

## Calculating the Carrying Cost of Inventory

Mary Lu Harding, Principal  
Harding & Associates  
802/453-5379; harding@sover.net

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**Abstract.** We will explore how the carrying cost of inventory is determined, what factors are (or should be) included, and how to use this information to measure cost savings from inventory reduction. (Hint: If you want lower inventory levels, the higher the cost to carry, the better.)

**What Is Inventory Carrying Cost?** The cost to carry inventory measures the overhead that an organization carries to support its inventory. In addition to the money originally spent to purchase it, more money will be spent on upkeep while inventory sits in your possession. The longer the inventory is there, the more it will cost in upkeep. Carrying cost is usually expressed as a percentage that represents the cents per dollar that will be spent on inventory overhead *per year*.

**Variable Versus Fixed Costs.** The elements that go into the carrying cost of inventory can be divided into fixed and variable cost factors. Variable cost factors change with the dollar level of the inventory in a direct manner. Fixed cost factors do not change directly as the dollar level of inventory changes. They can change, and often do when organizations make significant changes to their inventory levels, but the change occurs as a step function when certain inventory levels are reached.

**Variable Cost Factors.** Variable cost factors include: the cost of money, taxes, insurance and obsolescence reserve. The cost of money is the interest rate your organization pays for borrowed money, or if you have no business loans, the interest rate that the money invested in inventory could be earning if it were invested elsewhere. Some political jurisdictions tax inventory. If that is true for any inventory storage points, then that tax is calculated as part of the carrying cost. Insurance covers the replacement value of the inventory in the event of a catastrophic loss such as fire or natural disaster. Insurance premiums can vary with the value of the assets. Organizations that are self-insured do not pay premiums, but they typically have a financial reserve established to cover any loss. The value of that reserve should be considered in the same manner as obsolescence reserve. Obsolescence reserve is a financial reserve set aside to cover forecasted inventory losses such as write-offs or shrinkage.

All of these factors are established and defined within finance. A financial analyst can provide the numbers for an organization. Since these factors can differ significantly from organization to organization, each organization should use its own numbers and not take a carrying cost number from another source and believe that it applies to them.

**Fixed Cost Factors.** Fixed cost factors include: the cost of space, capital equipment and personnel. The cost of space is the overhead cost to operate a facility and is often stated on a per-square-foot basis. If an organization operates a warehouse, there is significant cost involved in the establishment and maintenance of that facility. It would not be there if the

inventory were not there. A small change in the level of inventory will not cause any change in this fixed cost. However, if the change is large enough that significant square feet are vacated, the cost would change as the empty space is reallocated to another use or vacated. Whether the cost changes or not, it is a part of the overhead required to support the inventory and should be included as an element of carrying cost.

Capital equipment measures the money invested in support systems, from small investments such as fork lift trucks, scales, racks, etc. to investments as large as automated material-handling systems. As long as the capital investment still has value on the books, that value should be included as an element of carrying cost. To determine the factor in percent, divide the total capital investment dollars by the average total inventory dollars.

Personnel includes those people whose job description is primarily the management and handling of inventory such as inventory managers, stockkeepers, material handlers, cycle counters, inventory controllers, etc. The level of staffing varies with the level of inventory, but not in a direct ratio. As significant changes to the level of inventory occur, changes to the level of staff required to support it can be made.

**Other Factors.** There are other factors that may apply to some organizations depending on the inventory that is being stored. These include secondary quality costs and computation costs. Secondary quality costs measure the cost of reinspection. (This does not include the cost of original inspection upon arrival.) Inventory that is fragile or easily damaged, has revision levels that change frequently or has a short shelf-life may require a significant level of reinspection before use to insure that the goods are still useable. If that is true for your inventory, then the cost of secondary inspection should be included as a carrying cost factor since it is created as a result of long storage.

Computation cost applies to organizations for which the hardware and software costs involved with inventory tracking systems are significant. Inventory is the largest and most active data base in many organizations. If the cost of the inventory tracking system is large, not a part of the overall operating software or a recent investment, then it should be considered as an overhead expense carried by the inventory.

**Putting It All Together.** Most organizations use the variable factors to calculate the carrying cost of inventory. Two reasons for this are: (1) they vary in direct proportion to the dollars of inventory and (2) their values already exist in finance and require no new calculations. However, ignoring fixed factors results in a falsely low carrying cost and can result in sub-optimal management decisions.

Organizations that do not look at the true cost of inventory's overhead are at risk for increased inventory levels and decisions that increase their fixed investment. A low carrying cost of inventory sends a message to people within the organization that inventory is cheap which makes it an easy solution for other problems.

**Summary.** Review *all* cost factors and decide which are relevant for your organization (i.e. Do you operate a warehouse or not?). Calculate a carrying cost that includes all fixed and variable factors that apply to your organization. The more important it is to reduce inventory, the higher your carrying cost should be. If inventory is cheap, you will have a lot of it.