

First Principles Estimating

What it is, how it benefits private companies and public organisations and important features to look for when selecting a first principles estimating system

First principles estimating

Executive summary

The practice of first principles estimating is not a new one, but one of the most important aspects of many businesses today. With strong competition, uncertain market conditions and with organisations relying more on technology to drive their business, first principles estimating systems are seen as a key competitive advantage and risk-minimisation strategy in many project-based organisations.

This paper explains the basics of first principles estimating, the benefits of it, compares it to the unit rate estimating method, and provides readers with a checklist of key features to look out for when choosing a first principles estimating solution.

What is first principles estimating?

Estimating from first principles is all about having accurate knowledge of the direct costs of the resources required to complete your project. Direct cost resources are generally classified as either:

- ⇒ Plant
- ⇒ Labour
- ⇒ Materials
- ⇒ Subcontractor

This method of estimating is regarded as best practice throughout the world. It can be used to price all types of projects no matter the size of the job, the industry you are in or the stage in the lifecycle of the project (i.e. strategic, concept, detailed).

When estimating a project it is common practice to break it down into a schedule of items, otherwise known as a bill of quantities or quite simply a scope of work. When using first principles estimating, the cost of each item in the schedule is based on a first principles buildup. This means that every item has the appropriate Labour, Materials, Subcontractor and Plant allowances to construct the item of work with adjustments made to suit any unique aspects of the site (such as difficult access or ground conditions).

What is unit rate estimating?

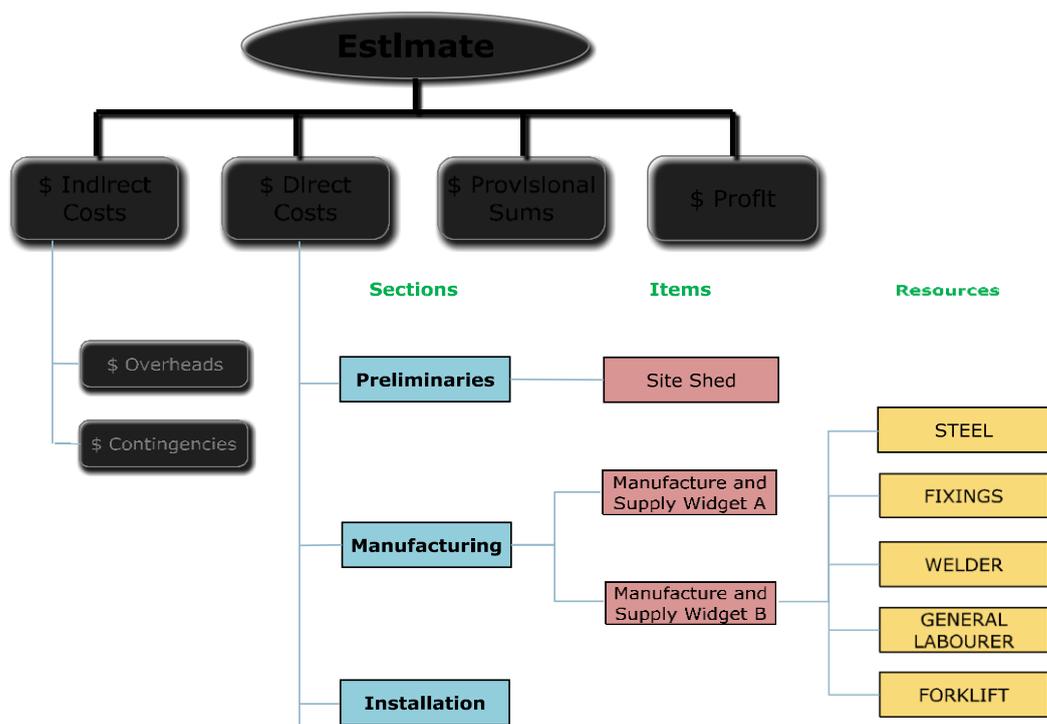
There are other forms of estimating and one is known as unit rate estimating. We will refer to this throughout this paper for the purposes of comparison. This is a method of estimating where the Quantity of each Item in the scope of work is simply multiplied by a Rate to obtain a price. This method does not use resources or have, generally, an underlying construction methodology.

Main cost components of an estimate

The illustration below shows the main cost components of an estimate. The **Direct Costs** as mentioned are a key component of a first principles estimate and the illustration also demonstrates how they can be broken down into a scope of work which is commonly done with “sections” at the first level and then the “items” of work.

