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Inventory Control Management

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1.0 PURPOSE

The purpose of this chapter is to define the internal control requirements of the Entity's inventory management and to keep tracking the Entity's stocked goods and monitoring their transactions and locations to minimize the cost of holding inventory while having the required number of days' worth of inventory at hand across all products with no excess inventory. This will help business owners to know how and when to replenish the inventory.

2.0 SCOPE

This chapter will discuss the guidelines that identify inventory requirements, provide replenishment techniques, responsibilities of reporting actual and projected inventory status and handle all functions related to the tracking and management of material.

This would include the monitoring of material moved into and out of stockroom locations and the reconciling of the inventory balances. It also includes setting the parameters to balance the need for product availability against the need for minimizing stock holding and handling costs, FIFO practice (First In First Out), managing relationships with suppliers, inventory contingency plan, ABC categorization, regular auditing of physical inventory, spot checking and cycle counting, forecasting, and drop shipping.

The guidelines discussed in this chapter are the minimum needed to assure effective control over the Entity's inventory.

3.0 DEFINITIONS

Definitions	Description
DN	Delivery Note
ERP	Enterprise Resource Planning
FIFO	First In First Out
GRN	Goods Received Note
KPIs	Key Performance Indicators
PO	Purchase Order
RFD	Request For Delivery
Supplier	Supplier may refer to a manufacturer, distributer, dealer, or wholesaler
Re-order Quantity	Reorder Quantity is the number of units to be ordered in a new purchase order for the replenishment of a particular inventory item. The formula for reorder quantity is the average daily usage multiplied by the average lead time.
Average Rate of Usage	Average Rate of Usage is the average of usage of an item within a measuring period. The formula for the average rate of usage is the total quantity used of an item within a measuring period divided by the number of days in the same period.

Table 1

4.0 REFERENCES

- APQC (American Productivity & Quality Center) https://www.apqc.org

5.0 RESPONSIBILITIES

5.1 General

- The responsibility for ensuring that the Entity has the right amount of stock to meet end-users' needs and avoid overstocking of goods and spare parts, which ties up cash and storage resources, is the responsibility of every team member who works in Inventory Organization
- The inventory controller is the only person authorized to undertake posting of stock transactions in the ERP. He/she should review all shipments received, issued, returned physically against the shipping documents and review the stock transactions completed in the ERP for the same shipments before posting them in the ERP
- The Inventory Control Management should ensure that complete stock count takes place on regular basis. The more frequent it happens, like quarterly, the highest control the Entity can achieve to avoid stock discrepancies
- Similarly, Random stock count should be done on a regular basis as well.

5.2 Inventory Control Manager

The inventory control manager's responsibilities should be as follows:

- Plan, implement, and manage procedures to optimize inventory control
- Manage operation and maintenance supplies and spare parts
- Ensure goods and spare parts stock is adequate for all warehouses and can cover direct demand from end-users
- Inspect the levels of goods supplies and spare parts to identify shortages and act in a timely manner
- Replenish stock avoiding insufficiencies or excessive surplus
- Define inventory KPIs and track them regularly
- Oversee daily operations and identify challenges
- Analyze data to anticipate future needs
- Suggest solutions for continuous improvements
- Stay up to date with the latest technology and best practices
- Use software to monitor demand and document characteristics of inventory
- Participate in suppliers' evaluation to achieve cost-effective deals and maintain trust relationships

5.3 Inventory Controller

The inventory controller's responsibilities should be as follows:

- Monitor inventory levels & materials history transactions
- Monitor & inspect all warehouse/inventory transactions
- Post stock transactions in ERP for materials received, issued, transferred, or returned
- Maintain the Entity's material and goods inventory including stock profiles and stock locations
- Ensure incoming goods are well documented, managed appropriately according to the Entity's processes and procedures and controlled to sufficiently support the goals of inventory management
- Ensure subcontracted processes are received and that suppliers/service providers are chased to ensure that there is no late delivery
- Implement improvement processes and systems to optimize inventory, minimize costs, and maximize working capital
- Be responsible for managing and running planned stock takes
- Perform cyclic stock checks
- In case logistics and warehousing operations are outsourced, the inventory controller should monitor and take care of 3rd party logsitcs warehouse and transactions IN & OUT
- Collaborate with warehouse employees and other stakeholders to ensure that inventory management goals are met

