

4 Cost of Ownership

4.1 Concept

Total cost of ownership (TCO) is a financial estimate. Its purpose is to help consumers and enterprise managers determine direct and indirect costs of a product or system. It is a management accounting concept that can be used in full cost accounting or even ecological economics where it includes social costs.

TCO when incorporated in any financial benefit analysis, provides a cost basis for determining the economic value of that investment. Examples include: return on investment, internal rate of return, economic value added, return on information technology, and rapid economic justification.

A TCO analysis includes total cost of acquisition and operating costs. An enterprise may use it as a product/process comparison tool. TCO directly relates to an enterprise's asset and/or related system's total costs across all projects and processes, thus giving a picture of the profitability over time.

TCO analysis was popularised by the Gartner Group in 1987. The root of this concept dates back at least to the first quarter of the twentieth century. It has since been developed in a number of different methodologies and software tools. TCO tries to offer a statement on the financial impact of deploying any technology product over its life cycle, for example the incorporation of a variable speed drive to an injection machine.

Many times, using TCO analysis has shown that there is a difference between the price of something and its long-term cost.

4.2 How to Calculate Total Cost of Ownership

The TCO concept is widely used in the software and transportation industries and can be easily applied to the plastics industry. For example, the TCO defines the cost of owning a production machine from the time of purchase by the owner, through

its operation and maintenance to the time it leaves the possession of the owner. Comparative TCO studies between various models help managers choose a machine to fit their needs and budget.

Some of the key data elements used to calculate the cost of ownership for a production machine include:

- **Depreciation costs:** Allocation of the cost of tangible assets to periods in which the assets are used. Generally the cost is allocated, as depreciation expense, among the periods in which the asset is expected to be used. Such expense is recognised by businesses for financial reporting and tax purposes. Methods of computing depreciation may vary by asset for the same business. Methods and lives may be specified by the accounting and/or tax rules of a country. Several standard methods of computing depreciation expense may be used, including fixed percentage, straight line, and declining balance methods. Depreciation expense generally begins when the asset is placed in service.
- **Energy costs:** The biggest part of the operation cost in the plastic industry and the one in which big differences can be made by choosing energy efficient equipment that saves energy during its whole life cycle.
- **Financing:** is the science of fund management. It deals with how money is spent and budgeted. Finance is one of the most important aspects of business management and includes decisions related to the use and acquisition of funds for the enterprise.
- **Maintenance and repairs costs:** Maintenance, repair, and operations (MRO) involves fixing any sort of mechanical or electrical device should it become out of order or broken (known as repair, unscheduled or casualty maintenance). It also includes performing routine actions which keep the device in working order (known as scheduled maintenance) or prevents trouble from arising (preventive maintenance). MRO may be defined as, 'All actions which have the objective of retaining or restoring an item in or to a state in which it can perform its required function. The actions include the combination of all technical and corresponding administrative, managerial, and supervision actions.'
- **Opportunity costs:** This is the cost related to the next-best choice available to someone who has picked between several mutually exclusive choices. It is a key concept in economics. It has been described as expressing 'the basic relationship between scarcity and choice.' The notion of opportunity cost plays a crucial part in ensuring that scarce resources are used efficiently. For example, an organisation that invests money in acquiring a new asset instead of spending that money on maintaining its existing asset portfolio incurs the increased risk of failure of its existing assets. The opportunity cost of the decision to acquire a new asset is