



# "ANALYZE, OPTIMIZE, IMPROVE BID EVOLUTION METHOD AND BIDDING STRATEGY"

**Submitted by:**

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**Chapter 1**

**INTRODUCTION**

## **1.1 Introduction to Estimation**

Building construction estimating is the determination of probable construction costs of any given project. Many items influence and contribute to the cost of a project, each item must be analyzed, qualified, and priced because the estimate is prepared before the actual construction. Construction, much study and thought must be put into the construction document. The estimator, who can visualize the project and accurately determine its cost, will become one of the most important persons in any construction company.

For a project constructed with the design-tender-built (DBB) delivery system, it is necessary for contractors to submit a competitive cost estimate for the project. The competition in construction tendering is intense with multiple firms vying for a single project. To succeed in business, a contractor must be the lowest-qualified tenderer on a certain number of projects, while maintaining an acceptable profit margin. This profit margin provides the general contractor an acceptable rate of return and competition for the risk associated with the project. Because the estimate is prepared from the working drawing and the project manual, the ability of the estimator to visualize all of the different phases of the construction project becomes a prime ingredient in successful tendering. The working drawing usually contains information relative to the design, location, dimension, and construction of the project, while the project manual is a written supplement to the drawing and includes information pertaining to materials and workmanship, as well as information about the tendering process.

The working drawing and the project manual constitute the majority of the contract documents, define the scope of the work, and must be considered together when preparing an estimate. The two complement each other, and they often overlap in the information they convey. The tender submitted must be based on the scope of work provided by the owner or the architect.

The estimator is responsible for including everything contained in the drawings and the project manual in the submitted estimate, because of the complexity of the drawing and the project manual, coupled with the potential cost of an error, the estimator must read everything thoroughly and recheck all items. Initially, the estimator can begin the process of quantifying all the materials presented. Every item included in the estimate must contain as much information as possible. The quantities determined for the estimate will ultimately be used to order and purchase the needed materials. The estimated quantities and their associated projected costs will become the basis of project controls in the field.

Estimating the ultimate cost of a project required the integration of many variable. These variables fall into either direct field costs or indirect field costs are also referred to as general conditions or projects overhead cost in building construction. The direct field costs are the material, labor equipment, or subcontracted items that are permanently and physically intergraded into the building. For example, the labor and materials for the foundation of the buildings would be a direct field cost. The indirect field costs are the cost for the items that are required to support the field construction efforts. For example, the project site office would be a general conditions cost in addition factors such as weather transportation soil conditions labor strikes materials availability, and subcontractor availability need to be intergraded in to the estimate. Regardless of the variables involved.

Estimator must strive to prepare as accurate an estimate as possible. Since subcontractors or specially contractors may perform much of the work in the field the estimator must be able complexity of on estimate requires organization estimators best judgment complete specially contractors ( subcontractors) tenders accurate quantity takes off and accuraterecords of completed projects

The Preparation of detailed estimate Consist of working out quantities of various items of work and then determines the cost of each item. This is prepared in two stages:

1. Details of measurements and conclusion of quantities : The complete work is divided into various items of work such as earthwork concreting ,brickwork ,RCC, Plastering etc, the details of measurements are taken from drawings and entered in respective columns of prescribed in perform. The quantities are calculated by multiplying the values that are numbers column to depth column as shown below:

**Table 1.1** Details of measurement forms

SL.NO	Description of item	No	Length(m)	Breadth(m)	Depth(m)	Quantity	Explanatory notes
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2. Abstract of estimated cost: The cost of each item of work is worked out from the quantities that already computed in the details measurement form at workable rate. But the total cost is worked out in the prescribed form is known as abstract of estimated form.4% of estimated cost is allowed for petty supervision, contingencies and unforeseen items.

**Table 1.1** Estimation sheet

SL.NO	Description of item	Quantity	Unit	Rate	Per (unit)	Amount
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The detailed estimate should be accompanied with:

- a) Report
- b) Specifications
- c) Drawings(plans, elevation, sections)
- d) Design chart and calculation.
- e) Standard schedule of rates.

### 1.1.1 Factors to be considered while preparing detailed estimate:

1. Quantity and transportation of materials: For bigger project, the requirements of materials is more. Such bulk volume of materials will be purchased and transported definitely at cheaper rate.

2 Location of site: The site of work is selected, such that it should reduce damage or in transit during loading, unloading, stocking of materials.

3 Local labor charges: The skill, suitability and wages of local labors are considered while preparing the detailed estimate.

### 1.1.2 Data for detailed estimate:

The process of working out the cost or rate/unit of each item is called data. In preparation of data, the rate of materials and labor are obtained from current standard scheduled of rate and while the quantity of materials and labor required. For one unit of item are taken from standard data book (SDB).

**Fixing of rate per unit of an item:**

The rate per unit of an item includes the following:

1. Quantity of materials and cost: The requirements of materials is taken strictly in accordance with standard data book (SDB). The cost of those includes first cost, freight, insurance and transportation charges.
2. Cost of Labor: The exact number of labors required for unit of work and multiplied by the wages/day to get of labor per unit item of work.
3. Cost of equipment (T&P): Some work need special type of equipment, tools and plants. In this case, an amount of 1-2% of estimated cost is provided.
4. Overhead charges: The meet expansions of office rent, differentiation of equipment, salaries of staff postage, lighting and amount of 4% of estimate cost is allocated.

**1.2 Introduction to Tendering**

Tendering is the process whereby the prime contractor receives subcontractor and vendor prices for labor, material and \or the combination of the two. It is the systematic process of simplifying the facts, reducing errors and omissions, relaying upon speed and efficiency to produce the relative accurate results. Tension rise because of the mental concentration required,

apprehensive over possible errors and anxiety regarding financial success or failure. It has been said that during the construction there is a more competitive pressure and more performance intensity than in any other industry.

In tendering, one is dealing with many divisions of the specifications, both broad and narrow scope in nature. Sub contractor and vendor quotations are matched to the specifications by the CSI 16 division format. The various sub contractors and vendor trades, federal regulations make a number crunching within a few hours of tender time is a major feat.

**1.2.1 Tendering Process**

Tender means a offer to tender for a project or item of work. In India public works or government works are allotted under the contract process only, at a specific quality must be freely advised with tender notifications, which are advertised in all Indian Newspapers, Trade Journals, Departmental Publications and Notice Boards, and on Internet.

**Taking after are the sorts of Tenders:** Tender can be characterized in light of the necessity class or tender type. Different sorts of tenders are there, and they are explained below:

**1.2.1.1 Selective Tender (Closed Tender)**

Here, just selected or well qualified contractors are permitted to take an interest. Closed Tenders are not promoted in daily newspapers, subsequently other tenderer for the most part don't even realize that such process is executed. The least tender valued tenderer will win the tender.

**1.2.1.2 Open Tender**

This is a type of tender in which a notice in local daily newspapers or exchange diaries calls contractors to apply for the project. This is a straightforward procedure guarantees that exclusive tenderer with low tender amount and passing in all the specialized prerequisites will get the tender.

**1.2.1.3 Negotiable Tender**

Under Negotiable Tender strategy, ordinarily one contractor is drawn closer and such tender for the most part utilized for pro work, for example, lift system or air terminal projects at high ranges, at that time few known contractors for such type of work only in the market/industry. Depending upon negotiating with the contractor for arrangement of the terms of agreement.

**1.2.1.4 Single Tender**

Tender form or notice is been sent to one specific person or company. Typically, it is either for a thing where there is one and only contractor or for a thing where the proprietor has created trust in one contractor and might simply want to check the present value, conveyance and so on. Single Tenders are additionally sent for things of exclusive nature.

**1.2.1.5 Percentage Rate Tenders**

Here, a point by point appraisal of the quantity of work to be done alongside the evaluation rates are been shown in the tender form. The tenderers supposed to tender the sum inrate more or less or at same.\

**1.2.1.6 Item Rate Tenders**

The contractors are supposed to quote the amount for every items specified in the tender form. The total

quantity of each item will be mentioned in tender form separately and total of each of those will give the total tender amount or tender value of the particular tenderer.

### 1.2.1.7 International Competitive Tendering

A technique of getting products & managements that obliges notice to universal group. Tenderers from qualified nations, characterized from the contractor's organization or nation, they given an equivalent chance to apply.

### 1.2.1.8 National Competitive Tendering

Such tendering are just for Indian organizations to take an interest. Global organizations are not permitted to take part.

### 1.2.1.9 Request for Proposal

In Request for proposal type of tender, an organization is needed to submit just technical proposition.

### 1.2.1.10 Request for Quote

RFP and RFQ are more similar, however some particular, & more subtle elements at every stage. Request for quote are utilized when an association is officially chosen one specific item or work & expecting competitive evaluating by numerous sellers of that work.

### 1.2.1.11 Request for Information

This is given when an association needs to assemble data around one particular organization or a contractor's items/managements in an underlying information collecting stage.

Generally because of such information, organizations can easily choose on the off chance that they might want to facilitate investigate acquiring that item or benefit, and can qualify the produce/service/seller for future discussions.

### 1.2.1.12 Expression of Interest

This is a kind of tender similar to RFP type. EOI means a industry expression demonstrating plan for tender.

### 1.2.1.13 Single Envelope Tendering

Here in this tender, Price and the Technical documents are submitted in single envelope. The tender is recompensed to the tenderer who's tender which has been resolved as the lower significantly relative tender.

### 1.2.1.14 Two-Envelope Tendering

Here two fixed covers are submitted, one with technical & other with Price Proposal, encased both in an external single cover. Those two covers are then placed in one large cover, and then fixed and applied. Initially Technical documents are opened and price documents of just those tenderers who all discovered in fact allowable are seen in this way afterwards.

