



Politechnika Wroclawska



Organization of construction works

Phd. Aleksandra Sambor



The importance of cost estimate documentation in the investment process

The cost estimate is a document specifying the value of objects or construction works expressed in money, calculated according to established methods.

In the construction cost estimate, depending on its scope, the value of all expenditures incurred for the implementation of the entire investment or a specific building object or a given type of works, e.g. digging or sanitary installations, is calculated.



Functions of cost estimate

1. Estimating investment costs
2. Price-creating function
3. Overlay function
4. Billing function



Cost estimation

Purpose of preparation of cost estimation for construction is different depending on stage and phase of investment proces.



Cost estimation for initiation of investment stage - Conceptual and Preliminary Estimates

- Cost estimation on initiation of investment stage is used as a main determinant of profitability and reality of project
- Lack of engineering design documentation at this stage, prevent preparing detailed cost estimation - only estimation of total cost is possible
 - Estimation is possible using statistical data, indices or information on similar investments
 - Cost calculation from initiation phase are often called **Conceptual and Preliminary Estimates**



Cost estimation for planning of investment stage - **Definitive Estimates**

- Cost estimation for programming and planning of investment stage are used to make choice on most cost efficient version
- At this stage cost estimation can be fairly detailed and profitability of investment assessed
- Forecast of project cost within allowable limits from a combination of conceptual and detailed information often including partial contract and other procurement awards



Cost estimation for design stage - Detailed Estimates

- Cost estimation for design stage (detailed estimates) are prepared from completed plans and specifications



Cost estimation - Owner's /Investor's POV

- Owner Cost Estimation is basis for:
 - reality and profitability assessment of project
 - choice of realization version of project
 - preparation financing policy
 - concluding agreements with contractors, subcontractors and suppliers
- Cost estimation is a valuable tool in expenditure control



Cost estimation - Contractor's POV

- For contractor cost estimation is a key tool
- According to cost calculation bid offers and profitability assessment for different production methods are prepared
- Cost estimation is a tool to assess prime costs of enterprise
- Cost estimation is used by contractor for rational planning and controlling of business in short-term and preparing medium- and longterm strategies and actions



Types of cost estimates

- take-off and quantity survey (bill of quantities)
- investor cost estimates
- offer cost estimates
- as-build cost estimates
- additional cost estimates
- replacement cost estimates
- cost estimates for bank credits purposes (including schedule of construction works)
- estimates



Take-off

- **Take-off** - study prepared according to engineering design. Measurement of material and labor quantities.
- Take-off consist of:
 - list of predicted works in technological order (including detailed description)
 - list of technical specification of execution and acceptance of work
 - list of calculated quantity of take-off units



Quantity Survey (Bill of Quantities)

- The development of the quantities of work to be placed in appropriate units (e.g. square meters, cubic meters, etc.) is referred to as the quantity takeoff (QTO) or quantity surveying
- The first step is to identify the materials required by each estimating account or work package
- Then relevant dimensions are recorded so that quantity calculations in the required unit of measure can be made



Elementary works (cost centers)

- **Elementary works (or cost centers)** - minimum scope of works, available for acceptance in terms of quantities and quality requirements
- **Elementary Expenditures on Tangible Assets** - expenditures on tangible assets of production:
 - labor
 - materials
 - machine operation time and means of technological transport
- Elementary Expenditures on Tangible Assets are cataloged or established according to individual analysis



General cost estimate

- **General cost estimate** - (Overall Expenditure List) - cost documentation for investment preparation stage
- General cost estimate is prepared for the whole project or in division to particular objects or stages of project



Detailed cost estimate

- **Detailed cost estimate** - prepared when engineering design is available
- The preparation of a detailed estimate requires that the estimator break down project into subcomponents that will generate costs
- Construction cost centers relate to some physical subcomponents of the project, such as foundation piles, excavation, steel erection, interior drywall installation etc.



Investment cost estimate

- **Investment cost estimate (ICE)** is required under public procurement law
- ICE may be prepared by investor before calling for offers or negotiations
- ICE is a best way to check if bidders include all necessary elements of project
- ICE help in establishing a reference point in evaluating bids submitted by the competing contractors
- ICE is to ensure that the design produced is within owner's financial resources to construct



Bid Estimate

- **Bid Estimate** is prepared by contractor on the basis of final drawings and specifications (including a markup or profit)
- Bid Estimate is a base of contractor's payment



As-built Bill of Quantities, Additional and Replacement Cost Estimates

- **As-built bill of quantities** - prepared at the realization of project if contractor's payment is based on real cost calculation
- **Additional cost estimates and replacement cost estimates** are prepared when during realization of project unforeseen works occur or the quantity of works are different from engineering design



Investor cost estimate - basics

- Investor cost estimate is prepared using simplified cost calculation method
- In simplified cost calculation method value of calculated works is a sum of products of take-off elementary units quantities and their costs (without VAT tax)

Estimate Value = Σ Take-off fundamental units \times Unit Price



Basis for cost estimate

- **Cost estimate** are based on:
 - engineering design
 - technical specification of execution and acceptance of work
 - preliminary assumption of cost estimates
 - unit prices for elementary works (e.g. cataloged in SEKOCENBUD, Orgbud Serwis or Bistyp)



Detailed cost calculation

Detailed cost calculation of unit price is calculated individually using equation:

$$\text{Unit Price} = \Sigma \text{EETA} \times \text{Price} + \text{Indirect Costs} + \text{Profit}$$

where:

- EETA - Elementary Expenditures on Tangible Assets



EETA

- **Elementary Expenditures on Tangible Assets** are defined in catalogues (KNR, KNNR etc.)



Indirect Costs

- Indirect Costs are calculated from:

$$\text{Indirect Cost} = \text{Indirect Cost Overhead} \times (\text{Labor Cost} + \text{Machine Cost}) / 100\%$$



Cost estimation software

- For cost estimation there are **many software packages available**:
 - Stand-alone:
 - Athenasoft NORMA (available for WRUT students)
 - WINBUD
 - ZUZIA
 - Rodos
 - On line:
 - www.ekosztorys.pl



Public Procurement in Poland

- **Public Procurement Law Act** specifies the rules and procedures for awarding public contracts, legal protection measures, control of the award of public contracts and the competent authorities



Public Procurement in Poland

- Act is applied to public contracts awarded by e.g. public finance sector units
- Act is not applied to e.g.:
 - contracts and contests where their value does not exceed the equivalent in PLN of EUR 14 000
 - services of the National Bank of Poland
 - contracts where the object of the contract includes arbitration or conciliation services
 - purchase of broadcasting time
 - purchase of property rights and other rights to real estates, in particular lease and rental rights



Forms of awarding public procurement

- Non-limited tender
- Limited tender
- Negotiated procedure with publication
- Negotiated procedure without publication
- Competitive dialogue
- Sole-source contract (no-bid contract)
- Request-for-quotations
- Electronic bidding (e.G. Via internet)



Award procedures

- Call for tender
- Opening of tender
- Corrections and obvious mistakes
- Rejection of tender
- Selection of the best tender