6.0 PROCESS

6.1 Inventory Control Techniques

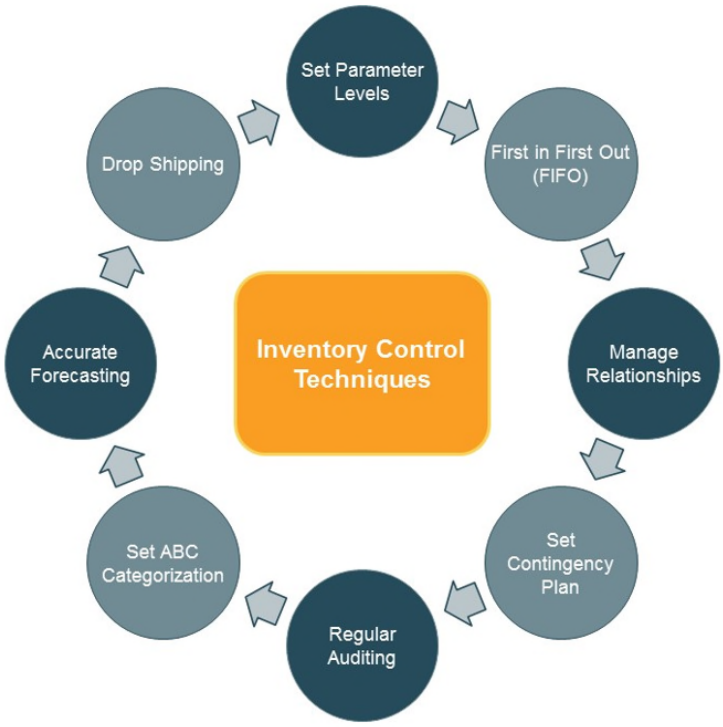

Figure 1: Inventory Control Techniques

6.1.1 Set Parameter Levels

Setting parameter levels is necessary to get the control of inventory and it should be done for all items in stock in order to systemize the process of ordering which will make it easier for inventory control staff to make decisions quickly.

The parameter levels vary by item and are based on the following factors:

- Consumption Average: It is the average of how quickly the item is consumed within a certain period of time
- Lead Time: It is the taken to get the item back in stock, i.e., the difference between the order date and the receipt date of the inventory ordered

Since conditions change over time, check on parameter levels on regular basis throughout the year to confirm that they still make sense. Otherwise the parameter levels need to be adjusted.

The parameters involved in inventory control management are as follow:

- **Re-Order Point (ROP):** It is the level of inventory which triggers an action to replenish that particular inventory stock. In other words, it is a minimum amount of an item which the Entity holds in stock, such that, when stock falls to this amount, the item must be reordered.

It is normally calculated as the forecasted usage during the replenishment lead-time plus minimum/safety/buffer stock as per the following formula:

Reorder Point = (Maximum Consumption per day × Maximum lead time in days) + Minimum/Safety/Buffer Stock Level

- **Minimum Stock Level:** It is that level of an item of material, below which the actual stock should not normally be allowed to fall. The main objective of fixing the minimum level of materials is to ensure that the required quantity of each item is available in stores at all times.

The fixation of this level acts as a safety measure and hence, it is also known as “Safety Stock” or “Buffer Stock”. In case the actual stock falls below this level, there is a danger of stoppage in operation and maintenance, and the management has to give top priority to the acquisition of fresh supplies.

The minimum stock level can be determined by applying the following formula:

Minimum Stock Level = (Maximum Consumption per day × Maximum lead time in days) – (Average Consumption per day × Average lead time in days)

- **Maximum Stock Level**: The amount of inventory which should not be exceeded. The limit is normally determined after considering storage space of the facilities, how quickly inventory is used, cost of insurance on inventory, and the risk of inventory becoming outdated before it is used.

