

OPERATIONS AND SUPPLY CHAIN MANAGEMENT

Inventory Planning and Control

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Agenda

- 1) Definition and Importance
- 2) Types of Inventory
- 3) Inventory Costs
- 4) Inventory Control
- 5) Classification of Materials
- 6) JIT
- 7) Examples
- 8) Q&A

Definition and Importance

Definition:

Inventory : Any idle resource that could be put to some future use.

Inventory management is an important aspect:

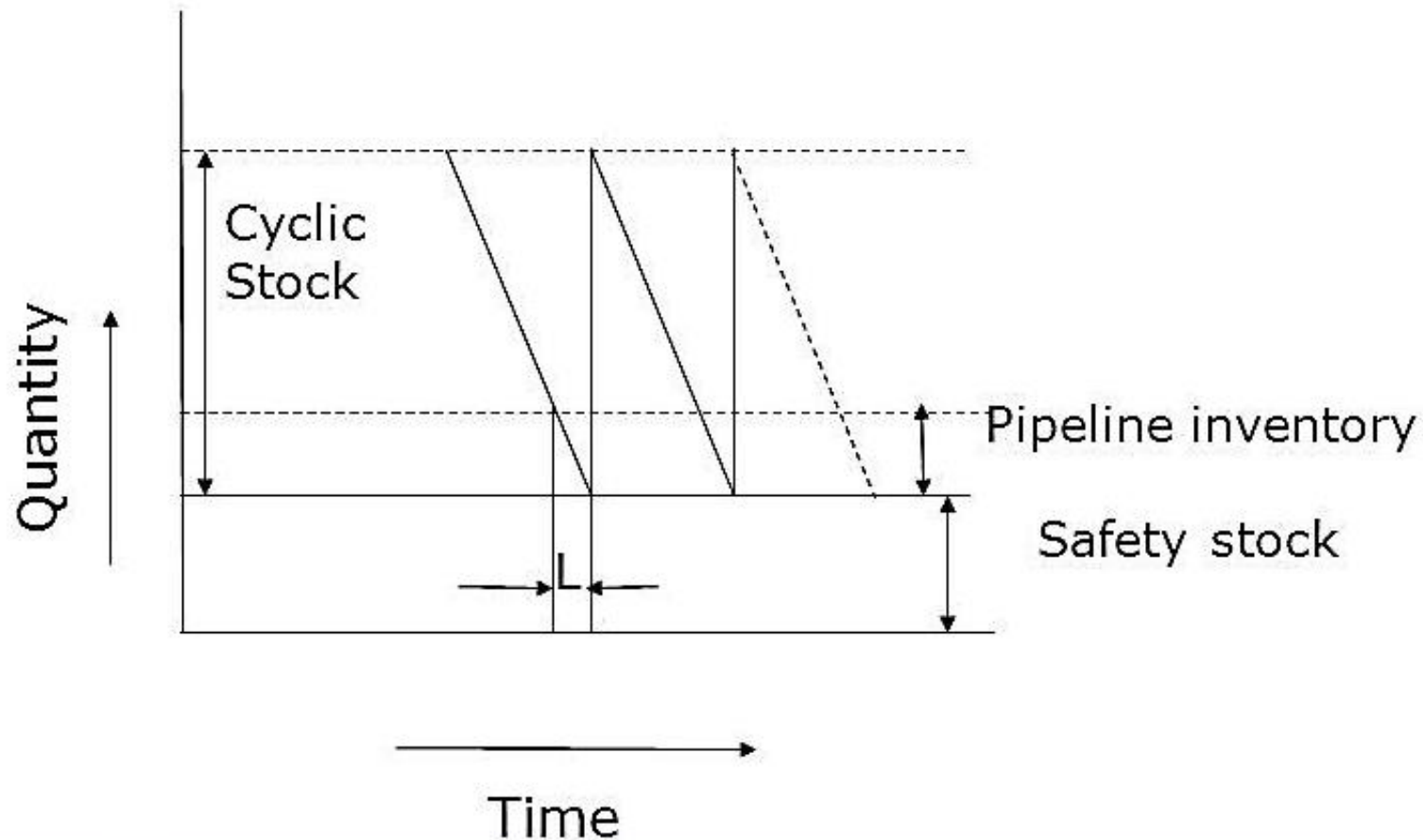
1. Continued dominance of material cost in the total cost of manufactured product.
2. Investment in inventory - major part of current assets.
3. Higher investment in Inventory - lower ROI .
4. Indian Scenario - 50 Days excess inventory.
5. International Scenario - 15/20 days excess inventory.

