



Performance Measurement Tools

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INVENTORY MANAGEMENT



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ABOUT STITCH DIARY

Stitch Diary is an educational blog by industry expert Mausmi Ambastha.

This is an attempt to educate people about the global apparel industry concepts.

What is the difference between SMV and SAM?

How can you optimize WIP in your industry?

What does NAFTA hold for the apparel industry?

All this and a lot more on www.stitchdiary.com

ABOUT MAUSMI

Mausmi, is an established expert in the garment industry with over 13 years of experience. Her brain child ThreadSol is a practical reflection of her ideology – “Buy what you need, use what you have!”

Mausmi, holds a Masters degree in Fashion Technology from NIFT, Delhi (India) and is also B.Tech in Computer Science. She has written over 20 publications for several leading apparel magazines like Stitch World and Fibre2Fashion.

Prior to ThreadSol, Mausmi did apparel consultancy and training with Methods Apparel in South-east Asia. She has also worked as a faculty at NIFT and loves to teach whenever she gets an opportunity.



INTRODUCTION

Inventory can be defined as the stock maintained between any two processes for uninterrupted operation. Inventory is maintained primarily due to two reasons – to optimize the sourcing cost (where requirement is predictable) and to minimize the risk of stock out (where requirement is unpredictable). Lack of correct information is often complimented with inventory. Higher the inventory, higher the capital blockage, and/or higher the space requirement; on the other hand lower inventory may lead to disruption in production or unsatisfied customer, thus managing inventory is very important for every organization. The overseeing and controlling of ordering, storage, usage and disposal of raw material as well as finished goods' inventory, are the key aspects of inventory management.

The quote from the movie “Revolutionary Road” aptly describes the concept of inventory management. "Knowing what you've got, knowing what you need, knowing what you don't – that's inventory control."



MONTHLY INVENTORY VALUE

Inventory is defined as assets that are intended for sale, or are in the process of being produced for sale, or are to be used in producing goods. Every factory must track their inventory values on a monthly basis. The following equation expresses how a company's inventory is determined. All the calculations are focused mainly on store room inventory.

Ending Inventory = Beginning Inventory + Purchases - Sold or Issued

There are three inventory-costing methods that are widely used by both public and private companies.

- a. **FIFO (First in, First out):** The first unit brought in the inventory is the first to be sold or issued.
- b. **LIFO (Last in, First out):** The last unit brought in the inventory is the first to be sold or issued
- c. **Average cost:** It takes the weighted average of all units available for sale during the accounting period and then uses that average cost to determine the value of goods sold and ending inventory.

If inflation was nonexistent and prices were same, then all three of the inventory valuation methods would produce the exact same results. Most garment factories that buy fabric on order basis may use average cost method as the prices do not vary much in a small span of time. Factories that buy fabrics for stock, need to decide on the method based on their accounting principles

EXAMPLE

Date	Transactions	Units	UCost (₹)
Jan 1	Beginning inventory	700	10
Jan 10	Purchase	100	12
Jan 16	Sold/Issued	500	—
Jan 25	Purchase	600	14
Feb 5	Purchase	200	15
Feb 11	Sold/Issued	400	—
Feb 25	Sold/Issued	100	—
Feb 28	Ending Inventory	?	—

Discussed below is a simple example with average method.

January

Quantity of ending inventory

= Beginning inventory + purchases - issued = 700 + 700 - 500 = 900 units

Weighted average cost per unit

= $(700 \times 10) + (100 \times 12) + (600 \times 14) / (700 + 100 + 600)$

= Rs. 16600 / 1400 = Rs. 11.86

Cost of goods sold/issued = Rs. 500 X 11.86 = Rs. 5930

Ending inventory value = Rs. 900 X 11.86 = Rs. 10674

February

Quantity of ending inventory

= Beginning inventory + purchases - issued

= 900 + 200 - 500 = 600 units

Weighted average cost per unit = $(900 \times 11.86) + (200 \times 15) / (900 + 200)$

= Rs. 13674 / 1100 = Rs. 12.43

Cost of goods sold/issued = Rs. 12.43 X (400 + 100) = Rs. 6215

Ending inventory value = Rs. 12.43 X 600 = Rs. 7458



INVENTORY TURNOVER

The inventory turnover ratio is a common measure of the firm's operational efficiency in the management of its assets. Inventory turnover is best thought of as the number of times that an inventory "turns over" or cycles through the warehouse in a year. Inventory turnover of 12 means the average inventory moves through the warehouse once per month; inventory turnover of 6 times means the average inventory circulates through the facility every two months. Since inventories represent a sizable investment of company funds, and larger inventories mean higher carrying costs (space, insurance, taxes, capital costs, etc.), a common inventory management goal focuses on improving inventory turnover. Low inventory turnover means that you are carrying too much inventory, thereby unnecessarily restricting your company's access to cash that it could be using to invest in profit-generating activities.