The main object for fixing up the maximum stock level is to avoid undue investment of capital leading to loss of interest, obsolescence of materials and additional overheads in the form of higher rents etc.

The maximum stock level can be determined by applying the following formula:

Maximum Stock Level = Re-order Point + Re-order Quantity – (Average rate of usage × Average Lead Time)

- **Economic Order Quantity (EOQ):** It is the order quantity that minimizes the total holding costs and ordering costs
    - The holding cost refers to the total cost of holding inventory. This includes warehousing costs such as rent, utilities, salaries, and financial costs such as inventory costs related to ageing, shrinkage (leakage), and insurance
    - Ordering costs are the expenses incurred to create and process an order to a supplier. These costs are included in the determination of the economic order quantity for an inventory item. Examples of ordering costs are:
        - Cost to prepare a purchase requisition
        - Cost to prepare a purchase order
        - Cost of the labor required to inspect goods when they are received
        - Cost to put-away goods once they have been received
        - Cost to process the supplier invoice related to an order
        - Cost to prepare and issue a payment to the supplier

An Entity must monitor its ordering costs and inventory carrying costs in order to properly balance order sizes and thereby minimize overall costs.

Please see the illustration below that show complete set up of above parameters:

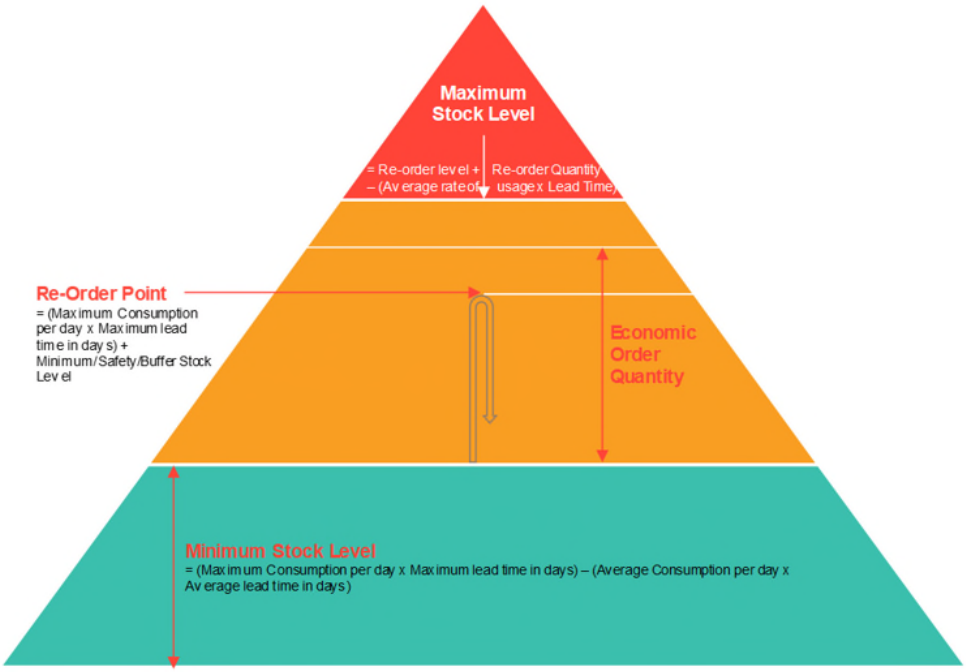

Figure 2: Inventory Parameters Pyramid

First-In First-Out (FIFO)

It is important to practice FIFO as a principle of inventory control management. It means the oldest stock (first-in) gets issued first (first-out), not the newest stock. This is especially important for products with shelf life so that the inventory does not end up with unused spoilage.

It's also important to practice FIFO for stock items with no shelf life in order to avoid obsolescence as packaging design and features often change over time and so the packaging is more likely to get worn out.