### 1.2.1.15 Multiple Envelope Tendering

Here, EMD is given in first, Technical documents in second Envelope and a Price document in third envelope is submitted. at the premise of prerequisite tender may be applied independent envelopes. EMD envelope and Technical document envelopes are opened first. Only pre-qualifying tenderer's envelope is opened and finally the individuals whose documents are discovered in fact acceptable, those are also opened.

## 1.2.2 Modified Tendering Process

The present construction Tendering process, the lowest tenderer has to get awarded and it is tedious to justify the Tendering process. By analyzing the different parameters like Experience, Class of the registration, Qualification Rating, Financial standards and Work done, by formulating them in excel sheet and calculating the tendering price by using different formulae we can get better result and can give the justification easily.

### 1.3 Problem Identification

The study goes for reformulating the tendering process in the construction industry of India. In India, in tendering process for honoring the contract is the Least Responsive Tenderer or Price Based technique, which has characteristic blemishes of high rivalry and least execution. These awkward practices represent a genuine danger and issues. It is hence, basic to evaluate the effect of competitive low-offer allotting system on execution of real public work tenders (as far as timetable, cost, quality and wellbeing) in India construction industry. The study will forward proposals and recommendations for building up a proposition for executing elective tender evaluation and contract recompense methods for the construction industries of India.

### 1.4 Significance of the Study

Predominantly, the study is carried out to examine the execution of public claimed construction projects which are granted by the most minimal tenderer offer honoring system in India. The investigation carried out on

several issues and how to formulate the tendering price

and the recommendation in tendering process are secured in this study. fareprocess is carried out which can be easily used to solve tendering tedious process.

A thought of

## 1.5 Objectives of the Study

1. Proper approach is adopted in tendering procedure and tendering price issues in the construction industry.
2. Strategies to lay coverage plan which will justify the tendering price in the construction industry.
3. An investigation of the tendering criteria and preparing a fair module to which our system can support and enhance the tendering procedure.

## 1.6 Organization of the Report

The report comprises of the accompanying seven parts which incorporates the following Contents:

**Chapter 1** incorporates a presentation which covers the introduction to the Tendering Process, centrality of the study and the Objectives are examined.

**Chapter 2** gives the survey of literature covering customary and altered Tendering and contracts system approaches did in India and somewhere else.

**Chapter 3** gives importance and procedures required in the Modified Tendering Process.

**Chapter 4** describes the result obtained from study and its analysis.

**Chapter 5** based on the discussions, suitable conclusion will be drawn and presented along with few recommendations and scope for the future work.

### Chapter 2 LITERATURE SURVEY

**Bhushan Ratekar et al. (2007)** his Studies in Tender/no tender Decision Various researchers have endeavored to establish a systematic tender/no tender decision process based on the factors that influence construction tender/no tender decisions. The table 1 shows a list of research studies on critical tender/no tender decision criteria. These research studies were undertaken in different cultural and geographical regions of the world. But many of the factors identified by the researchers are more or less same. Egemen & Mohamed 2007 tried to divide a criterion into some sub-criteria and that is why they discovered a large number of influencing criteria. Moreover, Ahmad & Minkarah (1988) discovered 17 new tender/no tender decision criteria as a result of their research participants' feedback to the survey.

**Tejas C. Patil et al (2013)** gave the rapid evolution of e-commerce in the past few years has introduced new ways for organizations to perform tendering processes and participate in tenderings. The term tendering is used to describe all the actions performed by the awarding authority to produce, publish and manage tendering documents, while tendering incorporates the effort of interested organizations to win contracts by responding to tenders. In this context, the value adding functionalities related to e-commerce technologies include for example electronic publication of tenders, electronic search of tenders as well for partners and suppliers, electronic submission of tenderings, electronic notification of award and so on.

**Friedman (1956-1957)** has considered the strategy of how to win a tender. The results of that study called for maximisation of the expected profit from a tender in which each competitor

concurrently submits one closed tender. It was found that the tenderer should select the mark-up on cost that maximizes expected value of the profit. However, this approach of Friedman's model is not a tender/ no tender model. This is because he has assumed that the company has already made the decision to tender, and his strategy is to maximise the value of the expected profit. His solution was to establish the competitors' 'tendering patterns' by calculating the ratios between their tenders and the cost estimates. Friedman addressed the existence of multiple tendering criteria by listing objectives of profit maximization. Boughton (1987) also addressed these multiple objectives in a survey of 126 construction firms; he found that profit maximization was the most frequently used tendering objective, and that it was the most important objective. However, what seems to be missed in Friedman's model is the previous stage of his model, which is the actual tendering decision. Models have been recognized as being, to some extent, developments of this pioneering work by Friedman.

**Gates (1967)** re-interpreted Friedman's strategy for a single tender into a general strategy with general applicability of a profit maximizing pricing model for tendering. There are many similarities between the Friedman and Gates papers (Runeson and Skitmore, 1999). However, subsequent work by Gates (1983) took a nonmathematical decision support model based on the Delphi technique, and reformulated. **Byung Gyo Kang et al., (2015)** Focused tendering was one of the central acquisition strategies for construction projects in the twentieth century. Because of the inconveniences, for example, effects of configuration change, nature of conclusive merchandise and so forth, ceaseless utilization of this tender strategy to construction industry has turned out to be very doubtful. This examination has inspected and looked at customer's perspective and contractor's

perspective on focused tendering in the Sudan gathering industry. Considering their inverse positions in connection to focused tendering, customers and contractors have been looked at. 16 comprehensive inquiries were inquired. The result demonstrates that there

is almost no contrast between customers' perspective and contractor' perspective in powerful tendering. Thusly, focused tendering might be still proficient and compelling in the 21<sup>st</sup> century as both sides are very much aware of the focal points and detriments. Further examines are required perhaps in different nations to check the discoveries of this research.

**Thogare N. Shridhara et al., (2014)** Decision Support System (DSS) tool upgrade choice makings towards unrivalled water supply in a given area. The rigors of handbook outline of the traditional stream treatment plants are just dispensed with apply of programming projects as in the packaging of DSS. Consequently, this paper concentrates on the improvement of a Water- DSS for configuration of treatment plant in Karkala Town, Udupi District of India. A four- decade occupants projection was finished utilizing the benchmark information of 1971 till date. The handbook division for water request, unit operation and bordering managements was completed and later implied in C-programming dialect for advancement of a DSS for less demanding drawing and process choice. Information acceptance was done and comes about because of the two methodologies were looked at. With the C-programming methodology, a choice support contraption for configuration and procedure choice of admission water treatment plant utilizing regular strategy has been created and named Water-DSS1. The planned apparatus is basic, precise, adaptable, competent and all inclusive, easily flexible to any comparative traditionalist treatment plant. Water-DSS1 is consequently recommended for general use in toward the day's end mitigating water contributes challenges.

### Chapter 3

#### METHODOLOGY

##### 3.1 General

The present work goes for the analysis and investigation of the thought of the Using modified tendering process formulation and calculation of tendering amount based on the structure of tendering criteria. The known parameter has dependably been firmly connected to the client prerequisites for particular work, tendering and contract system. The tendering procedure and the issuing relies on upon an expansive number of variables which plays a vital, for example, Experience of work (years), Class of registration, Qualification Rating, Requirement of showing the financial standard (Solvency certificate), Work accomplished for most recent 5 year, Profit ratings, Original tender quantity, Tenderers quantity, Least Tenderer, Final rating. A few parameters are of extraordinary significance and merit successive consideration and perception, though difference gives an unpleasant picture of tendering procedure and its quality status. The present study is completed with the accompanying destinations:

1. Analysis was carried out by Conventional methods.
2. Decision making by calculating the tendering price based on total cost and mark up of project (Contractor's Estimation of Cost and Tendering Strategy).
3. Analysis was carried out by modified excel formulation. .

## 3.2 Conventional Procedure

### 3.1.1 Scope of Tender

The Purchaser indicated in the Tendering Data Sheet (BDS), issues these Tendering Documents for the supply of Goods and Related Services incidental thereto as specified in Section VI, Schedule of Requirements. The name and identification number of this International Competitive Tendering (ICB) procurement are specified in the BDS. The name, identification, and number of lots of are provided in the BDS.

### 3.1.2 Tendering Process Aims

With appropriately inclusive eligibility rules, a competitive tendering process allows the market to bring forward the technologies that can most cost effectively provide the required capacity (and fulfill whatever technical requirements are associated with the product being auctioned). Competitive pressure should provide tenderers with incentives to tender at the level that corresponds to the funding they require to provide capacity, so such a process should identify the funding gap preventing adequate investment without the state support. A competitive tendering process should offer a transparent route to market for existing and potential new market entrants. Finally, as with any mechanism for allocating aid, a mechanism needs to support the successful delivery of benefitting projects – though this may depend on the design of the support instrument that is awarded in the competitive process, as well as the design of the tendering process itself.

