

## Strategic Cost Accounting

**M. Com (Semester IV)**  
**Topic- Life-cycle Costing**

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### What is Life-cycle Costing?

The life cycle of any product commences with the initial identification of a consumer need and extends through planning, research, design development, production, evaluation, use, logistic support in operation, retirement and disposal. The concept of life-cycle assumes significance for cost control purposes because of interdependencies of activities in different time periods.

Life cycle costing is a system that tracks and accumulates the actual costs and revenues attributable to cost object from its invention to its abandonment. Life Cycle Cost (LCC) of an item represents the total cost of its ownership, and includes all the costs that will be incurred during the life of the item to acquire it, operate it, support it and finally dispose it. Life Cycle Costing adds all the costs over their life period and enables an evaluation on a common basis for the specified period (usually discounted costs are used).

Thus, product life cycle costing is an approach used to provide a long-term picture of product line profitability, feedback on the effectiveness of the life cycle planning and cost data to clarify the economic impact on alternative chosen in the design, engineering phase etc.

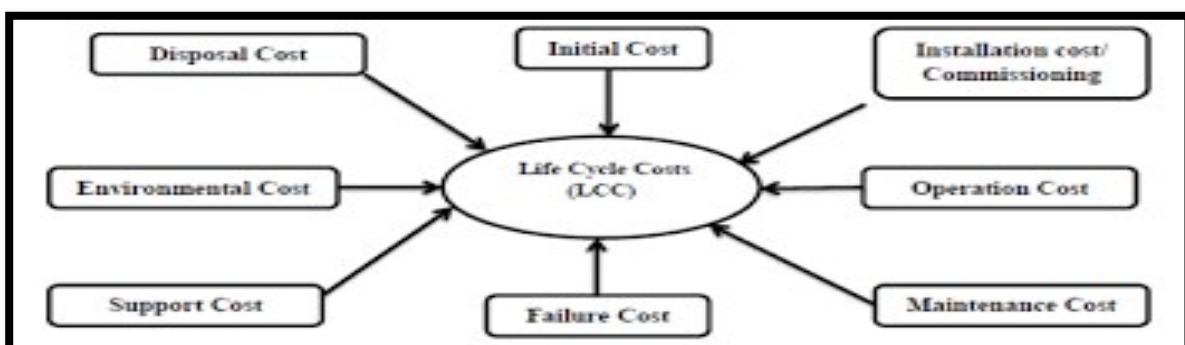
### **Characteristics of Life Cycle Costing:**

The important characteristics of life cycle costing are as follows-

- Product life cycle costing involves tracing of costs and revenues of a product over several calendar periods throughout its life cycle.
- Product life cycle costing traces research, design and development costs and total magnitude of these costs for each individual product and compared with product revenue.
- Each phase of the product life-cycle poses different threats and opportunities that may require different strategic actions.
- Product life cycle may be extended by finding new uses or users or by increasing the consumption of the present users.

### **Elements of Life cycle cost**

A clear picture of life cycle cost can be understood by the following diagram-



## **Types of Life-cycle costing**

There are two types of life-cycle costing:

- (a) Product Life-cycle costing
- (b) Project Life-cycle costing

### **A. Product Life-cycle Costing:**

The life-cycle of a product or service begins in the following order:

- i. Identification of new consumer need or new need of existing consumer.
- ii. Invention of a new product and get it patented.
- iii. Development of new product to make it saleable.
- iv. Manufacturing/producing the product.
- v. Expansion of market with product's market acceptability.
- vi. Entrance of competitors with rival/initiation products and diminishing of product's market.
- vii. Gradually product is degenerated.