In order to manage a FIFO system, the Entity will need an organized warehouse. This typically means adding new items from the back, or otherwise making sure that old items stays at the front. If the Entity is working with a warehousing service provider, they probably do this already, but it's important to confirm with them.

6.1.2 Manage Relationships

It is necessary for successful inventory control management to be able to adapt quickly with the stock and check if they need to do any of the following:

- Return a slow-moving item to make room for a new one
- Restock a fast-moving item very quickly
- Troubleshoot manufacturing issues
- Expand temporary storage space
- Get lower minimum order quantity so that there is no need to carry as much inventory and reduce capital blocked in inventory

Thus, it is important to have a strong relationship with Entity suppliers willing to work and solve such problems through clear, proactive communication where the supplier knows that there can be an increase in demand so they can adjust production and delivery. In addition, the suppliers should communicate when a product is running behind schedule so that projects can be paused or temporary options considered.

Supplier relationship management shall be discussed in details in Chapter 6 - Supplier Relationship Management - EOM-ZI0-GL-000005.

6.1.3 Set Contingency Plan

6.1.3.1 Material deliveries from suppliers to Entity can possibly be disturbed, delayed, and even stopped for some reasons such as:

- Supplier lead time has been increased
- Supplier capacity has been decreased
- Supplier product quality and performance issues
- Supplier runs out of your product
- Supplier discontinues your product without warning
- Labour strikes and conflict in supplier's country
- Natural disasters, e.g. floods, earthquakes, hurricanes, etc.
- Unexpected demand spike when out of stock
- A miscalculation in inventory leading to product shortage
- Shortfall in cash flow leading to inability to pay for goods
- A slow-moving product taking up all storage space
- Warehouse doesn't have enough room to accommodate spikes in demand

It is important to figure out where the risks are and prepare a contingency plan in order to secure the flow of material supplies to Entity through the following guidelines:

- The logistics officer should always expedite the suppliers' shipments and should inform the logistics service provider for the shipments to be collected as per the expected delivery schedule
- The logistics service provider should inform the logistics officer whenever there is a delay from the supplier
- The logistics officer should investigate the delay issue with the supplier in order to find out the reason(s) and report the findings to Procurement to take necessary actions as per the Purchase Order terms and conditions
- In case the supplier lead time has been increased, capacity has been decreased, run out of stock, or discontinued the product, product quality and performance no longer meets the standard and KPIs agreed upon, the Procurement department should cancel the balance quantities of the Purchase Order (PO), apply for delay penalty and source the material needed from another supplier or multiple suppliers on the supplier's account
- Procurement can take further actions against suppliers such as blacklisting in the Entity suppliers list and even more, across the Kingdom, if needed.
- In case of labour strikes, conflicts, and natural disasters in the supplier's country, the Procurement department should cancel the Purchase Order and consult the material end user to decide the optional technology replacement that can meet the material end user needs and can be sourced from another supplier
- In case the demand spikes unexpectedly or there is a miscalculation in the inventory and the current supplier can't meet the need for additional quantities, Procurement should source the extra quantities from the next lowest supplier participated in this bidding
- In case of cash flow shortfall or it needs to be returned, good relationships with the supplier can go a long way here to upgrade the credit limit and trade off the slow moving item. Supplier relationship management shall be discussed in details in Chapter 6 - Supplier Relationship Management - EOM-ZI0-GL-000005.
- In case the warehouse doesn't have enough room to accommodate the spike in demand, the Procurement department should arrange with all suppliers to consider drop shipping and deliver directly from supplier's warehouse to end-user project/work site

6.1.4 Regular Auditing

Regular reconciliation is vital. In most cases, the Entity will be relying on ERP inventory reports to know how much product the Entity has in stock. However, it is important to make sure the facts match up. The following methods should be followed.

6.1.4.1 Physical Inventory

A physical inventory is the practice of counting all the inventory at once by year-end because it ties in with accounting and filing taxes. Although physical inventories are typically done once a year, it can be disruptive to the operation and maintenance because if discrepancies are found, it can be difficult and it will take time to pinpoint the issue when we are looking back at an entire year. In order to avoid such a situation, the following method for Spot Checking should be followed as well.