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

COGS (Cost Of Goods Sold): This is the cost of the amount of inventory sold and can be deduced from software or book records. This can also be deduced from the following formula.

$$\text{Cost of goods sold} = \text{Beginning inventory} + \text{Inventory purchases} - \text{End inventory}$$

Average Inventory: The average inventory is calculated on a monthly basis. Company can prefer to have a weekly or daily average for more accurate results. Both COGS and average inventory calculations should use same inventory valuation method to get accurate results LIFO, FIFO or weighted average.

EXAMPLE

As per the previous example inventory turnover for Factory XYZ is calculated based on average valuation method.

Weighted average cost per unit = Rs. 19600 / 1600 = Rs. 12.25

$$= \frac{(700 \times 10) + (100 \times 12) + (600 \times 14) + (200 \times 15)}{(700 + 100 + 600 + 200)}$$

$$= \text{Rs. } 19600 \div 1600 = \text{Rs. } 12.25$$

Cost of goods sold = Beginning inventory + Inventory purchases – End inventory

$$= \text{Rs. } 700 + 900 - 600 = 1000 \times 12.25$$

$$= \text{Rs. } 12250$$

Avg inventory = beginning inventory + ending stock + ending inventory / 3

$$= (700 + 900 + 600) / 3 = 733.33 \times 12.25 = \text{Rs. } 8983.3$$

Inventory turnover

$$= \text{Rs. } 12250 / \text{Rs. } 8983.3 = 1.4$$



OBSOLETE INVENTORY OR DEAD STOCK

This means, materials that have not been used for a significant amount of time and cannot be sold anymore. This material has either gone out of fashion or was bought more than what was required or is damaged and cannot be used. In most cases, this inventory must be liquidated at a reduced price, or sold as scrap.

The store room should be monitored at regular intervals to identify obsolete inventory and take proactive actions. If possible, offer it to the buyers at a discounted rate or else dispose it of instead of spending time and money in further storing it. This metric is used to highlight inventory management practices and effectiveness of the forecasting team. Regular monitoring may be able to reduce the losses occurring due to obsolescence.

The best way to identify obsolete inventory is by checking the last used tag. If the item has not been used for a long time (say a year or 6 months), the items may be considered as obsolete, however the decision to determine an inventory item as obsolete should be taken in consultation with merchandising, production, purchasing and stores manager.

Obsolete inventory = (value of obsolete inventory / value of total inventory) X 100

Each organization has to devise its own methods of determining obsolescence and the percentage obsolete inventory that is acceptable.



INVENTORY ACCURACY

Inventory accuracy is a measure of how closely official inventory records match the physical inventory. The units of measurement are either dollar based or count based. These two bases have different purposes and may give widely differing results.

Accountants and financial auditors prefer dollar-based measurements of accuracy. Their concern is to ensure that the inventory value stated on books and tax returns is accurate at an aggregate level. Discrepancies on individual items hold little concern provided that positive and negative discrepancies are roughly equal and the total value is the same.

Operations and material management people have a stronger interest in the accuracy of individual items as shortage can result in major production breaks or emergency buying and an excess can result in obsolete inventory

Accuracy = (total accurate records / total inventory record checked) X 100

There can be many reasons for inaccuracy such as improper data entry, incorrect unit used for calculation, poorly trained employees, stealing and supplier errors.

EXAMPLE

Factory XYZ has following inventory records:

Item no.	Value(₹)	Physical Count	Records	Variance
1	10	95	100	-5
2	30	99	100	-1
3	40	100	100	0
4	80	101	100	+1

Physical inventory count should be done every few months and in a periodic cycle count to ensure that correct inventory records are maintained.

Any value less than 95% should be a cause of concern. Accuracy may also be calculated in terms of actual quantity or value of the stock items.

Operational Accuracy

Three out of four items have inaccurate information. Therefore, operational or production accuracy is 75%.

Financial Accuracy

Negative discrepancies shown by item 1 & 2:
 $(-5 \times 10) + (-1 \times 30) = -80$

Positive discrepancy shown by item
 $4:1 \times 80 = +80$

The overall discrepancy in financial terms here is =
 $-80 + 80 = 0$

Therefore, no financial inaccuracy is present.