### **Stages of Product Life Cycle Costing:**

Following are the main stages of Product Life Cycle:

- i. **Market Research:** It will establish what product the customer wants, how much he is prepared to pay for it and how much he will buy.
- ii. **Specification:** It will give details such as required life, maximum permissible maintenance costs, manufacturing costs, required delivery date, expected performance of the product.
- iii. **Design:** Proper drawings and process schedules are to be defined.
- iv. **Prototype Manufacture:** From the drawings a small quantity of the product will be manufactured. These prototypes will be used to develop the product.
- v. **Development:** Testing and changing to meet requirements after the initial run. This period of testing and changing is development. When a product is made for the first time, it rarely meets the requirements of the specification and changes have to be made until it meets the requirements.
- vi. **Tooling:** Tooling up for production can mean building a production line; building jigs, buying the necessary tools and equipment's requiring a very large initial investment.
- vii. **Manufacture:** The manufacture of a product involves the purchase of raw materials and components, the use of labour and manufacturing expenses to make the product.
- viii. Selling
- ix. Distribution
- x. Product support
- xi. **Decommissioning:** When a manufacturing product comes to an end, the plant used to build the product must be sold or scrapped.

To accumulate the expenses incurred on all the above activities is the essence of product life-cycle costing. Thus, product life-cycle costs involve the expenses on stages from designing to development of product/service, on introduction in the market, selling & distribution and finally on its abandonment from the market.

## **Purpose of Product Life-cycle Costing**

Life-cycle costing in general provides a comprehensive accounting of product's costs right from its inception to abandonment and this helps design-makers to understand the cost consequences of manufacturing that product and also to identify the areas where cost reduction efforts are desirable and effective. The major purposes of life-cycle costing are as follows-

1. To help in developing a sense of total costs associated with a product; this will help in identifying as the profits earned during manufacturing phase would cover the costs in development & decommissioning phase.
2. To identify a product's environmental cost consequences and to initiate action for reducing or eliminating such costs.
3. To help in identifying the planning and decommissioning costs during the product and process design phase, so that costs in that phase be managed and control.

## **Benefits of Product Life Cycle Costing:**

Following are the main benefits of product life cycle costing:

1. It results in earlier action to generate revenue or lower costs than otherwise might be considered. There are a number of factors that need to be managed in order to maximise return in a product.
2. Better decision should follow from a more accurate and realistic assessment of revenues and costs within a particular life cycle stage.
3. It can promote long term rewarding in contrast to short term rewarding.
4. It provides an overall framework for considering total incremental costs over the entire span of a product.

## **B. Project Life-cycle costing**

“Project life-cycle costing includes costs associated with acquiring, using, caring for and disposing of physical assets.” At the same time costs generated by the acquisition, use, maintenance and replacement of permanent physical assets in respect of feasibility studies, research design, development, production, maintenance, replacement and disposal as well as support, training and operating are also included in project life-cycle cost.

Thus, life cycle costing, or whole-life costing, is the process of estimating how much money you will spend on an asset over the course of its useful life. Whole-life costing covers an asset's costs from the time you purchase it to the time you get rid of it. In contrast to product life-cycle costs, the project life-cycle costs are incurred for fixed assets. The components of a project cost over its entire life include the following-

- i. Costs of research, design, testing, production, construction or purchase of capital equipment i.e., cost of acquisition.
- ii. Costs of transportation and handling of capital equipment.
- iii. Cost of maintenance of capital equipment.
- iv. Costs incurred in operations like, energy costs, various facilities costs and utility costs.
- v. Training costs.
- vi. Costs of holding spare parts, warehousing etc.
- vii. Costs of purchasing any technical data (information).
- viii. Retirement and disposal costs at the end of economical life of the capital equipment.

