Basic EOQ Model

\[ TC = A \cdot c + \frac{A}{Q} \cdot S + \frac{Q}{2} \cdot i \cdot c \]

\[ TRC = A \cdot S + \frac{Q}{2} \cdot i \cdot c \]

\[ h = i \cdot c \]

\[ EOQ = \sqrt{\frac{2AS}{ic}} \]

with
- \( A \) = annual demand/usage [units/year]
- \( c \) = unit acquisition cost [$/unit]
- \( S \) = ordering/setup cost [$/order]
- \( i \) = annual carrying cost rate [%]
- \( h \) = carrying cost per average unit of inventory per year [$/unit/year]

\( TC \) = total cost
\( TRC \) = total relevant cost

Reorder Point for Basic EOQ Model

\[ ROP = \bar{d}L \]

with
- \( \bar{d} \) = average daily demand [units/day]
- or average weekly demand [units/week]
- \( L \) = leadtime [# of working days or weeks]

Order Cycle Time, or Time Between Orders (TBO)

\[ TBO = \frac{Q}{A} \cdot (# of working days/year) \]

or \( \frac{Q}{A} \cdot (# of working weeks/year) \)

Period-Order Quantity (POQ)

\[ POQ = \frac{EOQ}{\text{average weekly usage}} \]

EOQ with Transfer Batches

\[ TC = A \cdot c + \frac{A}{Q} \cdot S + \frac{Q}{2n} \cdot i \cdot c \]

\[ EOQ = \sqrt{\frac{2nAS}{ic}} \]

with
- \( n \) = number of transfer batches

EOQ with Usage During Production

\[ TC = A \cdot c + \frac{A}{Q} \cdot S + \frac{p-d}{p} \cdot \frac{Q}{2} \cdot i \cdot c \]

\[ EOQ = \sqrt{\frac{2AS \cdot p}{ic \cdot (p-d)}} \]

with
- \( p \) = daily/weekly production rate
- \( d \) = daily/weekly usage rate
**Reorder Point for Fixed Order Quantity Model with Safety Stock**

\[ ROP = DDLT + SS \]
\[ = \bar{d}L + z\sigma_L \]
\[ \sigma_L = \sqrt{L} \cdot \sigma_d \]

where

\( DDLT \) = expected demand during leadtime
\( SS \) = safety stock
\( z \) = safety factor associated with the service level
\( \sigma_d \) = standard deviation of daily [or weekly] demand

**Fixed Time Period Model with Safety Stock**

\[ Q = \bar{d}(R + L) + z\sigma_{R+L} - I \]
\[ \sigma_{R+L} = \sqrt{R + L} \cdot \sigma_d \]

with

\( R \) = duration of review cycle
\( R + L \) = “protection interval”
\( I \) = inventory on hand at time of review