AVERAGE DAYS OF INVENTORY IN HAND

This KPI measures the average number of days a product or line of products spend in inventory. The time period for which we hold the inventory before selling or producing the product is called average days of inventory on hand. It is also called inventory conversion period. If average days of inventory in hand are small, the organization requires less working capital to invest in inventory. Saved working capital can be utilized for other purposes.

Avg days of inventory in hand = 365 / inventory turnover ratio

For garment industry the average days of inventory on hand from fabric in-house to PCD (Planned Cut Date) should be an important number to chase. For manufacturers who buy stock fabrics also need to monitor this number to ensure a healthy cash flow.



INVENTORY CARRYING COST

This is the cost a company incurs over a certain period of time, to hold and store its inventory. There is a daily cost of holding inventory. The best way to reduce these costs is to ensure that inventory is sold as soon as it becomes obsolete. A number of companies simply do not let go off the dead stock. They allow the original purchase price of the inventory to compromise their decision to liquidate it. They keep trying to generate profit off the original purchase price.

The likelihood that a company will be able to recoup the full value of the dead stock declines every day as they choose not to liquidate it and further accumulate carrying costs. There is a window of opportunity here. The moment stock becomes slow moving or outdated, it needs to be sold immediately. The faster the company sells it, the better its chances are of recouping the full value.

The cost of carrying inventory is expressed as a percentage of each dollar carried on the average in inventory throughout a full year.

$$\text{Cost of carrying inventory} = \frac{\text{Total annual costs}}{\text{Average inventory value}}$$

Total annual cost comprises of the following entities :

Warehouse space: The actual monthly rental or monthly rental equivalent of the space as per local real estate standards. Insurance and taxes for warehouse space.

Taxes: Taxes paid on inventory as per local laws as mentioned in company accounts records. **Insurance:** Premiums for protection of inventory.

Obsolescence and shrinkage: Inventory shrinkage refers to the amount of inventory that exists in accounts records but no longer exists in actual records. This can happen due to theft, vendor fraud or administrative errors. The inventory that was not found (inventory shrinkage), damaged and obsolete inventory needs to be written off from inventory records at the year end. Writing off inventory means removing some or all of the cost of an inventory items from the accounting records. The amount to be written off should be the difference between the book value (cost) of the inventory and the amount of cash that can be obtained by disposing of this inventory.

Material Handling: This is the cost of employees in the warehouse/ store and equipment used to receive, put away, move, check and count inventory.

Cost of money invested: This is prime rate (interest rate on borrowed money) multiplied by value of average inventory.

EXAMPLE

For factory XYZ, total annual costs = Rs. 5600000

Average inventory value = Rs. 20000000

Cost of carrying inventory = $(\text{Rs. } 5600000 \div \text{Rs. } 20000000) \times 100 = 28\%$

This means that the organization spends Rs. 0.28 for every Rs. 1.00 carried in the inventory on average for a year. The 28% rate remains constant until the calculation is made again the next year.



INCIDENCE OF 'OOS' (OUT-OF-STOCK) / PART & RAW MATERIAL USAGE

For any business having too many occurrences of out-of-stock incidences is damaging to business. Deciding on inventory levels is a delicate balance between not having too much and also avoiding stock out situations. One simple stock out situation can have huge cascading effect on costs and these should be tracked to control inventory levels. In situations where a stock out situation occurs, the company always prefers to expedite the raw material than to lose an order from a customer.

Loss of an order is definitely a loss of trust of the customer and in extreme cases may result in loss of a customer as well. The delay due to stock out and further expediting the raw material and processes may result in various other costs.

- HERE RAW MATERIA VENDOR MAY charge a rush fee if they have to expedite a raw material delivery
- HERE WILL BE INCREASED FREIGHT cost to expedite raw material in the store.
- HERE PLANNED PRODUCTION PROCESSES will be disrupted resulting in loss of efficiency
- HERE DELAY MAY FURTHER RESULT IN AIR freight to deliver the goods to the customer
- APART FROM THE ABOVE THERE IS A loss of trust and reputation of the company.

One of the biggest reasons why companies are unaware of these costs is because they are very cumbersome and a lot of discipline is required to properly track them back to their source.

However, even a basic count of number of times the production process is disrupted due to some out-of-stock incidences with responsible department and basic costs incurred, will give a decent picture of the situation.

The measurement factors are pillars of support for good management of the factory. In order to use these performance measurement tools in the correct light one should take help from trained IE professionals or consultants.

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120+ customers in **15** countries plan **1 billion** pieces annually with ThreadSol products.