Abenes, Enrico O. CIT 1-2H Inventory Models EPQ, QDM November 22, 2024

1) Given: $D = 6{,}750$ paper slicers / year $Ch = \$1$/paper slicers / year $d = 30$ paper slicers/year
$Cs = \$150$ / production run $p = 125$ paper slicers / day

a) $Q^* = \sqrt{\dfrac{2DCs}{Ch(1-\frac{d}{p})}}$

$Q^* = \sqrt{\dfrac{2(6{,}750)(150)}{1(1-\frac{30}{125})}}$

$Q^* = 1{,}633$ paper slicers/batch

b) $t = \dfrac{Q}{p}$

$t = \dfrac{1{,}633}{125}$

$t = 13$ days / production

c) $\dfrac{D}{Q} = \dfrac{6750}{1633}$

$= 4.1$ productions

$= 5$ productions run/year

d) $TC_T = TCs + TCh$

$TC_T = \dfrac{D}{Q} Cs + \dfrac{Q}{2}(1-\dfrac{d}{p})(Ch)$

$TC_T = \dfrac{6450}{1633}(150) + \dfrac{1633}{2}(1-\dfrac{30}{125})(1)$

$TC_T = 620.02 + 620.54$

$TC_T = \$1{,}240.56$/year or $\$1{,}241$/year

2) Given: $D = 1400$ metal detectors $Co = \$25$/order
$I = 20\%$ or 0.20

Discount Number	Unit Price (c)	Order Quantity (Q)	EOQ	Adjusted Q	Material Cost	Ordering Cost
1	\$400	200	$= \sqrt{\dfrac{2(1400)(25)}{20\%(400)}}$ = 30 metal detectors/order	200	= 1400(400) = \$560,000	$= \dfrac{1400}{200}(25)$ = \$175
2 (5%)	\$380	300	$= \sqrt{\dfrac{2(1400)(25)}{20\%(380)}}$ = 31 metal detectors/order	300	= 1400(380) = \$532,000	$= \dfrac{1400}{300}(25)$ = \$116.67

Holding Cost	Total Cost
$= \dfrac{200}{2}(0.20 \times 400)$ = \$8,000	= 560000 + 175 + 8,000 = \$568,175
$= \dfrac{300}{2}(0.20)(380)$ = 11,400	= 532,000 + 116.67 + 11,400 = \$543,516.67

* Dorsey should take the discount number 2, with a unit price of \$380 and an Order quantity of 300 metal detectors. Since discount number 2 has the lowest total cost of them all/two.