most construction projects didn’t completed with the estimated project cost because of the following reasons: -Variations due to request from either parties,-Delay,- Under estimated quantities,- Incompleteness of designs,

**The method of cost controlling in PPA has been defined from clause 37 up to 54 of General conditions of contract**

**Clause 37 :** Bill of Quantities or activity schedule=>> *Types of Contract==*Admeasurements contract » BOQ==== Lump sum » Activity schedule=.>>>The quantities set out in the Bill of Quantities are the estimated quantities for the Works, and they are not to be taken as the actual and correct quantities of the Works to be executed by the Contractor in fulfilment of his obligations under the Contract.

**Clause 38:** Change in bill of quantities =>>*Option 1:* Changes in the Bill of Quantities for Admeasurements Contracts =>>If final qty >qty in BOQ by 25% provided that the change exceeds 5% of the contract price, the engineer shall adjust the unit rate. =>>engineer shall not adjust the unit rate if the change exceeds 15% of the contract price.=>> The contractor shall submit the cost breakdown up on request

**Clause 39**: Variations=>>Variations shall be included in updated program produced by the Contractor

**Clause 40:** Payment for Variations=>> For both Admeasurement and Lump Sum Contracts, the Contractor shall provide the Engineer with a quotation for carrying out the Variation when requested to do so by the Engineer.

**Clause 41**: Cash flow forecast=>>When the Program is updated, the Contractor shall provide the Engineer with an updated cash flow forecast.

**Clause 42:** Payment Certificates=>> The Contractor shall Summit to the Engineer monthly statements of the estímate value of the work executed less the cumulative amount certified previously=>> The value of work executed shall comprise the value of: a) The quantities of the items in the Bill of Quantities completed in the case of Admeasurement Contracts; or B) Completed activities in the Activity Schedule in the case of Lump Sum Contracts

**Clause 43:** Payments🡺>Payments shall be adjusted for deductions for advance payments and retention =>> If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause

**Clause 44:** Compensation event

**Clause 45**: Tax🡺Unless otherwise specified in the SCC, the Engineer shall not adjust the Contract Price if taxes, duties, and other levies are changed that subsequently affect the Contract Price. **Clause 46**: Currencies=>> Where payments are made in currencies other than Ethiopian Birr, the exchange rates used for calculating the amounts to be paid shall be the exchange rates stated in the Contractor’s Bid.

**Clause 47**: Price Adjustements **Clause 48**: Retention

**Clause 49**: Liquidated damage **Clause 50:** Bonus

**Clause 51:** Advance Payment **Clause 52**: Securities

**Clause 53**: Day work **Clause 54:** Cost of repair

**Supervision the preparation phase** Know Your Project 🡺 Know your Contract=>>Compile project drawings, specifications and contracts……=>> Set up site office=>> Obtain necessary equipment….**supervision the start up phase=>** Obtain bonds. =>> Project kick off meeting=>. Set up an Inspection Procedure ----Develop a “Site procedures manual” --- Develop inspection and follow-up forms =>> Agree on exchanging information on test/ inspection times=>> Agree on formats to be used **supervision the implimantaion phase =>**Compile project records**--**Keep project reports**--** Keep site dairy**--**Maintain record of meetings**🡺** Follow-up work progress**🡺** Follow-up work quality **=>>** Keep records of inspections **=>>** Keep track of variations **supervision the close out phase =>>** Prepare and finalize project final account=>> Carry out testing and commissioning=>> Request and obtain as built record drawings=>> Request and obtain operation and maintenance manuals..(O& M Manuals)

**Construction site administration** => Certify and keep record of payments => Follow up the work=> Resolve disputes=> Develop testing and commissioning procedures and records => Obtain and Keep project as built Records and Operation and maintenance manuals => Issue project Close out and contractor discharge letters….

