



IIT ROORKEE



NPTEL ONLINE
CERTIFICATION COURSE

SUPPLY CHAIN ANALYTICS

Multi echelon Inventory Management for four stations

DR. RAJAT AGRAWAL

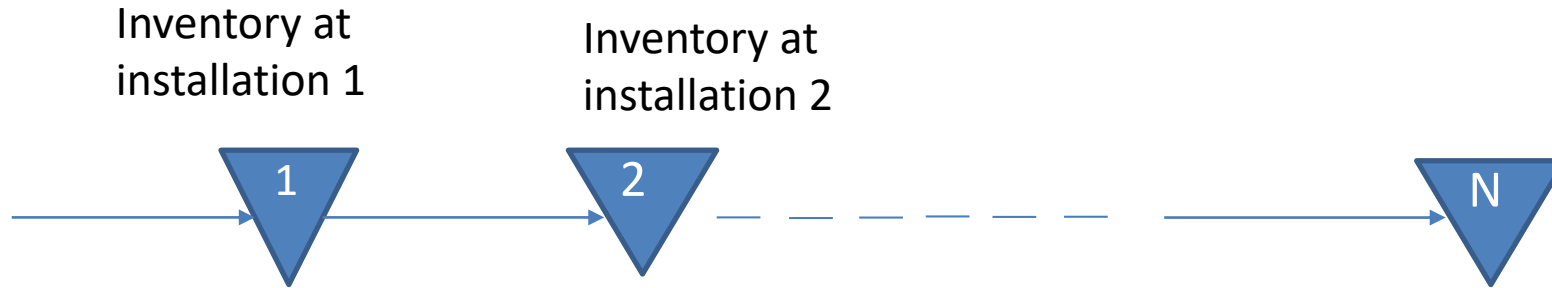
DEPARTMENT OF MANAGEMENT STUDIES

IIT ROORKEE



Serial Multi-Echelon Inventory System

Consider a long supply chain of N installations as follows:



A specific case of this can be a four stage supply chain:



Assumptions for serial multi-echelon model: Constant demand rate is d units per unit time



$Q_1 \longrightarrow Q_2 \longrightarrow Q_3 \longrightarrow Q_4$

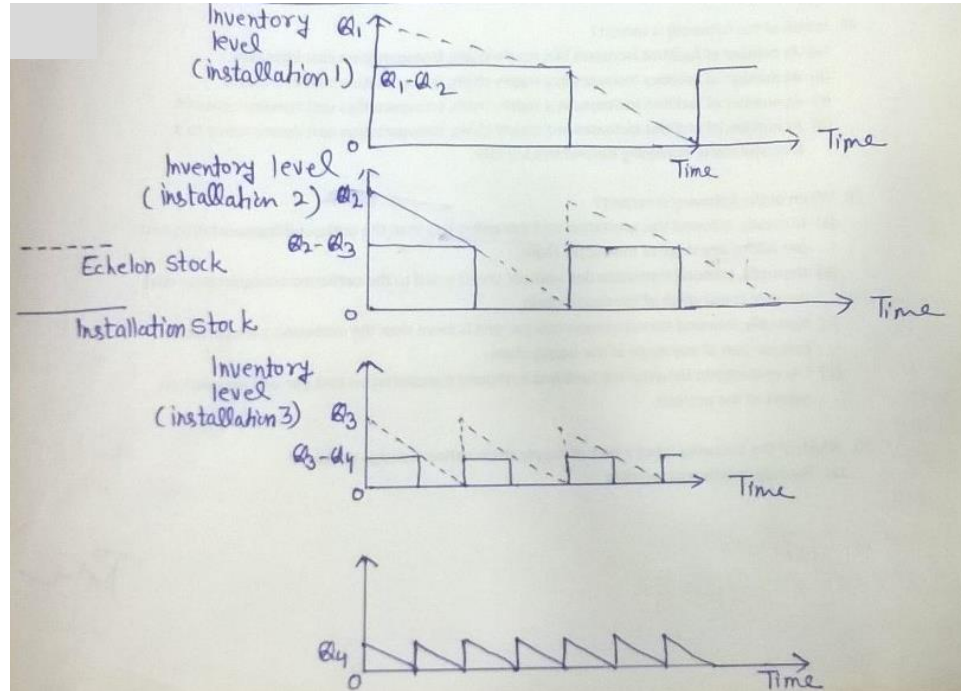
Quantity	i.e.	Q_1	$\geq$	Q_2	$\geq$	Q_3	$\geq$	Q_4
		Q_1		Q_2		Q_3		Q_4
Setup/order Cost		k_1		k_2		k_3		k_4
Holding Cost		h_1	$<$	h_2	$<$	h_3	$<$	h_4

[As units increase in value each time they are received and processed at the next installation.]

Additional Assumptions,

- An order quantity of Q_1 units is placed in time to replenish inventory at installation 1 before a shortage would occur.
- The assumptions of the basic EOQ model hold at installation 4. Thus, there is a known constant demand of d units per unit time, an order quantity of Q_4 units is placed in time to replenish inventory when the inventory level drops to zero, and planned shortages are not allowed.





On the basis of presentation of synchronized inventory, it is taken as,

$$Q_3 = 2Q_4$$

$$Q_2 = 2Q_3$$

$$Q_1 = 2Q_2$$

and finally, $Q_1 = 8Q_4$

$$Q_2 = 4Q_4$$

$$Q_3 = 2Q_4$$

Further it can be generalized also.



THANK YOU

