Presentation & Discussions

of Case Studies and Real-live Examples of project

Cost Estimating for Building and Civil Engineering projects

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Cadprofessional™ SYSTEMS TECHNOLOGY LIMITED

NIGERIAN INSTITUTE OF QUANTITY SURVEYORS

The professional construction cost managers.

Introductions

Cost Estimating is not an actual science, but a predictive process of applying resources and unit costs to individual quantities of items associated with the project scope. These resources includes materials, labour, equipment, capitals, subcontracts, and even vendor quotations.

Generally, Cost Estimating is difficult because of lack of sufficient information about project characteristics and properties, but more so because:

- Definitive solutions are difficult to quantify
- Variability and Uncertainty are difficult to quantify
- It is difficult to evaluate completeness & quantities of solution estimates
- Its difficult to track impact of scope development between cost estimates.

Types of Cost Estimating

There are basically four (4) distinctive types of estimating used in construction:

- Conceptual Estimating- *based on the statistical relationship between project scopes, ratio between project definitions and their costs.*
- Bid Based Estimating- *based on data from recently awarded contracts which provides the rates for evaluation of proposed project quantities & costs.*
- Cost Based Estimating- *calculated cost to construct using the most economic manner based on contractor's capacity.*
- Risk Based Estimating- *based on application of risk identification and uncertainty analysis to forecast project contingency.*

Characteristics of Good Cost Estimate

- It is anchored on historical Performance (Data)
- It reflects intents and potential future process
- It should be easily understood by the person's involve
- It follows established ground rules and assumptions
- It addresses risks and uncertainties
- It is driven by requirement, specification and scope
- It is based on good definition of the project scope
- It can be validated by independent means
- It is traceable and auditable

Invitation to Tender/Decision to Bid

The Invitation to Tender and, or decision to Bid is usually the beginning of every cost estimating process. It defines the willing commitment of the Contractor to participate in the Tendering process given the procuring documents and satisfaction of some internal concerns which are weighted against the probability of winning the bid, the risks involved in the construction and the potential profits accruable from the project. Other concerns include:

- What is the type/scope of the works
- Who are other Parties /Bidders participating on the procurement process
- Do they have the resources and experience to execute the works
- What economic & Technical advantage does the project location offer
- What are the contractual and technical risks inherent on the project
- What is the cost of participating in the Bid

Factor 1: Bid/Contract Document

The Bid/Contract document contain some basic information which are to be considered when costing and pricing the project. Some of these information includes:

- Information on Work scope & Requirements (Drawings, Spec. & Standards)
- Information on provisional access to site and Site conditions
- Information on Contract type & conditions (fixed, lumpsum with fluctuating items or fully fluctuating contract).
- Information on Bid/ Project Bonds, Validity periods and Intended Duration
- Intended amount for Advance Payment (AP) and AP Amortization plan.
- Percentage Amount of Retention, and Maximum amount to be Retained.
- Other Information with cost implication on the project (eg. Taxes)

Factor 2: Contract Conditions/ Form

Without prejudice to special conditions and amendments in the contract form, Contract conditions contain clauses which entails possible cost implication to the contractor in performance of project obligation. Some of these

- Risk sharing burden
- Claims entitlement
- Treatment of Fluctuations and Variation
- Dispute Resolution etc.

Building Competitive Cost Estimate

To build a competitive Cost Estimate, a good Strategy is required to for Accurate and Functional cost estimates aligned with the other project performance indicators- scope, quality and time.

Steps to Good Cost Estimating

- Understand the scope of activities to qualify resources.
- Apply cost to the resources
- Apply price adjustment(s) to the estimates
- Organize the output in structured way to support decision making
- Access all risks associated with the estimate.

Composition of Contractor's Estimate

Construction cost items are categorized into Direct and Indirect Cost.
Direct Costs include:

1. Material Costs (including adjustments for wastes & incidental costs)
2. Equipment (Equipment cost, Operating cost and logistics)
3. Labour (Base wage, Benefits and Overtime costs)
4. Subcontract (Material vendors and Subcontractors quotations)

Indirect Costs include:

1. Overhead, Profit, Risks, in-built Preliminaries, Other economic factors considered in the estimate.

Material Resources

Material cost constitute a major cost component of the estimate. Installed cost of material in an estimate cost is influenced by :

1. Base material Cost
2. Transportation/Handling cost
3. Wastages
4. Forex & Government Policy
5. Material Management etc.

Labour Resources

Labour is the single most expensive component in a project. Its impact affects every aspect of the project activity. Depending on the category, Labour cost in an estimate is influenced:

1 The Base Labour wage

2 Benefits and Incentives

3 Labour Skill & Education

4 Project Location

5 Government Policy etc.

Equipment Resources

Equipment are important productivity tools used in construction. Equipment perform various tasks, and contribute reasonably to the overall percentage cost of work estimate.