## **Purpose of Project Life-cycle Costing Analysis**

As mentioned, conducting a life cycle cost analysis helps you estimate how much an asset will cost you over the course of its life. The following are the major purpose of project life-cycle costing analysis-

1. **Choose between two or more assets:** Using life cycle costing helps you make purchasing decisions. If you only factor in the initial cost of an asset, you could end up spending more in the long run. For example, buying a used asset might have a lower price tag, but it could cost you more in repairs and utility bills than a newer model. Life cycle cost management depends on your ability to make a smart investment. When you are deciding between two or more assets, consider their overall costs, not just the price tag in front of you.
2. **Determine the asset's benefits:** How do you know if you should buy an asset? Generally, you weigh the pros and cons of your purchase. But if you only consider the initial, short-term cost, you won't know if the asset will benefit your business financially in the long run. By using life cycle costing, you can more accurately predict if the asset's return on investment (ROI) is worth the expense. If you only look at the asset's current purchase cost and don't factor in future costs, you will overestimate the ROI.
3. **Create accurate budgets:** When you know how much an asset's total price is, you can create budgets that represent your business's actual expenses. That's way, you won't underestimate your business's costs. A budget is made up of expenses, revenue, and profits. If you underestimate an asset's cost on your budget, you are overestimating your profits. Failing to account for expenses can result in overspending and negative cash flow.

## **Uses of Project Life-cycle Costing**

The concept of project life-cycle costing is now widely accepted. It involves accounting for all costs relating to capital expenditure decisions which may be incurred during its life-time. Project life-cycle costing is specifically useful in the following cases:

- i. When projects are to be operated in capital intensive industry.
- ii. Where projects have sizeable on-going constructing programme.
- iii. Where projects depend on numerous and expensive items of plant with consequent substantial replacement programmes.
- iv. Where projects relate to major expansion.
- v. Where projects contemplate the purchase or design or development of expensive new technology.
- vi. Where projects are sensitive to disruption due to down-time.

## **Life Cycle Costing Process**

Life cycle costing is a three-staged process. The first stage is life cost planning stage which includes planning LCC Analysis, Selecting and Developing LCC Model, applying LCC Model and finally recording and reviewing the LCC Results. The Second Stage is Life Cost Analysis Preparation Stage followed by third stage Implementation and Monitoring Life Cost Analysis. The three stages are as follows-

**Stage 1: LCC Analysis Planning:** The Life Cycle Costing process begins with development of a plan, which addresses the purpose, and scope of the analysis.

The plan should:

- i. Define the analysis objectives in terms of outputs required to assist a management decision.
- ii. Make the detailed schedule with regard to planning of time period for each phase, the operating, technical and maintenance support required for the asset.
- iii. Identify any underlying conditions, assumptions, limitations and constraints (such as minimum asset performance, availability requirements or maximum capital cost limitations) that might restrict the range of acceptable options to be evaluated.
- iv. Identify alternative courses of action to be evaluated. The list of proposed alternatives may be refined as new options are identified or as existing options are found to violate the problem constraints.
- v. Provide an estimate of resources required and a reporting schedule for the analysis to ensure that the LCC results will be available to support the decision-making process for which they are required.

Next step in LCC Analysis planning is the selection or development of an LCC model that will satisfy the objectives of the analysis. LCC Model is basically an accounting structure which enables the estimation of an asset components cost.

### **Stage 2: Life Cost Analysis Preparation:**

The Life Cost Analysis is essentially a tool, which can be used to control and manage the ongoing costs of an asset or part thereof. It is based on the LCC Model developed and applied during the Life Cost Planning phase with one important difference: it uses data on real costs.

The preparation of the Life Cost Analysis involves review and development of the LCC Model as a “real-time” or actual cost control mechanism. Estimates of capital costs will be replaced by the actual prices paid. Changes may also be required to the cost breakdown structure and cost elements to reflect the asset components to be monitored and the level of detail required.

Targets are set for the operating costs and their frequency of occurrence based initially on the estimates used in the Life Cost Planning phase. However, these targets may change with time as more accurate data is obtained, from the actual asset operating costs or from the operating cost of similar another asset.

### **Stage 3: Implementing and Monitoring:**

Implementation of the Life Cost Analysis involves the continuous monitoring of the actual performance of an asset during its operation and maintenance to identify areas in which cost savings may be made and to provide feedback for future life cost planning activities.

For example, it may be better to replace an expensive building component with a more efficient solution prior to the end of its useful life than to continue with a poor initial decision.