### 3.1.3 Tendering Process Design Choices

1. **Eligibility rules:** In principle, the process should be open to all types of capacity that can meet the necessary technical requirements, as wider participation should increase competition and reduce costs.
2. **Pre-qualification and collateral rules:** Strong performance incentives (penalties) should reduce the need for pre-qualification checks and collateral, since if beneficiaries will face high costs for not delivering capacity then they should have incentives to make an accurate self-assessment of the amount of reliable capacity they can offer into a tendering process. However, even with strong penalties it may be necessary to audit participants' projects before they are able to tender, to ensure that they have a credible plan for actually delivering capacity that meets the necessary technical requirements, and determine the amount of capacity that a project is able to offer into the tendering process..
3. **Tendering process structure and tendering rules:** There are many possible variations for the structure of a tendering process, but one main choice is between an open format and a sealed tender format. In sealed tender formats, tenders are submitted independently by tenderers. Tenders are compared and then binding on the successful tenderers. In open formats, tenderers have an opportunity to react to other tenderers' behavior and adapt their tenders during the process. It is possible to combine both formats through a two-stage process with an initial open round followed by a final round of sealed tenders.
  - **Pricing rule** The definition of a competitive tendering process in the EEAG allows for the compensation to beneficiaries to be set 'on either the basis of the initial tender submitted by the tenderer or a clearing price'. This allows for both 'pay as tender' and 'pay as clear' (also known as 'uniform price') pricing rules.
  - **Selection rules :** Defining a clear product requirement and inviting tenders just on the basis of cost means it is easy to compare tenders and identify the winner/s. But this may favor tenderers whose competitive advantage is aligned with the product definition, and care will have to be taken to define appropriate technical requirements (see separate papers on eligibility, and on obligations and penalties.
  - **Transparency:** Another consideration concerns the information to be published in advance of a competitive tendering process. For example, whether to publish pre-qualification information (ie. number / identity of pre-qualified tenderers), whether to publish fullscoring rules, and whether to publish the demand curve for the process.

### 3.1.4 Ensuring Competition between New and Existing Resources

The EEAG require generation adequacy measures to 'provide adequate incentives to both existing and future generators' and to 'allow for the participation of new market entrants with different build times'. Two of the most important design considerations in this respect are the timing of the tendering process in relation to the point in time at which contracted capacity must be available, and the length of contracts available to participants in the tendering process.

**1. Lead time:** As noted in the separate paper on eligibility, the lead time between the tendering process and the point in time when capacity must deliver its obligation needs to be set so that different technologies can be developed in time to participate. This requires consideration of the

lead time for new capacity development, as well as the requirements of demand response capacity which may be unwilling to commit to demand reductions several years ahead

3. **Contract lengths:** Depending on the financing arrangements for new power plants in a Member State, the contract lengths available may have a significant impact on the extent to which new projects can compete with existing projects. A longer contract provides additional certainty which can reduce the cost of financing a new project by allowing the investor to spread any debt service costs over the life of the contract.

### 3.1.5 Tendering Procedure

Construction estimating consists of three parts:

1. **Quantity survey:** Quantity survey is the physical removal of quantities from the working drawings and specifications. This can be done using instruments such as a scale, tape, wheel or a digitizer attached to a computer program.
2. **Price extension:** Price extension is the portion of the estimate in which the contractors –price out the individual items, such as pricing out labor and material using current labor rates and material prices. Due to technological advancement and specialization in today's construction world, the prime contractor's work is confined to those trades that the company performs directly, usually without subcontracting. Depending on the type and size of the projects and the tender strategy the prime contractor's portion of the total estimate may be only 5% to 20%. The amount of direct work contributed to the project reflects the risk that the prime contractor determines to take on a certain project. The remainder of the work is then brokered out or subcontracted.
3. **Tendering process:** Tendering is the process whereby the prime contractor receives subcontractor and vendor prices for labor, material and/or the combination of the two. It is a systematic process of simplifying facts, reducing errors and omissions, relying upon speed and efficiency to produce relatively accurate results. Tensions rise because of the mental concentration required, apprehension over possible errors and anxiety regarding financial success or failure. It has been said that during the construction tender there is more competitive pressure and more performance intensity than in any other industry. In tendering, one is dealing with many divisions of the specifications, both broad and narrow scope in nature. Subcontractor and vendor quotations are matched to the specifications by the standard Division format. The various subcontractor and vendor trades, personalities, ambiguities, omissions contradictions-not to mention having to meet state and federal regulations make number crunching within a few hours of tender time a major feat.

### 3.1.6 Tender Timeline and Strategies

The tendering phase of estimating is probably the most vulnerable, talked about and scrutinized phase of an estimate. There are many reasons for this, a major one being the pressure that is placed on the estimator on tender day. Conflicts occur when legitimate and non-legitimate opportunities arise with the arrival of the various sub tenders or items. Below are some examples:

#### Legitimate Opportunities

1. Special equipment not available to other tenderers.
2. Service of expert not available to other tenderers.
3. Special material prices found through investigation, presumably not available to other tenderers.
4. Holding an exclusive low quotation not available to other tenderers and obtained without disclosing other sub tenders
5. Special construction techniques not used by other tenderers.
6. Presumably a tighter, more accurate schedule.

#### Non Legitimate Opportunities

1. Inside information given by the owner, engineer or architect not given to other tenderers.
2. Accepting and using low sub tenders without obtaining confirmation from sub tenderer.
3. Asking a subcontractor for a special price, thus revealing other sub quotations.
4. Peddling other sub tenders to the advantage of low prices.
5. Reducing one or all sub quotations by a certain percentage to lower the total contract amount without permission.
6. Not revealing obvious or hidden problems on the working drawings or specifications.

Along with legitimate and non-legitimate opportunities are legal responsibilities, which can be vague in meaning and based more on ethical reasoning than on sound interpretation of the law. Whatever the reasoning, the name of the game is to be the successful tenderer. When actively tendering because they do not win enough low tenders, and/or are too low to make a profit on the open market, a successful contractor will only be low on 10%-15% of all estimates. There are also many inexperienced tenderers learning the hard way by winning a great number of contracts with unreasonably low tenders. Most of these contractors fail

### 3.1.7 Evaluation & Qualification

#### 3.1.7.1 Evaluation of Tender:

UNDP shall examine the Tender to confirm that all terms and conditions under the UNDP General Terms and Conditions and Special Conditions have been accepted by the Tenderer without any deviation or reservation. The evaluation team shall review and evaluate the Tenders on the basis of their responsiveness to the Schedule of Requirements and Technical Specifications and other documentation provided, applying the procedure indicated in the Data Sheet absolutely no changes may be made by UNDP in the criteria after all Tenders have been received.

UNDP reserves the right to undertake a post-qualification exercise, aimed at determining, to its satisfaction the validity of the information provided by the Tenderer. Such post-qualification shall be fully documented and, among those that may be listed in the Data Sheet may include, but need not be limited to, all or any combination of the following :

1. Verification of accuracy, correctness and authenticity of the information provided by the tenderer on the legal, technical and financial documents submitted.
2. Validation of extent of compliance to the ITB requirements and evaluation criteria based on what has so far been found by the evaluation team
3. Inquiry and reference checking with Government entities with jurisdiction on the tenderer, or any other entity that may have done business with the tenderer.
4. Inquiry and reference checking with other previous clients on the quality of performance on non-going or previous contracts completed
5. Physical inspection of the tenderer's plant, factory, branches or other places where business transpires, with or without notice to the tenderer.
6. Testing and sampling of completed goods similar to the requirements of UNDP, where available.
7. Other means that UNDP may deem appropriate, at any stage within the selection process, prior to awarding the contract.

#### 3.1.7.2 Clarification of Tender:

To assist in the examination, evaluation and comparison of tenders, UNDP may, at its discretion, ask any Tenderer to clarify its Tender. UNDP's request for clarification and the Tenderer's response shall be in writing. Notwithstanding the written communication, no change in the prices or substance of the Tender shall be sought, offered, or permitted, except to provide clarification, and confirm the correction of any arithmetic errors discovered by UNDP in the evaluation of the Tender, in accordance with ITB. Any unsolicited clarification submitted by a Tenderer in respect to its Tender, which is not a response to a request by UNDP, shall not be considered during the review and evaluation of the Tender.

#### 3.1.7.2 Responsiveness of Tender:

UNDP's determination of a Tender's responsiveness will be based on the contents of the Tender itself. A substantially responsive Tender is one that conforms to all the terms, conditions, and specifications of the ITB without material deviation, reservation, or omission. If a Tender is not substantially responsive, it shall be rejected by UNDP and may not subsequently be made responsive by the Tenderer by correction of the material deviation, reservation, or omission. Nonconformities, Reparable Errors and Omissions provided that a Tender is substantially responsive, UNDP may waive any non-conformities or omissions in the Tender that, in the opinion of UNDP, do not constitute a material deviation. Provided that a Tender is substantially responsive, UNDP may request the Tenderer to submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Tender related to documentation requirements. Such omission shall not be related to any aspect of the price of the Tender. Failure of the Tenderer to comply with the request may result in the rejection of its Tender. Provided that the Tender is substantially responsive, UNDP shall correct arithmetical errors as follows:

1. If there is a discrepancy between the unit price and the line item total that is obtained by multiplying the unit price by the quantity, the unit price shall prevail and the line item total shall be corrected, unless in the opinion of UNDP there is an obvious misplacement of the decimal point in the unit price, in which case the line item total as quoted shall govern and the unit price shall be corrected.
2. If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected.
3. If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to the above. If the Tenderer does not accept the correction of errors made by UNDP, its tender shall be rejected

### 3.1.8 Tendering Form

#### TENDER SUBMISSION SHEET

DATE \_\_\_\_\_  
 ICB NO \_\_\_\_\_  
 INVITATION TENDER NO. \_\_\_\_\_

TO:

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We, the undersigned, declare that

1. We have examined and have no reservations to the Tendering Document, including Addenda issued in accordance with Instructions to Tenderers
2. We offer to execute in conformity with the Tendering Document the following Works
3. The total price of our Tender, excluding any discounts offered in item below is
4. The discounts offered and the methodology for their application are
5. Our tender shall be valid for a period of \_\_\_\_\_ days from the date fixed for the tender submission deadline in accordance with the Tendering Document, and it shall remain binding upon us and may be accepted at any time before the expiration of that period
6. If our tender is accepted, we commit to obtain a performance security in accordance with the Tendering Document
7. We, including any subcontractors or suppliers for any part of the contract, have or will have nationalities from eligible countries, in accordance with ITB
8. We, including any subcontractors or suppliers for any part of the contract, do not have any conflict of interest in accordance with ITB
9. We are not participating, as a Tenderer or as a subcontractor, in more than one tender in this tendering process in accordance with ITB, other than alternative offers submitted in accordance with ITB
10. We, including any of our subcontractors or suppliers for any part of the contract, have not been declared ineligible by the Bank, under the Employer's country laws or official regulations or by an act of compliance with a decision of the United Nations Security Council;
11. We are not a government owned entity/ We are a government owned entity but meet the requirements of ITB
12. We have paid, or will pay the following commissions, gratuities, or fees with respect to the tendering process or execution of the Contract:

Name of Recipient	Address	Reason	Amount

13. We understand that this tender, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until formal contract is prepared and executed.
14. We understand that you are not bound to accept the lowest evaluated tender or any other tender that you may receive.

