**Echelon Inventory Policy**

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|  | **Echelon Inventory Policy**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Stage 3** | **🡪** | **Stage 2** | **🡪** | **Stage 1** |   Upstream 🡪 🡪 Downstream  . . . |  |
|  | \*Echelon inventory = on hand + downstream inventory  \*Echelon inventory position = on hand + upstream orders not received - backorders  \*Echelon lead time = LTe = LT + downstream LT  \*Echelon reorder point = ROPe = d \* LTe + Z \* d \* sqrt( LTe ) |  |
|  | \*Echelon Inventory Policy. When the echelon inventory position is at or below the echelon reorder point, ROPe=d\*LTe+Z\*d\*sqrt(LTe), order the appropriate lot size, Q. |  |
|  | \*Let demand, Xd , for Stage 1 be stochastic, Xd ~ N( d , 2d ) ,  where d = 539/week and 2d = 6724/week2 . Thus, d = 82/week.  \*Stockout Level, =0.10. Thus, Z≈1.282  \*Let unit ordering cost, Co, and unit carrying cost, Cc, be:  -For Stage 1: Co=$249/order, Cc=$0.41/item/week.  -For Stage 2: Co=$254/order, Cc=$0.32/item/week.  -For Stage 3: Co=$260/order, Cc=$0.29/item/week.  \*Lot Size:  -Lot Size for Stage 1: EOQ= sqrt(2\*539\*249/0.41)=809  -Lot Size for Stage 2: EOQ= sqrt(2\*539\*254/0.32)=925  -Lot Size for Stage 3: EOQ= sqrt(2\*539\*260/0.29)=983  \*Let Lead Time, LT, be:  -Lead Time between Stage 1 and Stage 2: LT1=0.2 weeks  -Lead Time between Stage 2 and Stage 3: LT2=0.5 weeks  -Lead Time between Stage 3 and Supplier: LT3=0.3 weeks  \*Echelon Lead Time: LTe  -Echelon Lead Time for Stage 1: LTe1 = 0.2  -Echelon Lead Time for Stage 2: LTe2 = 0.2 + 0.5 = 0.7  -Echelon Lead Time for Stage 3: LTe3 = 0.2 + 0.5+0.3 = 1.0  \*Echelon Reorder Point: ROPe = d \* LTe + Z \* d \* sqrt( LTe )  -Echelon Reorder Point for Stage 1: ROPe1 = 539\*0.2+1.282\*82\*sqrt(0.2)=155  -Echelon Reorder Point for Stage 2: ROPe2 = 539\*0.7+1.282\*82\*sqrt(0.7)=465  -Echelon Reorder Point for Stage 3: ROPe3 = 539\*1.0+1.282\*82\*sqrt(1.0)=644  \*Echelon Inventory Policy:  -Echelon Inventory Policy for Stage 1: (155,809)  -Echelon Inventory Policy for Stage 2: (465,925)  -Echelon Inventory Policy for Stage 3: (644,983)  . . . |  |