

Inventory management

Holding cost $\text{Holding cost} = \frac{Q}{2}(H)$

Ordering-/setup cost $\text{Ordering or setup cost} = \frac{D}{Q}(S)$

Material handling cost $C = \frac{Q}{2}(H) + \frac{D}{Q}(S)$

Economic order quantity $EOQ = \sqrt{\frac{2DS}{H}}$

Time between orders $TBO_{EOQ} = \frac{EOQ}{D}$

Q = Order quantity

H = Holding cost per item

D = Forecasted demand

S = Setup cost per order

Continuous review (Q) system

Inventory position $IP = OH + SR - BO$

IP = Inventory Point

OH = On-hand inventory

SR = Scheduled receipts

BO = Back orders

Re-order point $R = \bar{d}L + \text{Safety stock}$

\bar{d} = Average demand per time unit

L = constant lead time In time units

Standard deviation of demand during lead time: $\sigma_{dLT} = \sqrt{\sigma_d^2 L} = \sigma_d \sqrt{L}$

Safety stock: $= z\sigma_{dLT}$

Periodic review (P) system

$$T = \bar{d}(P + L) + z\sigma_{(P+L)} = \bar{d}(P + L) + z\sigma_d \sqrt{P + L}$$

T = average demand during the protection interval + safety stock for protection interval

P = length of time between reviews

Noninstantaneous replenishment

$$\text{Maximum cycle inventory: } I_{max} = \frac{Q}{p}(p - d) = Q \left(\frac{p-d}{p} \right)$$

p = production rate

d = demand rate

Q = lot size

$$\text{Total annual cost: } C = \frac{I_{max}}{2}(H) + \frac{D}{Q}(S)$$

$$\text{Total annual cost: } C = \frac{Q}{2} \left(\frac{p-d}{p} \right) (H) + \frac{D}{Q}(S)$$

$$\text{Economic production lot size: } ELS = \sqrt{\frac{2DS}{H}} \sqrt{\frac{p}{p-d}}$$

I = Inventory

D = annual demand

p = production rate

d = demand rate

Q = lot size

H = holding cost

S = ordering/setup cost