### 3.1.9 Supply Requirements

In addition to finding the right products at the right prices, city officials and employees must follow various state laws that govern the tendering and contracting process. This Statement of Position provides general information on tendering and contract requirements.

**3.1.9.1 Uniform Municipal Contracting Law:** The Uniform Municipal Contracting Law sets out procedures that cities must follow for contracts to sell, purchase or rent supplies, materials, or equipment, or to construct, alter, repair or maintain real or personal property. The procedures to follow depend on the estimated amount of the contract. Of course, estimates should be reasonable. For example, if a city asks for quotations because it estimates the value of a contract

will be below the tender threshold but all of the quotations are substantially over the threshold, the city should solicit formal tenders. Contracts estimated to have a value over \$100,000 must be made by sealed tenders, solicited by public notice, and awarded to the lowest responsible tenderer. Tenders should be retained for the period specified in a validly adopted records retention schedule. A contract should be executed in writing. The requirement that the successful tenderer be responsible protects cities from having to choose unqualified or unscrupulous low tenderers. It allows a city council to consider factors such as the tenderer's financial responsibility, integrity, skill and ability, and the likelihood that the tenderer will do satisfactory work. A city can even include evaluation criteria for responsible tenderers in the tender specifications.

**3.1.9.2 Best Value Procurement Alternative :** As an alternative, cities and other government entities may use a best value procurement process for –construction, building, alteration, improvement or, repair (and maintenance) contracts. Best value procurement is a process based on competitive proposals that awards the contract to the vendor or contractor offering the best value, taking into account the specifications of the request for proposals, the price and (specific) performance criteria.

The price and performance criteria may include, but are not limited to:

- 1) The quality of the vendor's or contractor's performance on previous projects
- 2) The timeliness of the vendor's or contractor's performance on previous projects
- 3) The level of customer satisfaction with the vendor's or contractor's performance on previous projects
- 4) The vendor's or contractor's record of performing previous projects on budget and ability to minimize cost overruns
- 5) The vendor's or contractor's ability to minimize change orders
- 6) The vendor's or contractor's ability to prepare appropriate project plans
- 7) The vendor's or contractor's technical capacities
- 8) The individual qualifications of the contractor's key personnel or
- 9) The vendor's or contractor's ability to assess and minimize risks

The solicitation document must state the relative weight of price and other selection criteria. The award must be made to the vendor or contractor offering the best value applying the weighted selection criteria. If an interview of the vendor's or contractor's personnel is one of the selection criteria, the relative weight of the interview must be stated in the solicitation document and applied accordingly. Personnel administering best value procurement procedures must be trained in the Request for Proposals (RFP) process for best value contracting for construction projects.

### 3.1.9.3 Notice of Solicitation of Tenders

The notice that tenders are being solicited must be published once in the city's official newspaper at least ten days before the last day for the submission of tenders. As an alternative to publishing the notice in a newspaper, a city may post the notice on its Web site or publish it in a recognized industry trade journal if certain steps (described below) are followed.

### 3.1.9.4 Alternative to Publishing of Tenders And Requests For Proposals (Rfps)

As an alternative to publishing tenders in a newspaper, a city or other political subdivision may post solicitations of tenders, requests for information or requests for proposals by using its Web site or recognized industry trade journals. The political subdivision must official newspaper, a

description of all solicitations or requests so distributed, along with the means by which the publications occurred. Publication by alternative means must be in substantially the same format and for the same period of time as a publication in a qualified newspaper. For the first six months after the political subdivision designates an alternative means of publication, it must continue to publish solicitations of tenders, requests for information, and requests for proposals in the official newspaper in addition to the alternative method. The publication in the official newspaper must indicate where to find the designated alternative methods. If, in the normal course of its business, a qualified newspaper maintains a Web site then, as a condition of accepting and publishing public notices, the newspaper must agree to post all the notices on its Web site during the notice's full publication period.

### 3.1.9.5 Electronic Tendering

Cities have authority for the following procedures related to purchases and sales:

#### a) Reverse Auction Purchases :

A city may enter into many contracts to purchase supplies, materials, and equipments (but not services) using an electronic purchasing process in which vendors compete to provide the supplies, materials, or equipment at the lowest price in an open and interactive environment.

#### b) Electronic Sales :

A city may contract to sell supplies, materials, and equipment which are surplus, obsolete, or unused, using an electronic selling process in which purchasers compete to purchase the surplus supplies, materials, or equipment at the highest purchase price in an open and interactive environment.

### 3.1.9.5 Invitation to Tender

Name of Country:

Name of Project:

Loan / credit number:

IFB Title:

IFB Number

- 1) This Invitation for Tenders follows the General Procurement Notice for this Project that appeared in Development Business, issue no. [insert number] of [insert date]
- 2) The [insert name of Borrower] [has received/has applied for/intends to apply for] a [loan/credit] from the [International Bank for Reconstruction and Development/International Development Association] toward the cost of [insert name of Project], and it intends to apply part of the proceeds of this [loan/credit] to payments under the Contract for [insert name/no. Of Contract]
- 3) The [insert name of Implementing Agency] now invites sealed tenders from eligible and qualified tenderers for [insert brief description of the Goods to be procured].
- 4) Tendering will be conducted through the International Competitive Tendering (ICB) procedures specified in the World Bank's Guidelines, Procurement under IBRD Loans and IDA Credits and are open to all tenderers from Eligible Source Countries as defined in the Guidelines.
- 5) Interested eligible tenderers may obtain further information from [insert name of Agency insert name and e-mail of officer in charge] and inspect the Tendering Documents at the address given below [state address at end of this ITB] from [insert office hours]
- 6) Qualifications requirements include: [insert a list of technical, financial, legal and other requirements]. A margin of preference for certain goods manufactured domestically [insert shall or shall not, as appropriate] be applied. Additional details are provided in the Tendering Documents.
- 7) A complete set of Tendering Documents in [insert name of language] may be purchased by interested tenderers on the submission of a written Application to the address below [state address at the end of this ITB] and upon payment of a non refundable fee [insert amount in local currency] or in [insert amount in specified convertible currency]. The method of payment will be [insert method of payment] The Tendering Documents will be sent by [insert delivery procedure].
- 8) Tenders must be delivered to the address below [state address at the end of this ITB] at or before [insert time and date]. Electronic tendering will [will not] be permitted. Late tenders will be rejected. Tenders will be opened in the presence of the tenderers' representatives who choose to

attend in person or on-line at the address below [state address at end of this ITB] at [insert time and date]. All tenders must be accompanied by a [insert Tender Security or Tender-Securing Declaration, as appropriate] of [insert amount in local currency or minimum percentage of tender price in case of a Tender Security] or an equivalent amount in a freely convertible currency.

- 9) The address referred to above is(are): [insert detailed address including Name of the Implementing Agency, Office designation (room number), name of Officer, Street Address, City (code), Country insert electronic address if electronic tendering is permitted.

### **3.3 Contractor's Estimation of Cost and Tendering Strategy**

#### **3.3.1 Contractor's estimation & tendering process**

1. Get involved in pre-qualification process
2. Study the tender document, drawings and prepare tender summary
3. Decisions to take
4. Arrange for site visit and investigation
5. Consultation, queries, meetings and other associated works
6. Prepare construction schedule and other related schedules
7. Collect information
8. Determining tender price

#### **3.3.2 Preparing Tender at a Glance**

A typical 'tender at a glance' report would contain

1. General information related to client, consultant and architect.
2. Commercial terms.
3. Information on mobilization advance, plant and machinery advance, material advance, etc.
4. Information on taxes and duties.
5. Information on terms of payment.
6. Information on escalation clause, liquidated damages and bonus clauses.
7. Information on arbitration and dispute resolution clauses.
8. Information on insurance.
9. Information on facilities to be provided at site. and
10. Information on materials issued by the clients.

While preparing the tender at a glance, the emphasis is more on highlighting those points that have financial implications.

#### **3.3.3 Decisions to take**

1. To tender or not to tender itself is a big decision
2. Whether to tender independently or in a joint venture (JV) with some other contractor(s).
3. The item to be subcontracted and the extent to which the work is to be subcontracted.
4. The decision on the construction method to be adopted for the project.