6.1.4.2 Spot Checking

Spot-checking means choosing an item, counting it, and comparing the fiscal quantity with the one on the ERP. This practice should be done on regular basis as a supplemental to physical inventory and in particular for problematic or fast-moving items in order to avoid any discrepancies during year-end physical inventory.

6.1.4.3 Cycle Counting

Instead of undertaking a full physical inventory at year-end, we can use cycle counting to audit the inventory. It can be done each day, week, or month for different items on a rotating schedule with more frequency for higher value items in order to spread reconciliation throughout the year.

6.1.5 Set ABC Categorization:

Certain goods/products need more attention than others. Using an ABC analysis can help to prioritize the inventory management by separating out products that require a lot of attention from those that do not. Do this by going through the inventory list and adding each item to one of the following three categories A, B, and C:

A. Refers to high-value products which cover 80 % of the total value with low frequency of consumption
B. Refers to moderate-value products which cover 15 % of the total value with a moderate frequency of consumption
C. Refers to low-value products which cover 5 % of the total value with a high frequency of consumption

Items in category “A” require regular attention because their financial impact is significant, but consumption is unpredictable. Items in category “C” require less oversight because they have a smaller financial impact and they are constantly turning over. Items in category “B” fall somewhere in-between.

6.1.6 Accurate Forecasting

Good and healthy inventory comes down to accurately predicting demand. Forecasts are never perfect as there are countless variables involved and for sure, the exact demand coming is never known. The following factors should be considered when projecting future demand:

- Last year’s consumption during the same period
- Monthly average consumption for the last 3 years, 2 years, 1 year, 6 months, 3 months to see the consumption behavior
- Highest month consumption and reasons
- Lowest month consumption and reasons
- Quantities available in stock

- Quantities on POs
- Quantities on transit
- This year's demand growth rate
- Upcoming preventive maintenance

6.1.7 Consider Drop Shipping

Instead of having to carry inventory and ship products to end-users, either internally or through third-party logistics, the manufacturer or supplier takes care of it. Many suppliers and manufacturers offer drop shipping as a service, but even if the supplier does not, it should be negotiated.

Although goods often cost more this way than they do in bulk orders, there is no need to bear expenses related to holding inventory, storage, and fulfillment. Inventory management is completely removed from the business which will add value to supply chain management and reduce operation cost efficiently.

6.2 Inventory Management KPIs

6.2.1 Inventory to Consumption Ratio

The Inventory to Consumption Ratio KPI is one metrics that helps evaluate the overstock that will also tell us whether we are able to face unexpected demand situations. It is measured by dividing the available inventory for consumption by the monthly average of quantity actually consumed.

Combined with the carrying costs of inventory, it will give a better picture of the financial situation of the inventory, but also help defining the direction to be taken (like clearing entire inventory for certain category as quickly as possible).

6.2.2 Back Order Rate

The Back Order Rate KPI measures the number of orders that cannot be filled at the time end-users place them. A high back order rate means the end-users are forced to wait while attempting to fill their orders, which will delay the operation and maintenance schedules and adversely affect the end-users' satisfaction.

This KPI is closely related to the inventory accuracy KPI and percentage of out of stock items KPI. This KPI needs to be monitored to identify why certain items are not in stock and deal with such issues that may affect inventory management performance.

The inventory accuracy KPI is discussed in Chapter 8 - Warehouse Management - EOM-ZI0-PR-000006 and the percentage of out of stock items KPI is explained here below.

6.2.3 Percentage of Out of Stock Items

The Percentage of Out of Stock Items KPI measures the number of items that are out of stock at the time an end-user places an order.

The formula to calculate it is the number of items out of stock divided by the number of items in stock

6.2.4 Inventory Carrying Costs

The Inventory Carrying Costs KPI evaluates the expenses involved in the management of our inventory such as ordering, storing, loading goods, labor, transport, and delivery.

The costs should be measured meticulously and not omitted in order to smoothen the overall management and add value.