**Duties of the resident engineer** =>>Coordinate and provide general direction of work and progress.=> Review contractor’s CPM schedules regularly.=>Assist in resolution of construction problems.=>Evaluate contractor claims for the design firm.=> Maintain log of change orders**.**

**Establishment of detailed inspection procedures**.=> Outline of acceptance/rejection procedures.=> Preparation of a chart showing all tests required,=> Preparation of a chart showing all tests required,=> Establishment of who will be responsible => Identification of who must physically prepare samples for testing, the contractor or the inspector; => Identification of who must physically prepare samples for testing, the contractor or the inspector;=> Establishment of ground rules for acceptable timing of work operations after sampling and testing; =>> Mandatory scheduling must be provided to assure not only time to make samples and tests, but also time to make corrections needed before work may be allowed to continue.

**Daily Construction Reports=>** Project name and job number.=> name=> Contractor’s name=> Name of the Project Manager for the design organization.=> Report number and date of report

Quality Assurance Is ensured by=> visual inspection, => tests, => certifications,=> Manufacturer’s installation instructions…=> experience qualifications=> Factory inspections=> Samples and mockup=> Certified laboratory reports, => Certificate of compliance or conformance=> And guarantees….

**Testing** is limited to those laboratory or field tests actually called for in the specifications, or allowed by them. Such tests may be performed by=> the contractor, => the architect/engineer, => the owner, or => commercial testing laboratories.

**An experience qualification** is a requirement that a firm performing a certain type of work have an established reputation for the successful completion of similar work elsewhere for a specified amount of time. The use of an experience

**Certified Laboratory Test Reports** is a requirement by which the contractor is asked to provide a certificate that indicates that a product meets specified quality requirements for performance or physical or chemical standards when the submitted sample is tested in accordance with certain specified laboratory standard tests;;; *Examples of materials that may require such certified reports are:=> Concrete reinforcing steel=> Structural steel=> Sound control ratings of materials=> Fire-spread ratings of materials=> Polyvinyl chloride materials for water-stops=> Masonry unit*

**Change Orders (Variations)** is a written agreement to modify, add to, or otherwise alter the work from that set forth in the contract documents at the time of opening bids, provided such alteration can be considered to be within the scope of the original project; ***The following are common categories Differing site conditions=>*** Errors and omissions in plans and specs=>Changes instituted by regulatory agencies=> Design changes=> Overruns/underruns in quantities beyond limits=> Factors affecting time of completion ***basic principles that apply to the handling of all types of change orders=>*** No work should be included beyond the scope of the base contract, particularly on public works contracts=> The identity of the individuals authorized to request and approve change orders should be established early=> During the preconstruction conference, a meeting should be held to establish the change order handling procedures.=> All changes in the work must be authorized in writing prior to the execution of any change. ***Types of Changes (Variations) Directed changes.*** is easy to identify. The owner directs the contractor to perform work that differs from that specified in the contract or is an addition to the work specified ***Constructive changes*** is an informal act authorizing or directing a modification to the contract caused by an act or failure to act. ***Types of Constructive Changes***=> Defective plans and specifications=> Engineer’s interpretation=> Higher standard of performance than specified=> Improper inspection and rejection=> Change in the method of performance=> Change in the construction sequence=> Owner nondisclosure=> Impossibility/impracticability of performance **ELEMENTS OF A CHANGE ORDER =>** Identification of change order**=>** Description of change**=>** Reason for change**=.>** Change in contract price**=>** Change in unit prices (if applicable)**=>** Change to contract time**=>** Statement that secondary impacts are included**=>** Approvals by owner’s and contractor’s representatives

**Evaluation of Delays in the Work** the following questions need to be answered:=> Was the cause of the delay beyond the contractor’s control? Did the contractor fail to take normal precautions?=> Was the contractor ready and able to work?=> Did the contractor submit a detailed schedule projecting project completion within the allotted time? Was the schedule updated => Did this schedule contain a critical path analysis or equivalent?=> Has the contractor maintained sufficient forces in those operations along the critical path where needed to meet target dates?=> How have causes, other than normal weather, beyond the control and without the fault or negligence of the contractor affected the target dates along the critical path?=> Has the contractor proven “unusually severe weather” with such information as climatological data, return probability of severe storms, or flood-depth data?=> Did the weather phenomenon actually delay operations along the critical path or in secondary operations?=> Was the contractor shut down for other reasons?