#### **3.3.4 Arrange for site visit & investigation**

1. Description of site;
2. Positions of existing services;
3. Description of ground conditions;

4. Availability of labour in the vicinity of site;
5. Assessment of security, law-and-order situation;
6. Description of access to the site;
7. Topographical details of the site;
8. Availability of water and power;
9. Facilities available for waste and excess earth disposal;
10. Description of any demolition works or temporary works to adjoining buildings.

### 3.3.5 Site Investigation

The site investigation helps to collect are following details General information related to site.

1. Information on taxes, duties and tariff s.
2. Information on laws/regulation.
3. Meteorological information.
4. Information related to access to project site by road, rail, air and water routes.
5. Information on public utilities and services.
6. Information on material availability and their rates.
7. Information on site topography.
8. Information on basic inputs for estimating material rates.
9. Information on site facilities.
10. Information on labour availability and their rates.
11. Information on subcontractor availability and their rates for different works.
12. Information on availability of plant and machinery, and their rates.

A detailed discussion on site investigation is provided separately in the book.

### 3.3.6 Prepare construction & other schedules

1. Construction schedule .
2. Split the projected quantities on bar chart .
3. Calculate cash inflow and outflow schedule, based on contract condition, and contractor's payment agreement with labour, vendors and supplier.
4. Cash inflow and outflow schedule.
5. Labour schedule.
6. Plant schedule.
7. Subcontractor schedule.

### 3.3.7 Collect information

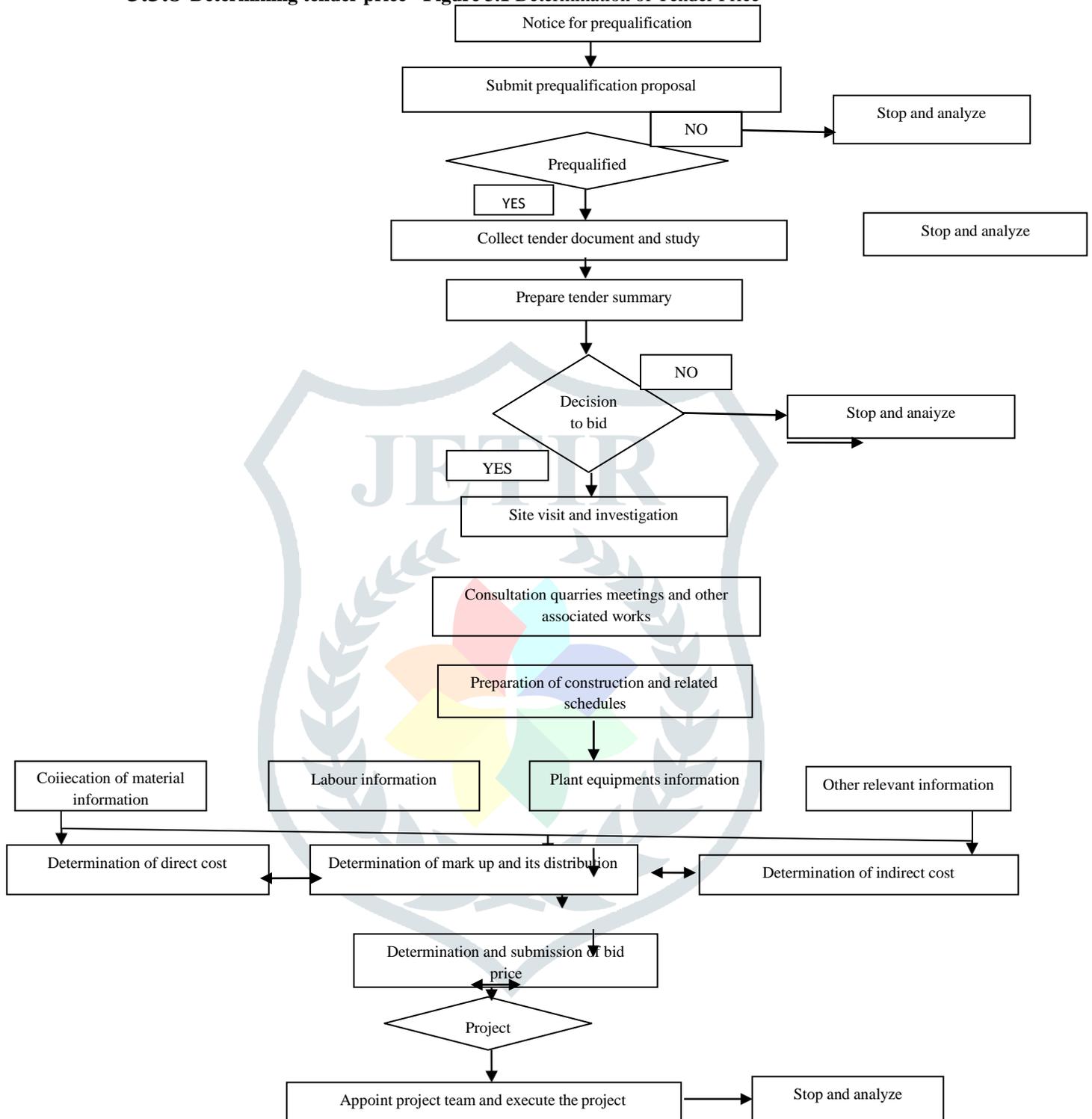
**Material:** Calculate material requirement per unit of an item/activity, find the different materials involved, their proportions with respect to volume, bulkage, wastage, breakage.

**Labour:** Calculate labour requirement based on average output of labour per hour, for both skilled & unskilled.

**Plant and Equipment:** Identify plant and equipments needed for completion of the project within given time and get information on the output of mechanical plant – different types and sizes .

**Construction method:** Knowledge of most economical manner to carry out the works.

**3.3.8 Determining tender price - Figure 3.1 Determination of Tender Price**



**3.3.9 Analysis of rates**

1. Operational Estimating
2. Unit Rate Estimating
3. Combined Operational Estimating and Unit Rate Estimating

**3.3.10 Fix mark-up**

Mark-up is the sum of profit, contingency, allowances for risk and general overheads. It can be expressed either:

(1) In terms of some percent of total cost **TC** or

(2) In terms of some percent of tender price *B* explained latter. In the second case, it is also referred to as 'off-top'.

**3.3.10.1 Factors Affecting Mark-Up**

Number of competitors and the intensity of competition, cost and intensity of the project.

1. Type of project—buildings, infrastructure projects, etc.
2. Duration of project
3. Location of project
4. Season in which the work is done
5. Degree of hazard and difficulty associated with the project
6. Name of owner/consultant and designers, and time available for tender preparation
7. Labour availability and productivity
8. Material availability and costs
9. Percent of the work, which is to be subcontracted and the tenders of subcontractors
10. Insurance cost and fringe benefits
11. Availability of supervisory talent
12. Method of performing the work
13. Uncertainty in estimate and historic profit
14. The current and forecasted economic conditions
15. The contractor's risk attitudes

**3.3.10.2 Computing tender price**

Let us assume that direct cost of a project is **DC** and the indirect cost is **IC**. Thus, total cost **TC** is given by

$$TC = DC + IC$$

For the 1st case, that is when the mark up is expressed in terms of some percent of the total cost *TC*, the tender price is computed as:

$$B = TC + \frac{\text{mark up}(\%)}{100} \times TC$$

### 3.3.11 Computing tender price

Assuming that mark-up is 10 per cent of the total cost  $TC$ , the tender price  $B$  is given as:

$$B = TC + \frac{10}{100} \times TC \quad B = 1.10 \times TC$$

For 2nd case, when the mark up is expressed in terms of some per cent of the tender price  $B$ , the tender price is computed as:

$$B = TC + \frac{\text{mark up}(\%)}{100} \times B \quad B = \frac{TC}{(1 - \frac{\text{mark up}(\%)}{100})}$$

Assuming that mark-up is 10 per cent of the tender price  $B$ , the tender price  $B$  is given as:

$$B = TC + \frac{10}{100} \times B \quad B = \frac{TC}{0.9} = 1.11 \times TC$$

The multiplication factor  $CO$ , for the direct cost of individual items would be given as

$$CO = \frac{B}{L + M + P}$$

Where  $L, M$  and  $P$  are the labour, material and plant and equipment costs for all the activities of the project. The expressions for computation of  $L, M$  and  $P$  are given below:

$$P = \sum_{i=1}^n p_i$$

$$L = \sum_{i=1}^n m_i$$

$$M = \sum_{i=1}^n$$

Knowing the tender price  $B$  and total cost  $TC$ , mark up (in terms of percent) can be obtained as given below:

(1) Mark up in terms of percentage of total cost  $TC$ :

$$\text{mark up}(\%) = \frac{(B - TC)}{TC} \times 100\%$$

(2) Mark up in terms of percentage of tender price  $B$ , referred to as off top is given as:

$$\text{off top}(\%) = \frac{(1 - \frac{TC}{B}) \times 100\%}{B}$$

### 3.4 Modified Excel Formulation (Modified Tendering process)

#### 3.4.1 Instruction for online submission

- To apply for any tender in e-tendering process, every tenderer must have a **class-Idigital signature certificate** to certify that tenderer.
- With the digital signature certificate, contractor must have **user ID and password** to login, which he will get after registering in [www.tenderwizard.com/DAE](http://www.tenderwizard.com/DAE), and by paying the annual registration fee.
- Once the tenderer gets his digital certificate, user ID and password, he is no more need to get new one. Only need to renew it after expires of annual fee duration.
- Rate quotations are supposed to enter in the online form of that particular work. No other options to apply for these types of tenders.
- On successful e-payment of tender processing fees, the applicants can download the tender documents (including Excel sheets, if any) from the e-tendering portal.
- It's not possible to apply for the tender after the last date of submission, because the link to submission form will automatically gets locked and will not be able to access.
- Tenderers are well instructed to fill and upload all the documents before the last date for submission.
- If any technical error occurs during the uploading of documents, the tenderer may call the helpdesk and or can go through the manual pro provided with digital key. Any technical error from tenderer's side is his own responsible.

