

COST ESTIMATION

TYPES OF COST ESTIMATES

- **Conceptual estimates for project feasibility studies.**
 - Conducted at the very early phases of project planning.
 - Conducted by the owner or the Architect/Engineer (consultant).
 - Little or no design is available.
 - Relies mostly on experience of past projects.
 - Applied to rough quantifications of project measurements such as area of building, length of road or railway, cost per student/patient, etc.
- **Engineer's (Owner's) estimate to evaluate contractor competitive bids or cost proposals.**
 - Conducted when the design is complete or near completion.
 - Conducted by the owner or the Architect/Engineer (consultant).
 - A quantity survey is conducted and unit prices obtained from previous projects are used to estimate the total price of the project.

Pricing in the previous types are based on experience and data collected from previous projects. Adjustments must be made for time, size and location.

- **Contractors estimate for a competitive bid.**
 - Conducted by the contractor in case of a competitive bid or a negotiated contract.
 - Complete sets of contract documents such as the drawings, general conditions, special conditions and technical specifications, are generally available.
 - Detailed estimation of the requirements of each item and the project as a whole such as materials, labor, equipment, etc. is conducted, and the cost is estimated based on the requirements and the current prices and rates.
- **Contract change estimates and/or Estimate to evaluate breach of contract damages.**
 - Conducted by the contractor if there are;
 - Alterations desired by the owner.
 - Delays imposed on the project that were not contemplated by the parties.
 - Different site conditions are encountered on site.
 - Revised by the consultant.
 - Conducted by the consultant if there are delays or failure to complete by the contractor.

COST COMPONENTS

Direct costs

Costs that can be directly associated with discrete part of the project construction work.

Components of direct costs

Labor costs

Labor costs are the costs of all labor associated with specific items or activities related to specific items in the bid. The labor costs include base pay, overtime, weekend pay, taxes, social insurance, medical insurance, and other benefits.

Materials costs

Material costs are the costs of the materials needed for the completion of the work in specific items or activities related to specific items. The material costs include;

- Price of materials.
- Storage.
- Transportation and handling.
- Waste.

Subcontractors costs

Costs of activities and items that are awarded to specialized subcontractors.

Equipment costs

Types of construction equipment

- Heavy construction equipment like bulldozers, excavators, concrete pumps, tower cranes etc.
- Small equipment like small mixers, concrete vibrators, electrical saws, etc.
- Small tools like small drills and manual tools, like wrenches and screw drivers
- Equipment costs also include scaffolding, formwork and all materials needed for their setup if they could be reused

All equipment costs are calculated as part of the direct costs except for the small tools which are generally calculated with the general overhead of the site.

Components of equipment costs

- Cost of rental ownership. rental costs include the rent of the equipment while the ownership costs include the following:
 - Capital costs, which are costs needed to cover the purchase of the equipment.
 - Maintenance costs
 - Storage
 - Insurance and licensing
- Operation costs include.
 - Cost of fuel, oil and grease.
 - Operator's costs.
 - Tires.
 - Third party service costs.

Cases of equipment ownership or rental

- Owned either previously owned or new purchase. (costs include ownership costs and operating costs)
- Rental, either from third party or in house rental (costs include rent and operation costs)
- Rent and operated (costs include rentals only)

Indirect costs

Costs that can not be easily associated with discrete part of the project construction work.

Components of indirect costs

Salaried payroll

Includes salaries, insurance, taxes and company benefits paid to company employees on site that are not directly related to specific activities in the project such as engineers, surveyors, safety personnel, administrative staff, etc.

Time related overhead expenses

Refers to recurring expenses that are time related such as office rentals, outside provided services, accommodations and transportation for company staff, utility bills, office consumables such as stationary, etc.

Non-time related overhead expenses

Consist of overhead expenses that occur once during the project (usually at the beginning of the project), such as purchase of office furniture and equipment, safety equipment, outside engineering and surveying expenses, etc.

General Plant in and out

Includes all costs for the construction of temporary offices, warehouses, storage facilities and roads. Also includes the costs of freight, unloading and erection expenses of equipment.

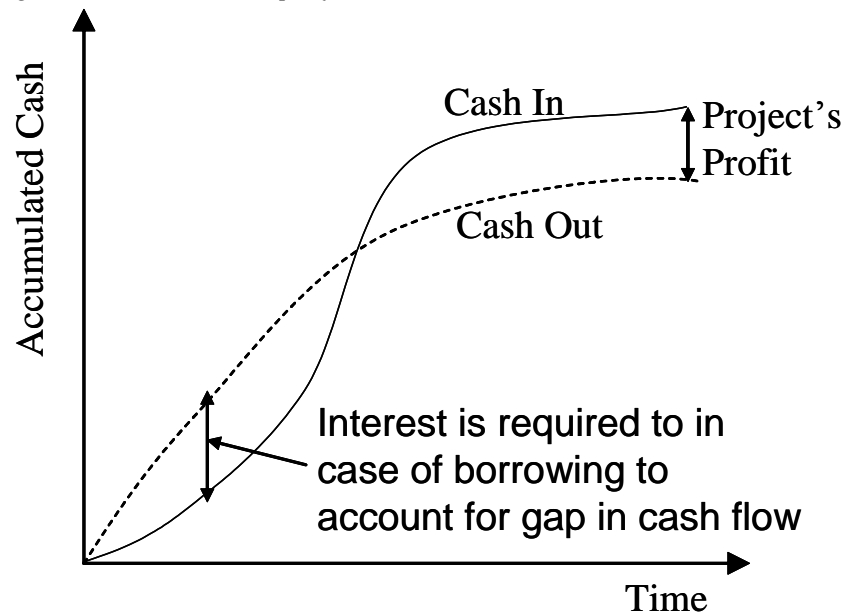
Escalations

Estimates are based on the current labor and material costs; therefore, for projects that have a long duration usually more than one year, an adjustment is needed to take into account the increase in material prices and labor rates that expected to occur during the period.

Escalations are calculated by dividing the project into a time frame of three to six months and calculating the estimated costs for each time. The escalation is then calculated for each time frame based on the expected inflation rates and the period elapsed from the beginning of the project to the time frame being calculated.

Interest

At the beginning of the project the accumulated contractor's expenses (cash out) will be greater than the accumulated revenue coming from the project (cash in) this will continue until a certain point in the project where the accumulated expenses will be less than the accumulated revenue and the project starts to generate profit. Until this point is reached the contractor will use either his capital or will borrow money form banks to fill this gap, in such case the interest for this money must be calculated.



Identified contingencies

Allowances are sometimes included in the costs of the project to account for productivity hedges, identified special risks and a soft subcontractors cost.

Markup

The markup is the amount of money added to the bid price in addition to all of above mentioned costs. Usually is taken as a percentage of total bid price.

Components of markup

- Risk coverage to account for unidentified contingencies
- Home office and general administrative expenses of the contractor.
- Profit