for efficient implementation of building projects. Unless shortage of construction material gets solution building projects may not be completed on time and budget to minimize this efforts should be done in the following area.

*1)* Contractors should pre schedule their martial requirement in advance.

*2)* Facilitate the way of all contracting parties get information about different condition of contracts

Healthy cash flow and financial availability is the unquestionable thing in building construction projects. Unless shortage of cash resolved projects might not completed on time and budget. Hence efforts should be done

*a)* Each and every project needs to be evaluated by all three parties (owner, engineer and contractor) and cooperation is required.
*b)* All parties need to understand the ramifications of the decisions in regard to construction contract time.
*c)* Adjust the construction contract time either prior to bid or by addendum when it is in the best interest of all parties.
*d)* Each project should have established lines of communication between the Owner, Engineer and Contractor for a cohesive working relationship.
*e)* Effective contract documents need to be in force which cover such issues as changes, conflict resolution and coordination.

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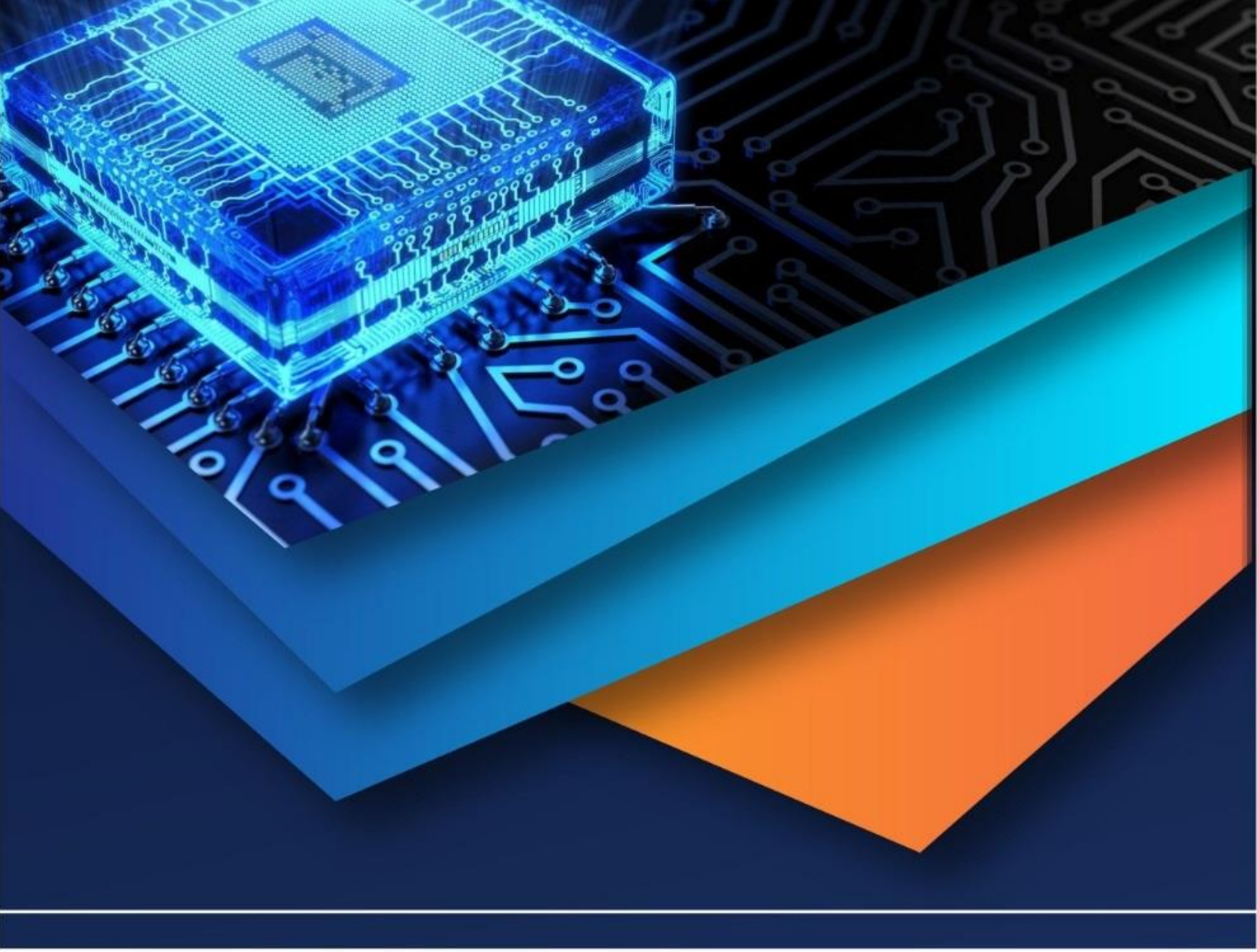

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