#### Terms and Conditions

- The citation and any request coming about because of such tendering might administered from the General Conditions of the agreement with contractor citing such tender should considered in perused and comprehended into.
- When some conditions and restrictions are set by the owner, this shouldn't regarded to acknowledged from contractor, only if particular composed acknowledgment thereof is acquired.

#### 3.4.2 Clarifications

- Any specialized and industry questions, data, elucidations and so on that might be required relating to this tender might be gotten from the Owner or his senior. Tenderer is supposed to forward solicitation of these elucidations towards Owner or his officer least 10 working days before the end date to present the offer.
- Tenders might be finished in all regards and should incorporate appropriately filled in costs, different details, plans, applicable drawings and inventories as fundamental.

#### 3.4.3 Scope of work/Supply and Specifications

Details of documents and specifications are mentioned and shown in the notifications clearly. Work being done entirely complying with the details inside worthy quality given in particulars as said in the tender documents or contractor agreement. Changes in the quality or type should be informed by the tenderer at the beginning only. The contractor must likewise explain or give demo on the changed materials, specialized writing, and tests, essential and must go with the citation. If there any adornments such are not mentioned in documents or agreement however those regular and important to legitimate and productive working in work according to the determinations of tender might be given by tenderer with no additional price above that to Owner, work must be finished at any responsibility.

#### 3.4.4 Alteration of specifications, Patterns and Drawings

- The proprietor maintains whatever authority is needed to change, at whatever point fundamental, particulars, examples with respective documents. From schedules, items should be as determinations, examples with other documents hence changed, and undoubtedly tenderer also will agree to this.
- In the occasion of such adjustment including an update in the expense, or in the conveyance time frame, the same should be talked about and commonly consented to, considering the unit rates of comparative things in the Contract. If there should arise an occurrence of difference, the choice of the proprietor, in the expense or the conveyance time frame, might be last and indisputable.

#### 3.4.5 Minimum Changes / Additional Scope of Work

Minimum or small adjustments/extra extent to the job for up to 2% of aggregate agreement worth shall be done by tenderer with no additional expense.

##### 3.4.5.1 Subcontracting or Assigning of Contract

The tenderer is not supposed to give sub contract of work allotted to him, exchange or dole out the Contract/part of work, bills or any other advantages, accumulating there from or respective the agreement without earlier composed assent of Owner (any subletting will be entertained only after the acceptance of the owner, on request by the contractor). Owner can withhold the work or agreement in case of subletting without his consent. If not, then contractor may have to come under legal warnings by the owner as per the contract agreement.

Any break of this condition might qualifies the Owner for scratch off the agreement, thereafter to work with different part with the danger and expense by the tenderer, should recuperate from tenderer harms emerging with these cancelations.

In the event that the Contractor sublets, exchanges or relegates any part of the Contract with the earlier composed assent of the Owner, all installments to the Sub-Contractor should be the obligation of the Contractor and any solicitations from such sub-Contractor might not be entertained by the Owner.

**3.4.6 Conditional Discount:** On the off chance that the tenderer tenders any restrictive markdown as to acknowledgment of their offer inside a particular installment terms, conveyance, and quantity and so on the Owner won't think about such contingent rebate while assessing their offer.

**3.4.7 Past performance:** On the off chance that the past execution of the tenderer is not observed to be tasteful as to quality, conveyance, guarantee commitment and non-satisfaction of conditions of agreement, and owner can reject their proposal of work.

**3.4.8 Compliance with the Security Requirements of the Owner:** Tenderer might entirely agree to the Security Rules/Conditions by Owner in charge and should finish necessary customs with confirmation by Police or whatever remaining power & acquire important earlier consent for section into the Owner premises, wherever approved by the Owner.

### 3.4.9 Procedure & method to submit the tenders

#### Language of Tender:

The price advised from the contractor, and in addition documents identifying with offer traded from contractor and Owner, might be composed in English dialect just particularly when subtle elements are specialized.

### 3.4.10 Submission of tenders

Each of the tenders because of this welcome should be submitted in TWO PARTS as under.

**Part-I (Techno-industry):** This a player in the tender might incorporate/contain records identified with qualification criteria, all specialized subtle elements, specialized determinations, drawings furthermore the industry terms and states of agreement for the supplies to be made and the managements to be rendered EXCLUDING ANY PRICE DETAILS THEREOF.

**Part-II (Price):** This part should contain just the costs of the stores offered for the managements to be rendered. On the off chance that tenderer incorporates costs of any nature in Part-I (Techno-industry) of the tender such tenders are at risk for dismissal with no notification to the tenderers.

### 3.4.11 Deadline for submission of Tenders

- The tender and other documents must be uploaded online as required on or before the last date of submission, as said in the notification as well as in the tender form. No other method of accommodation is worthy
- The Owner may, at its carefulness, augment the due date for accommodation of tender by giving notifications where all do's and no do's are said and commitments by Owner and Contractor beforehand applies to the due date shall from that point liable to the due date as amplified.

### 3.4.12 Late Tenders

Cannot accept the tender after the last date or not entertained either. Last date mentioned shall be the final to all tenderers and at no circumstance it will be accepted unless the tender date is postponed.

### 3.4.13 Confidentiality:

- Information identifying with the examination, assessment, correlation, and post capability of tenders, and proposal of agreement recompense, might not be uncovered to tenderers or some other persons not formally worried with such process until the Work Order is discharged.
- Any exertion from the contractor which impact Owner clarification procedure, assessment, correlation and afterword power to tenders honor choices shall bring about chances of rejecting of contract.

## Chapter 4

### RESULTS AND DISCUSSIONS

#### 4.1 General

Tendering process in India is quite Competitive offering technique tries to guarantee that everybody gets an equivalent opportunity to offer, minimizes plot, and spares people in general cash. It concentrates on fair rivalry to get the finest work and supplies at the most minimal conceivable expense. It likewise requires ensuring against nepotism, bias, luxury, defilement and misrepresentation. For the technique to be reasonable and workable, it is required to have an unmistakably characterized model to help the offer assessing authorities figure out if tenders are responsive and the tenderers appear to be dependable. This is the most generally utilized technique to acquire and select contractor/construction firms for execution of construction tasks. In expansive range, the point of competitive offering (value based) is to get the minimum conceivable cost for a specific undertaking, management or office. In the focused most reduced offering strategy, the prequalified and responsive tenderer who presents the minimum offer, meeting the details must be champ of the agreement. Taking after information is dissected and results are drawn:

## 4.1.1 Conventional Method

### 4.1.1.1 Work Type -I

**Name of Work:** Cement road to Jambhulwadi from Dattnagar in ambegaon pune.

PMC/2018-19/RD/WORK\_INDENT41870

**Est. Cost:** Rs.350.00 Lakhs

**Tender Period:** 2 Months

**Tender Validity Date:** 90

Days

**Table 4.1** Number of tenderers and their complete data scrutinized at the department:

Jambhulwadi Road Pune						
SI No.	Name of the contractor/firm	Class of registration	Original bid amount	Bidders amount	Least Bidder	Final rating
1	2	3	4	5	6	7
1	Ashok B Sureban	1	350	363.62	7	
2	C B Morabad	1		304.79	3	
3	H P Madhukar	1		333.38	6	
4	M B Kallur	1		274.39	1	M B Kallur
5	N B Hiremath	1		327.58	5	
6	N S Nayak & Sons	1		305.18	4	
7	S S Policepatil	1		300.08	2	

The tender has been called by the PMC and no. of Tenderers are 7, contractor had applied there tender quantity and they are

1. Ashok B – 363.62 Lakhs
2. B Morabad – 304.79 Lakhs
3. H P Morsbad – 333.38 Lakhs
4. M B Kallur - 274.39 Lakhs
5. N B Hiremath - 327.58 Lakhs
6. N S Nayak - 305.18 Lakhs
7. S S Policepatil -300.08 Lakhs

In this -M B Kollur is the least tenderer and selected contractor for this work after verifying the documents and least tender.

### 4.1.1.2 Work Type -II

**Name of Work:** Construction of shaninagar to blue bay hotel road ambegaon. Pune. PMC/2018-19/RD/WORK\_INDENT41 960

**Tender Period :** 2 Months

**Table 4.2** Number of tenderers and their complete data scrutinized at the department:

<b>Name of the work:</b> Construction of shaninagar to blue bay hotel hotel road ambegaon.Pune						
Sl No.	Name of the contractor/firm	Class of registration	Original bid amount	Bidders amount	Least Bidder	Final rating
1	2	3	4	5	6	7
1	ANIL PATIL	1	195.42	192.22	2	IMAM MEERASAHEB M
2	IMAM MEERASAHEB M	1		190.13	1	
3	R NAGARAJ	1		194.44	3	

Tender quantity 195.42, the tender has been called by the PMC and no. of Tenderers are 4, contractor had applied there tender quantity and they are

1. ANIL PATIL – 192.22 Lakhs
2. IMAM MEERASAHEB M- 190.13 Lakhs
3. R NAGARAJ- 194.44 Lakhs
4. SHIVANGOUDA M PATIL-196.14 Lakhs

In this IMAM MEERASAHEB M is the least tenderer and selected contractor for this work after verifying the documents and least tender.