Types of Inventory - 5 Common Types

Sl. No.	Type	Explanation
1.	Seasonal	To meet fluctuations in demand arising out of seasonality, like festive season, winter and summer season. Peak and no peak hours of restaurants
2	Decoupling	Series of stages, planning and control, input and output buffer. Decouple. Capacities and Bottlenecks. Statistical fluctuations. -Tell the story
3	Cyclic	Saw tooth pattern. Cyclic consumption. Hospital syringes 500 per day and order 10000 in one order. 20 days to consume. Average Cyclic Inventory = $Q/2$
4	Pipeline	The inventory carried to take care of delay between order placement and order receipt , i.e. Lead Time Pipe Line Inventory = Average demand in defined period * Lead Time in appropriate units
5	Safety Stock	Buffer against uncertainty in demand and supply of raw materials. Higher uncertainty -> Keep Higher safety stock

Cyclic, Pipeline and Safety Stocks

A graphical illustration



Cyclic inventory, pipeline inventory and safety stocks are critically linked to "how much" and "when" decisions in inventory planning

Example

A manufacturer of transformers requires copper as a key ingredient. The average weekly requirement is 200 tons. The lead time is 2 weeks. If monthly orders are made, analyze various types of inventory in the system?

Solution:

1. Order Quantity (Q) = 1 month requirement = $200 * 4 = 800$ tonnes
2. Cyclic inventory in the system = $Q/2 = 800/2 = 400$ tonnes
3. Lead time(L) = 2 weeks
4. Average weekly demand (m) = 200 tonnes
5. Pipeline inventory = $L*m = 2*200 = 400$ tonnes

Inventory Costs

1. Inventory Carrying Cost = $(Q/2) * C_c$
2. Cost of Ordering = $(D/Q) * C_o$
3. Cost of shortages = C_s

Here;

- C_c = Inventory carrying cost per unit per unit time
- C_o = Cost of ordering per order
- D = Annual demand(known)
- Q = Order Quantity
- $Q/2$ = Average inventory carried by an organization

Inventory Control-Deterministic Demand

Assumptions:

1. Demand known and continuous
2. Exclude possibility of shortages

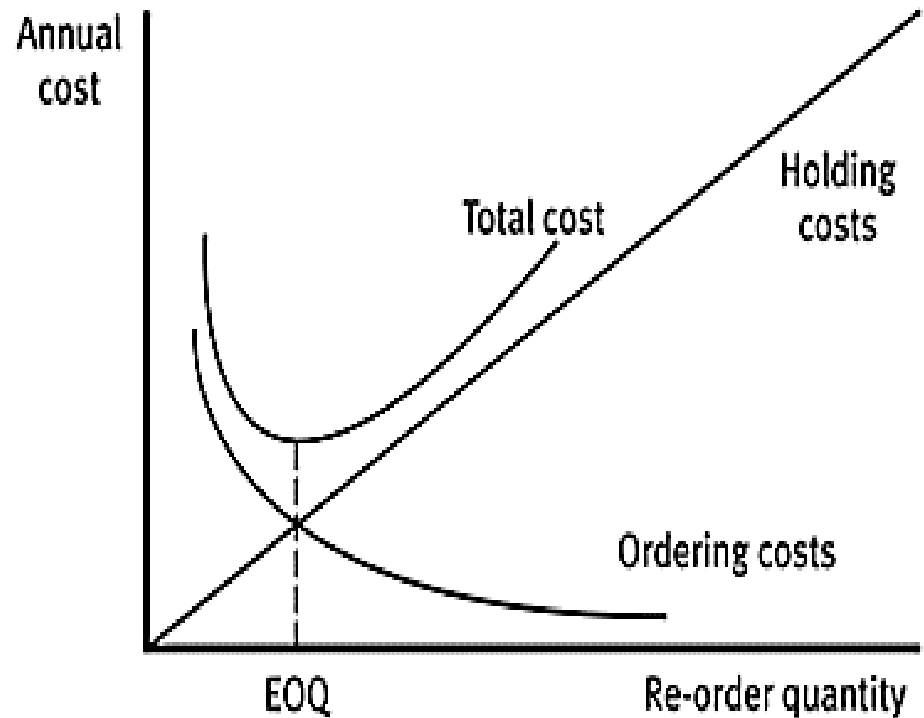
Problem Statement :

Balancing the total cost of ordering and carrying inventory?

$$TC(Q) = (Q/2) * C_c + (D/Q) * C_o$$

When total cost(TC) is minimum we obtain EOQ

$$EOQ = \sqrt{2 * C_o * D / C_c}$$



Note: Show differentiation

Classification of Materials

- ABC Analysis
 - High Value, Medium Value, Low Value
- VED
 - Vital, Essential, Desirable
- HML -
 - H = High value items, M = Medium value items, L = Low value items
- FSN -
 - Fast Moving, Slow Moving, Non Moving
- GOLF-
 - G = Government controlled supplies, O = Open market supplies, L = Local supplies, F = Foreign market supplies
- SOS -
 - Seasonal, Off-seasonal

Just-in-Time (JIT)

- Just-in-time (JIT) is an inventory strategy companies employ to increase efficiency and decrease waste by receiving goods only as they are needed in the production process, thereby reducing inventory costs.
- This method requires producers to forecast demand accurately.
- This inventory supply system represents a shift away from the older just-in-case strategy, in which producers carried large inventories in case higher demand had to be met.

Thanks