

COSTING

Cost Estimating

Critical for:

- a) Determining whether to make an investment to provide a product for the consumer market
- b) Deciding if a company should quote on a product for sale to another company

Purpose of Estimating

1. Establish the bid price of a product for a quotation or contract.
2. Verify quotations submitted by suppliers.
3. Ascertain whether a proposed product can be manufactured and marketed profitably.
4. Provide data for make-versus-buy decisions.
5. Help determine the most economical method, process, or material for manufacturing a product.
6. Provide a temporary standard for production efficiency and guide operating costs at the beginning of a project.
7. Help in evaluating design proposals.

Preliminary Product Cost Estimates

- Often used to compare different concepts of product designs or manufacturing processes
- Typically, this type of estimate is wanted almost immediately and there is no time for a detailed analysis

Final Product Cost Estimates

- Include costing of every part and subassembly going into a product
- Include the results of detailed studies on the optimum manufacturing processes and make-versus-buy decisions
- When the product is released for production, information from the detailed product cost estimate is directly used in establishing standard costs and ordering necessary tools and equipment

Data Structure

Cost Estimate

Labor

Material

Machine

Out Sourced

Overhead

Labor	Material	Machine	Out Sourced	Overhead
Labour Categories	Ferrous Metals	Assembly	Adhesive Part	Fringe Benefits
General Manufacturing	Non-Ferrous Metals	Welding	Bolt	Mark-ups
Forging & Foundry	Chemicals	Plastic Fabrication	Connector	Indirect Labour Cost
Chemical Electrical	Petroleum Products	Boring Drilling & Reaming	Electronic Component	Manufacturing Burden
Rubber & Plastics	Plastics	Soldering & Brazing	Washer	
Glass	Tooling Materials	Exhaust Systems Fabrication	Hose Clamp	
Textile	Elastomer Rubber	Rubber Fabrication	Nut	
General Labour & Wiring	Plastics	Soft Trim Fabrication	Pin	
Aluminium Foundry	Paper Materials	Wiring Fabrication	Retaining Ring	
Robots	Leathers	Robots	Retainer & Clip	
Tool-room	Non-Metallic	Inspection Equipment	Rivet	
Source Country	Textiles	Test Equipment	Screw	
	Applied Finishes	Abrasive Finishing	Shielding Component	
	Electrical	Cleaning Equipment	Spring	
	Misc. Materials	Heat Treating	Stud	
		Painting	Terminal	

Direct and Indirect Cost Estimates

Direct cost examples

- Physical assets
- Maintenance and operating costs (M&O)
- Materials
- Direct human labor (costs and benefits)
- Scrapped and reworked product
- Direct supervision of personnel

Indirect cost examples

- Utilities
- IT systems and networks
- Purchasing
- Management
- Taxes
- Legal functions
- Warranty and guarantees
- Quality assurance
- Accounting functions
- Marketing and publicity

Category of Ferrous Materials

- Alloy steel bar
- Carbon steel bar High Temperature steel bar
- Stainless Steel Bar
- Cast Iron
- Cast Steel
- Powdered Metal Ferrous
- Sheet steel

Some Details on Ferrous Metals

- Country of origin, currency
- Trade discount
- Reclaimed Scrap
- New alloy
- Melt temperature
- Thermal conductivity, etc.

Machine Costs Data

Equipment Description	Manufacturer	Supplier	Depreciation
Date of Purchase	Current Date	Capital Cost	Interest
Installation Cost	Residual Cost	Restricted Length	Maintenance
Restricted Width	Floor space Area	Lifetime	Floor Space
Insurance on Machine	Electricity Usage	Gas Usage	Tool
Uptime	Interest on Capital	Manning Level	Cleaning
Indirect Material	Source Country	Special Handling	Distance Between column x
Litre Shot Size	Tonnage Capacity	Dry Cycle	Distance Between column y
Lock pressure	Max. Diameter	Max. Weight In	Screw Speed 10
Shot Weight			

Categories of Overheads

- Plant supervisor
- Plant administrator
- Plant engineer
- Quality control
- Production control
- Laboratory
- Health department
- Maintenance
- Work safety
- Plant security etc.

Cost estimation in manufacturing

- focus is on cost estimation in manufacturing. Manufacturing refers to the series of interrelated activities and operations involving the design, the materials selection, the planning, the production and the quality assurance of the products (Chisholm, 1990). The product development cycle consists of a combination of manufacturing activities resulting in a product. Production is only a part of manufacturing and the product development cycle. Production is the act or process (or the connected series of acts or processes) of actually physically making a product from its material constituents. Production can consist of fabrication and assembly operations (Chisholm, 1990). Fabrication addresses those operations applied during production that are not assembly operations. The preparation of the actual production of a product is dealt with by engineering. Therefore, engineering includes activities as design, process planning and production planning.
- During the product development cycle, the execution of engineering tasks includes many decisions to be taken. The decisions are concerned with the product, the production of the product and the disposal/recycling of the product. The decisions are based on several criteria, e.g. technical constraints, but costs are also an important criterion. In order to be able to use costs as a decision criterion, the costs of all aspects of the product have to be known. Because the costs are not known in advance, a cost estimation system is required to generate the required cost information. The cost estimates have to be based on the product information, which is available at a certain stage of the product development cycle. Because the available information is different in amount and detail in different stages of the product development cycle, it is difficult to support all engineering tasks. Besides the use of cost estimation for decision-making, it can also be used to control costs. When the costs can be controlled, it is possible to propose specific product changes reducing the costs. In order to reduce the time span of the product development cycle concurrent engineering is used. In concurrent engineering, the engineering tasks are partially performed simultaneously. Concurrent engineering requires the integration of the engineering tasks in the product development cycle. In order to support the engineering tasks with cost information, cost estimation has to be integrated in the product development cycle as well.

COST ESTIMATING

Direct costs: may be directly allocated to a cost object, such as a piece of product

Indirect costs: costs that cannot be directly allocated to a cost object

- 1. Material costs: occur by consuming materials
- 2. Labour costs: occur by utilizing human labour force
- 3. Overhead costs: occur by consuming cost elements other than the above two

To develop a study estimate

- Specifically, to develop a study estimate, the following must be known:
 - Location of the plant;
- □ Location of the source within the plant;
- □ Design parameters, such as source size or capacity rating, uncontrolled pollutant concentrations, pollutant removal requirements, etc.
- □ Rough sketch of the process flow sheet (i.e., the relative locations of the equipment in the system);
- □ Preliminary sizes of, and material specifications for, the system equipment items;
- □ Approximate sizes and types of construction of any buildings required to house the control system;

- Rough estimates of utility requirements (e.g. electricity, steam, water, and waste disposal); Quantity and cost materials consumed in the process (e.g., water, reagents, and catalyst);
- Preliminary flow sheet and specifications for ducts and piping; Approximate sizes of motors required;
- Economic parameters (e.g. annual interest rate, equipment life, cost year, and taxes.)