#### 4.1.1.3 Work Type –III

**Name of the work:** New Construction of District Integrated 30 Beded AYUSH Hospital at Sindhudurg.

**Agreement No:-** B1/Sindhudurg-AYUSH/01/2019-20-NHM

**Tender Cost :- Rs.661.00 Lakhs**

**Table 4.3** Number of tenderers & There Complete Data Scrutinized at The IDW NHM Mumbai Cell

<b>Name of the work: New Construction of District Integrated 30 Beded AYUSH Hospital at Sindhudurg.</b>						
Sl No.	Name of the contractor/firm	Class of registration	Original bid amount	Bidders amount	Least Bidder	Final rating
1	2	3	4	5	6	7
1	M/s Prabhu Engineers	1	661.00	577.71	1	M/s Prabhu Engineers
2	Neharkar Construction	1		621.41	4	
3	Mudassarnazar T. Shirgaonkar	1		591.53	3	
4	M/s U. M. Mhadalkar & Sons	1		579.11	2	

Tender quantity 661.00, The tender has been called by the NHM IDWW and no. of Tenderers are 4, contractor had applied there tender quantity and they are

1. M/s Prabhu Engineers – 577.71 Lakhs
2. Neharkar Construction – 621.41 Lakhs
3. Mudassarnazar T. Shirgaonkar – 591.53.Lakhs

4. M/s U. M. Mhadalkar &amp; Sons – 579.11 Lakhs

In this –M/s Prabhu Engineers is the least tenderer and selected contractor for this work after verifying the documents and least tender.

#### 4.1.2 Modified Tendering Process (EXCEL)

**Table 4.4** Number of tenderers and their complete data scrutinized at the department by Modified Tendering Process:

**Name of the work: Jambhulwadi road**

Sl No.	Name of the contractor/firm	Experience of work (years)	Class of registration	Qualification Rating	Requirement of displaying the financial standard (Solvency certificate)	Work done for last 5 year	Profit ratings		Original bid amount	Bidders amount		Least Bidder
1	2	3	4	5	6	7	8		9	10		11
1	Ashok B Sureban	7	1	3	1591.94	276.22	0.17	5	350	363.62	1.039	7
2	C B Morabad	6	1	4	1194.68	283.49	0.24	6		304.79	0.871	3
3	HP Madhukar	4	1	6	7522.98	1013.13	0.13	4		333.38	0.953	6
4	M B Kallur	10	1	1	4832.92	228.69	0.05	3		274.39	0.784	1
5	N B Hiremath	8	1	2	8652.32	253.53	0.03	2		327.58	0.936	5
6	N S Nayak & Sons	5	1	5	16286.70	185.79	0.01	1		305.18	0.872	4
7	S S Policepatil	3	1	7	2917.31	1087.77	0.37	7		300.08	0.857	2

In compare to the conventional method here By Modified tendering process the tender is awarded to **M B Kallur**, the same result is obtained by Conventional Method is M B KALLUR. The others parameters which are drawn from analytical hierarchy process are analyzed and then the final award is made.

**Name of the work:**

**Name of Work:** Construction of shaninagar to blue bay hotel road ambegaon. Pune.

Name of the contractor/firm	Experience of work (years)	Class of registration	Qualification Rating	Requirement of displaying the financial standard (Solvency certificate)	Work done for last 5 year	Profit ratings		Original bid amount	Bidders amount		Least Bidder	Final rating
2	3	4	5	6	7	8		9	10		11	12
ANIL PATIL	9	1	2	1724.05	1724.05	1.00	1	195.42	192.22	0.984	2	1.67
IMAM MEERASAHEB M	10	1	1	2266.94	2266.94	1.00	1		190.13	0.973	1	1.00
R NAGARAJ	6	1	3	1005.16	1005.16	1.00	1		194.44	0.995	3	2.33
SHIVANGOUDA M PATIL	5	1	4	695.36	695.36	1.00	1		196.14	1.004	4	3.00

In compare to the conventional method here By Modified tendering process the tender is awarded to **IMAM MEERASAHEB M**, the same result is obtained by Conventional Method. The others parameters which are drawn from analytical hierarchy process are analyzed and then the final award is made.

**Table 4.6** Number of tenderers and their complete data scrutinized at the department by Modified Tendering Process:

**Name of the work:** New Construction of Integrated AYUSH Hospital at Dist - Sindhudurg

SI.No.	Name of the contractor/firm	Experience of work (years)	Class of registration	Qualification Rating	Requirement of displaying the financial standard (Solvency certificate)	Work done for last 5 year	Profit ratings		Original bid amount	Bidders amount		Least Bidder	Final rating
1	2	3	4	5	6	7	8		9	10		11	12
1	M/S Prabhu Engineers	15	1	1	70	746.36	10.66	2	661.00	577.71	0.874	1	1.33
2	Neharkar Construction	6	1	3	150	1539.18	10.26	1		621.41	0.940	4	2.67
3	samazar T. Shirgaonkar	7	1	2	90	2024.25	22.49	3		591.53	0.895	3	2.67
4	. M. Mhadlkar & sons	5	1	4	100	2526.11	25.26	4		579.11	0.876	2	3.33

In compare to the conventional method here By Modified tendering process the tender is awarded to **M/s Prabhu Engineers**, the same result is obtained by Conventional Method is M/s Prabhu Engineers. The others parameters which are drawn from analytical hierarchy process are analyzed and then the final award is made.

### 4.1.3 Modified Tendering Process with probability of winning (formulae)

#### 4.1.3.1 Work Type -I

**Name of Work:** Jambhulwadi road  
**Est. Cost:** Rs.350.00 Lakhs

**Period:** 2 Months

**Tender Validity Date:** 30 Days

**For 1<sup>st</sup> case**, assuming that mark-up is 10 per cent of the total cost  $TC$ , the tender price  $B$  is given as:

$$B = TC + \frac{10}{100} \times TC \quad B = 1.10 \times TC$$

$$B = 661 + [(10/100) \times 661] = 727.10 \text{ lakhs}$$

**For 2<sup>nd</sup> case**, when the mark up is expressed in terms of some per cent of the tender price  $B$ , the tender price is computed as:

$$B = TC + \frac{\text{mark up}(\%)}{100} \times B \quad B = \frac{TC}{(1 - \frac{\text{mark u}(\%)}{100})}$$

$$B = 661 / [(1 - (10/100))] = 594.90 \text{ lakhs}$$

385 lakhs will be the maximum amount over which the tendering will not be awarded to any parties.

**Probability calculation:**

1<sup>st</sup> Contract’s probability  $[1/7((363.62-350)/350 + 1)] \times 100 = 100.55\%$

2<sup>nd</sup> Contract’s probability  $[1/74((304.79-350)/350) + 1] \times 100 = -99.98\%$  (-ve sign showstendering is done below original tender amount)

3<sup>rd</sup> Contract’s probability  $[1/7((333.58-350)/350) + 1] \times 100 = -99.33\%$  (-ve sign showstendering is done below original tender amount)

4<sup>th</sup> Contract’s probability  $[1/7((274.39-350)/350) + 1] \times 100 = -99.97\%$  (-ve sign showstendering is done below original tender amount)

5<sup>th</sup> Contract’s probability  $[1/7((327.58-350)/350) + 1] \times 100 = -99.08\%$  (-ve sign showstendering is done below original tender amount)

6<sup>th</sup> Contract’s probability  $[1/7((305.18-350)/350) + 1] \times 100 = -99.98\%$  (-ve sign showstendering is done below original tender amount)

7<sup>th</sup> Contract’s probability  $[1/7((300.08-350)/350) + 1] \times 100 = -97.96\%$  (-ve sign showstendering is done below original tender amount)

**The rating can be given based on maximum percentage carrying, such as for 78.59% we have to rate it as 1, for 75.05 % we have to rate it as 2, similarly for 69.04 ,52.63, 52.51, 50.04 and 39.80 we can rate them as 3,4,5 & 6 respectively .**

**Table 4.7** Number of tenderers and their complete data scrutinized at the department by Modified Tendering Process:

**Name of the work: Jambhulwadi road**

Class of registration	Qualification Rating	Requirement of displaying the financial standard (Solvency)	Work done for last 5 year	Profit ratings		Original bid amount	Bidders amount		Least Bidder	Probability of winning (%)		Final rating	Award
				8	9		10	11		12	13		
4	5	6	7	8	9	10	11	12		13			
1	3	1591.94	276.22	0.17	5	363.62	1.039	7	100.56	1	4.00	M B Kallur	
1	4	1194.68	283.49	0.24	6	304.79	0.871	3	99.98	2	3.75		
1	6	7522.98	1013.13	0.13	4	333.38	0.953	6	99.33	4	5.00		
1	1	4832.92	228.69	0.05	3	274.39	0.784	1	99.97	3	2.00		
1	2	8652.32	253.53	0.03	2	327.58	0.936	5	99.08	2	2.75		
1	5	16286.70	185.79	0.01	1	305.18	0.872	4	99.98	2	3.00		
1	7	2917.31	1087.77	0.37	7	300.08	0.857	2	97.96	6	5.50		

In compare to the conventional method here By Modified tendering process with probability of winning the tender is awarded to **M B Kallur**, the same result is obtained by Excel tamplet.