Other key cost elements of an estimate are:

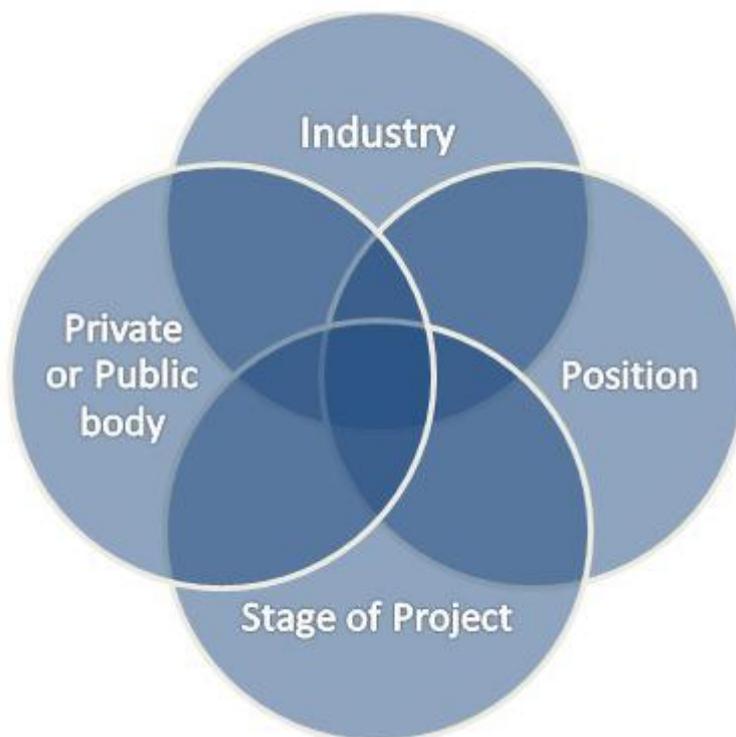
- ⇒ **Indirect Costs** - Contingencies (Risk) and Overheads. Overheads can be classified as either On-Site Overheads which themselves can have a first principles estimate, or Off-Site Overheads.
- ⇒ **Provisional Sums**
- ⇒ **Profit**



Note: Descriptions of Sections/Items/Resources above are examples only and are specific to each industry/company.

First principles estimating does not discriminate

It doesn't matter if you are a designer, full time estimator or project manager, and irrespective of your industry, first principles estimating is appropriate for you.



First principles is common among full-time estimators, however, if you are a designer for example preparing a budget price for a project with little detail available about the project, you can still (and we propose you should) develop a first principles estimate in order to ensure maximum accuracy. You may not go into the detail like an estimator would when preparing a hard dollar bid, however, having the first principles detail ensures the estimate is not only accurate, it also means you have more confidence in it and, when the project moves along its lifecycle, it is easier then to adjust the scope and make changes to the estimated cost with complete traceability.

7 benefits of first principles estimating

First principles estimating offers organisations, both public and private, many benefits. Some of these are detailed below:

1. GREATER ACCURACY OF ESTIMATES

When you estimate by first principles you need a clear understanding of your direct costs. The process is to assess the project and the amount of materials for every item. You then allocate plant and labour, often through the use of production rate data, and then of course subcontractors. Because the estimate that you've done is particular to the project it is far more accurate than "unit rate" data.

2. GREATER ACCOUNTABILITY

Accountability for estimates is paramount today. With a first principles estimate this is possible. The exact allowances of labour, plant, materials and subcontract can be accounted for, for every item in the estimate. With unit rate estimating this is not possible.

3. BE MORE COMPETITIVE

When you have an accurate direct cost breakdown you will have the confidence and ability to adjust your overhead and profit amounts so as to make your bid as competitive as possible. By that we mean that if you have certainty in your material costs, for that project, and you really want to win the job, you will have the confidence to reduce your profit margin as required. You may wish to apply different profit margins to each main component of the direct costs (plant, labour, materials, subcontract) to be more competitive.

4. WINNING A JOB AT THE RIGHT PRICE

As we all know, anyone can win a job simply by cutting their price, especially jobs that are more difficult. The beauty of first principles estimating, in this case, is to be able to allow the right amount of money for the project. There is nothing wrong with winning a challenging project, as long as you have the money in your bid to perform the job satisfactorily.

5. MAKING MONEY

When you have done a first principles estimate for a bid and you win the project you are in a great position to make money. The estimate that you have done can produce a budget which will enable you to do many things. One is to be able to order your materials as you will know exactly what is needed for the projects. Another is that you will be able to track your progress against this budget so as to ensure that you are on track to be profitable.

6. BETTER PROJECT MANAGEMENT

With a first principles estimate, the project manager and all those involved in the project know exactly what has been allowed for. Only with a first principles estimate is this possible. This means that the project manager has the information needed to run the project correctly and within budget

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Benefit	1st principles	Unit rate
Speed of estimate production	✓	✓
Accuracy	✓	
Accountability	✓	
Project management reports	✓	
Competitive estimates	✓	
Maximum profits	✓	
Captures corporate knowledge	✓	
Ease of updating rates	✓	
Ability to apply profit by different categories	✓	
Ease of adjusting estimate to suit project site conditions	✓	
Facilitates integration with ERP/ accounting systems	✓	

7. EASIER INTEGRATION WITH ERP AND ACCOUNTING SYSTEMS

Enterprise Resource Planning (ERP) and accounting systems generally require Resource details when setting up a budget. Using unit rate estimating this is not possible. First principles estimating techniques ensure that you can easily create a budget from the estimate to assist in not only running the project, but also to facilitate easier and more effective integration between business systems.