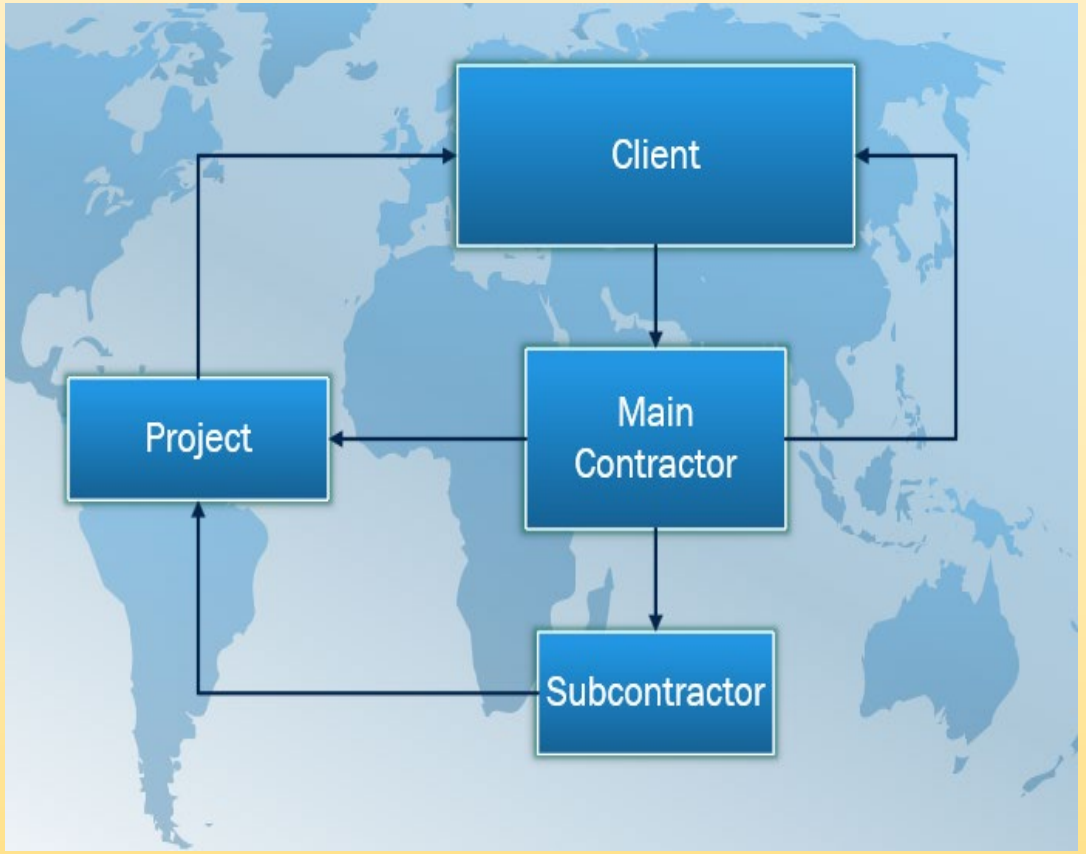
Equipment costs are affected by:

1. Ownership Cost/ Rental Cost
2. Foreign Exchange values
3. Maintenance & Lubrication
4. Operating Cost,
5. Site Condition

Material Suppliers and Subcontracts

Materials and Subcontract works make up over 70% of the estimated cost in Building Works. Outsourcing part of the project obligation is a recognize practice in construction, and influences the contractor's estimate.

1. Subcontractor's logistic cost
2. Profits and Overhead
3. Other noted cost consideration



Costing, Pricing and Markup

- Costing can be defined as the application of unit costs information to individual quantities of items required in an estimate. Costing includes the assignment of costs to labour, materials, equipment, subcontractors etc. to establish aggregated cost information.
- Pricing on the other hand is the adjustment of aggregated cost information to allow for overhead and profits, improved cashflow and other specific project conditions, items and adjustments which needs to be considered in an estimating job.

Through Markup, derived factor is applied to cost items to cover for pricing considerations.

Conclusion

Although it is difficult to achieve 100% accuracy in cost estimating of Building and Civil Engineering works, but realistic cost estimates of works based on available project and resources information is possible and obtainable.

Through conscious consideration and assignment of resources to work activities, coupled with the understanding of construction methodology and pricing experience, functional and competitive cost estimates of works can be achieved with the least possible risk.

Appreciation

Thanks for your wonderful patience and attention throughout this time, I will now wait for your questions if any.

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