**4.1.3.2 Work Type -II**

**Name of Work:** Construction of shaninagar to blue bay hotel road ambegaon. Pune.

**Tender Period :** 3 Months

**For 1<sup>st</sup> case,** assuming that mark-up is 10 per cent of the total cost *TC*, the tender price *B* is given as:

$$B = TC + \frac{10}{100} \times TC \quad B = 1.10 \times TC$$

$$B = 195.42 + [(10/100) \times 195.42] = 214.96 \text{ lakhs}$$

For 2<sup>nd</sup> case, when the mark up is expressed in terms of some per cent of the tender price  $B$ , the tender price is computed as:

$$B = TC + \frac{\text{mark up}(\%)}{100} \times B$$

$$B = \frac{TC}{(1 - \frac{\text{mark u}(\%)}{100})}$$

$$B = 195.42 / [(1 - (10/100))] = 217.13 \text{ lakhs}$$

214.96 lakhs will be the maximum amount over which the tendering will not be awarded to any parties.



**Probability calculation:**

1<sup>st</sup> Contract’s probability  $[1/ 4((192.22 -195.42)/ 195.42) + 1] \times 100 = -99.99\%$  ( -ve signshows tendering is done below original tender amount)

2<sup>nd</sup> Contract’s probability  $[1/ 4((190.13 -195.42)/ 195.42) + 1] \times 100 = -99.99\%$  ( -ve signshows tendering is done below original tender amount)

3<sup>rd</sup> Contract’s probability  $[1/ 4((194.44-195.42)/ 195.42) + 1] \times 100 = -100.00\%$  (-ve signshows tendering is done below original tender amount)

4<sup>th</sup> Contract’s probability  $[1/ 4((196.44 -195.42)/ 195.42) + 1] \times 100 = 100.00\%$

**The rating can be given based on maximum percentage carrying, such as for 100.0% we have to rate it as 1, for -100.00% we have to rate it as 3 & for 99.99% we have rate them as 2 for Remaining.**

**Table 4.8** Number of tenderers and their complete data scrutinized at the department:

Name of Work: Construction of shaninagar to blue bay hotel road ambegaon. Pune.														
Name of the contractor/firm	Experience of work (years)	Class of registration	Qualification Rating	Requirement of displaying the financial standard (Solvency certificate)	Work done for last 5 year	Profit ratings		Original bid amount	Bidders amount		Least Bidder	Probability of winning (%)	Final rating	Award
2	3	4	5	6	7	8	9	10	11	12	12	12	12	
ANIL PATIL	9	1	2	1724.05	1724.05	1.00	1	192.22	0.984	2	99.99	2	2.33	IMAM MEERASAHEB M
IMAM MEERASAHEB M	10	1	1	2266.94	2266.94	1.00	1	190.13	0.973	1	99.99	2	1.67	
R NAGARAJ	6	1	3	1005.16	1005.16	1.00	1	194.44	0.995	3	100.00	3	3.33	
SHIVANGOURDA M PATIL	5	1	4	695.36	695.36	1.00	1	196.14	1.004	4	100.00	1	3.33	

In compare to the conventional method here By Modified tendering process with probability of winning the tender is awarded to **IMAM MEERASAHEB M**, the same result

**4.1.3.3 Work Type –III**

**Name of the work:** New Construction of Integrated AYUSH Hospital at Dist - Sindhudurg **Tender Period : 3 Months**

**For 1<sup>st</sup> case,** assuming that mark-up is 10 per cent of the total cost *TC*, the tender price *B* is given as:

$$B = TC + \frac{10}{100} \times TC \qquad B = 1.10 \times TC$$

$$B = 661.00 + [(10/100) \times 661.00] = 727.10 \text{ lakhs}$$

For 2<sup>nd</sup> case, when the mark up is expressed in terms of some per cent of the tender price  $B$ , the tender price is computed as:

727.10 lakhs will be the maximum amount over which the tendering will not be awarded to any parties.

#### Probability calculation:

1<sup>st</sup> Contract's probability  $[1/4((577.71 - 661)/661) + 1] \times 100 = 98.19\%$  (-ve sign shows tendering is done below original tender amount)

2<sup>nd</sup> Contract's probability  $[1/4((621.41 - 661)/661) + 1] \times 100 = -99.14\%$  (-ve sign shows tendering is done below original tender amount)

3<sup>rd</sup> Contract's probability  $[1/4((591.53 - 661)/661) + 1] \times 100 = -97.37\%$  (-ve sign shows tendering is done below original tender amount)

4<sup>th</sup> Contract's probability  $[1/4((579.11 - 661)/661) + 1] \times 100 = -98.23\%$  (-ve sign shows tendering is done below original tender amount)

The rating can be given based on maximum percentage carrying, such as for 99.14% we have to rate it as 1, for 98.23% we have to rate it as 2, similarly for 98.19 we can rate them as 3 & 97.37% as we can Rate them as 4.

Table 4.9 Number of tenderers and their complete data scrutinized at the department

Name of the work: short cut bypass near windser county ambegaon ,pune.														
Name of the contractor/firm	Experience of work (years)	Class of registration	Qualification Rating	Requirement of displaying the financial standard	Work done for last 5 year	Profit ratings		Original bid amount	Bidders amount	Leas t Bidde r	Probability of winning (%)		Fin al rati ng	
2	3	4	5	6	7	8		9	10	11	12		13	
M/s Prabhu Engineers	15	1	1	70	746.36	36.09	4	661.00	577.71	0.874	1	98.190	3	2.00
Neharkar Construction	6	1	3	150	1539.18	10.26	1		624.41	0.945	4	99.140	1	2.67
Mudassarnazar T. Shirgaonkar	7	1	2	90	2024.25	22.49	2		591.53	0.895	3	97.370	4	2.33
M/s U. M. Mhadalkar & Sons	5	1	4	100	2526.11	25.26	3		579.11	0.876	2	98.23	2	3.00

In compare to the conventional method here By Modified tendering process with probability of winning the tender is awarded to **M/s Prabhu Engineers**, the same result is obtained by Excel tamplet

## Chapter 5

### CONCLUSION

The prequalification and tender evaluation processes requires the development of necessary and sufficient criteria. The last two decades has witnessed a huge development in project complexity and client's needs and this has led to an increasing use of alternative forms of project delivery systems. In contrast, the prequalification and tender evaluation process, quantifying and the assessment of criteria is still in its original form. Selecting a suitable contractor to execute a particular project is an important decision for the client to take. Awarding construction contracts based on the price only is not always a successful strategy for contractor selection as it could result in construction delays and cost overruns. For instance, a bill of quantities is a list of all the materials (and other work such as amount of excavation) of a project which have sufficient detail to obtain a realistic cost, or rate per described item of work/material. The tenders should not only show the unit cost per material/work, but should also if possible, break it down to labour, plant and material costs. In this way the individual who is selecting the

tender will be quite confident that the tender is feasible. Tenders are not only chosen on cost alone. Sometimes contractors submit lower tenders to win the contract and win the work. Either the costs that the contractor incurs are greater than the price he is charging the client (as a consequence of a lower tender determining the contract sum), and thus is likely to go insolvent or he will claim for "loss and/or expense" due to discrepancies in the contract documents (this can be done deliberately). The lowest tender is not always a feasible tender.

The lowest tender is the most likely to increase the contract sum the most throughout the course of the project. Objectives of the study are to analyze the conventional process and to generate a new process to come over from the flaws which are there in conventional method of tendering. This was formulated by analyzing different parameters and performance of tenderers (parties taking part in to the tendering process)

As in conventional method, In cost based tendering system, contractor for the work will be selected on the bases of least tender amount with some condition, other criteria's are to be sidelined in the conventional method due to which the grip on the work and the quality maintenance will be difficult. But in this method the contractor will be selected by considering by using efficient tender evaluation method and the result found different comparing to the conventional method because in conventional method cost was the only main criteria 1<sup>st</sup> considered before selecting any tenderer. But in this method of AHP all the data like Name of the Contractor, Experience of the work, Class of registration, Qualification rating, Solvency certificate, Work done for 5 years, Profit rating, Original tender amount, Tenderer amount, least tenderer and Final rating. Were considered and result is based upon least tender amount as well as experience and work done by that tenderer/contractor.

Based on the study we can conclude that.

1. Many studies have been conducted in India to assess the efficiency of the online reverse auctions. The main conclusions drawn from these studies are that the adoption of the on-line auctions can result in cost savings for clients. While, the main drawback of auctions is that award of the contract is mainly driven by the lowest price rather than best value or quality.

Conventional method carries few flaws which are having direct impact on the quality control and there may be chances of awful methods in the conventional process.

2. By modifying the Tendering process it is possible to process with fair tendering system. Conventional method demotivates the tenderer or competitive process by getting the unrealistic quotes.

3. Government needs to create opportunity for domestic consultants in the construction industry to work as joint venture with foreign consultancy firms for selection of contractors with modern methods. Greater quality can be achieved by the modified tendering process and we can save substantial time. If the lowest tenderer is of lesser experience their perception may be different from experience contractor or firm.

4. The developed multi-criteria model for mark-up decision, based on the analytical hierarchy process, can be easily used by contractors in the construction industry to determine which project will result in higher mark-up. This model takes into account various factors affecting mark-up decision.

#### Future Scope

1. To utilize the fuzzy sets theory to quantify the uncertainty and risk involved in making tendering decisions. Then to evaluate its effectiveness in practice and furthermore compare it with the outcome from the Analytical Hierarchy Process

2. Further studies can be carried out with maximum numbers of parameters for the precise conclusion. Case study can be done larger project on least tender and modified tendering process and the results can be cross verified or time over run and quality control.

3. To expand the work on the mark-up decision model to assist the contractor, by further introducing a mark-up percentages to the hierarchy, as alternatives. Then, apply it to real life projects and assess the results. Alternative methods can be analyzed and different programmer can be generated for modified Tendering process.

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