

ACC/ACF3200 MANAGEMENT ACCOUNTING

TUTORIAL SOLUTION

WEEK 11 – Managing Suppliers

- 15.8** The economic order quantity (EOQ) is the order quantity that minimises total holding of inventory and ordering costs for the year. Even if all the assumptions do not hold exactly, the EOQ gives us a good indication of whether or not current order quantities are reasonable.
- 15.9** Under the EOQ system, total ordering costs are lower as there are fewer orders; these are only placed when inventory reaches a certain level. However, under an EOQ system there are large inventory storage costs as goods are held until used in production. Under the JIT system, goods are ordered more frequently but are not held for a long period of time. While orders are placed more frequently, the cost per order may be lower due to the implementation of more efficient ordering processes. These include the use of electronic ordering and payments, less frequent invoices and a smaller number of suppliers to contract with. The costs associated with holding inventories are also reduced, because the goods are used as soon as they are delivered. Carrying costs are eliminated or minimised.
- 15.10** A just-in-time (JIT) inventory and production system is a comprehensive system for controlling the flow of manufacturing in a multistage production environment. Inventory management is a critical component of JIT, which is designed to reduce or eliminate inventories at every stage of production. JIT forces the elimination of inherent waste in long setups. JIT does not work well when it removes the security blanket of using high inventories to sort out operational problems. Back-up inventories help during unexpected shortages or freight delays. Some managers are comfortable with the existing process and are inflexible to change and, hence, JIT does not fit well with them. Some suppliers do not support delivering raw materials in small batches on a daily basis.
- 15.11** JIT purchasing and JIT production management are designed so that production inputs are available just as they are needed, eliminating the need for delivered inventory and intermediate inventory (i.e. an inventory between production processes). Many non-value adding activities and costs are related to holding inventory, such as movement of inventory, storage costs and insurance costs. There is also the risk of damage and obsolescence. Costs may also be saved due to the simplification of the accounting system consequent upon deliveries going straight into production, outputs from one process feeding directly into the next and finished goods being dispatched immediately to the customer.

It is this focus on constant flow and the need to be able to respond to demand immediately that has led to significant improvements in set-up times, the quality of inputs, throughput and output and the reliability of processes.

PROBLEM 15.37 (45 minutes) Economic order quantity; effects of JIT purchasing: wholesaler

- 1** (a) The ordering cost per order is composed of the following costs:

Inspection fee	\$47.00
Direct labour: receiving clerk (4 hours × \$24.00)	96.00
Variable overhead (4 hours × \$6.00)	24.00
Processing cost*	<u>5.80</u>
Total ordering cost per order	<u>\$172.80</u>

$$\text{* Processing cost per order} = \frac{\text{change in ordering cost}}{\text{change in number of orders}}$$

$$= \frac{\$12\,700 - \$12\,300}{97 - 17}$$

$$= \frac{\$400}{80}$$

$$= \$5.00$$

$$\text{Recognition of 16\% cost increase} = \$5.00 \times 1.16$$

$$= \$5.80$$

- (b) The storage cost per windshield is composed of the following costs:

Variable warehouse rent (fixed fee not relevant)	\$6.25
Breakage cost	4.00
Taxes and fire insurance	1.25
Other storage costs	<u>8.50</u>
Total storage cost per windshield	<u>\$ 20.00</u>

- (c) The economic order quantity (EOQ) is calculated as follows:

$$\text{EOQ} = \sqrt{\frac{(2)(10\,800)(\$172.80)}{\$20.00}}$$

$$= \sqrt{186\,624}$$

$$= 432 \text{ windshields per order}$$

- (d) The minimum annual relevant cost at the economic order quantity is calculated as follows:

$$\text{Minimum cost} = \text{ordering cost} + \text{storage cost}$$

$$= \frac{10\,800}{432} \times \$172.80 + \frac{432}{2} \times \$20.00$$

$$= \$4\,320 + \$4\,320$$

$$= \$8\,640$$

- (e) The reorder point in units is calculated as follows:

$$\text{Usage per day} \times \text{lead time in days} = 36^* \text{ units} \times 6 \text{ days}$$

$$= 216 \text{ windshields}$$

$$* 10\,800 \div 50 \text{ weeks} \div 6 \text{ days}$$

2 Computation of EOQ using the given data as follows:

$$\begin{aligned} \text{(a)} \quad \text{EOQ} &= \sqrt{\frac{(2)(10\,800)(\$32.40)}{\$60.00}} \\ &= \sqrt{11\,664} = 108 \text{ windshields per order} \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad \text{Number of orders per year} &= \frac{\text{annual requirement}}{\text{order quantity}} = \frac{10\,800}{108} \\ &= 100 \text{ orders} \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad \text{Minimum cost} &= \text{ordering cost} + \text{storage cost} \\ &= \frac{10\,800 \times \$32.40}{108} + \frac{108 \times \$60.00}{2} \\ &= \$3\,240 + \$3\,240 \\ &= \$6\,480 \end{aligned}$$

CASE 15.45 (60 minutes) Supplier selection; supplier costs; supplier performance measures; JIT systems: manufacturer

1 & 2 Following is the computation of cost per unit of activity driver for each of the supplier-related activity:

	A	B	C	D	E	F
1		Activity cost per unit of activity driver (\$)	No. of activities	Hot Exhausts \$ (A*B)	No. of activities	Chrome Manufacturer \$ (A*C)
2	Activity					
3	Order components	300.00	90	27,000.00	130	39,000.00
4	Receive order	900.00	90	81,000.00	150	135,000.00
5	Return components	700.00	15	10,500.00	16	11,200.00
6	Receive late delivery	2,000.00	6	12,000.00	28	56,000.00
7	Downtime: Late delivery	3,000.00	45	135,000.00	59	177,000.00
8	Downtime: Defective material	1,200.00	20	24,000.00	29	34,800.00
9	Process invoice	350.00	12	4,200.00	130	45,500.00
10	Disputed invoice	800.00	3	2,400.00	8	6,400.00
11	Quality audit	50,000.00	1	50,000.00	2	100,000.00
12	Total supplier activity costs (A)			346,100.00		604,900.00
13	No. units purchased (B)			3,000.00		4,000.00
14	Supplier cost per unit (C) (A/B)			115.37		151.23
15	Purchase cost per unit (D)			100.00		90.00
16	Total cost of ownership per unit (C+D)			215.37		241.23
17	Supplier performance index (C/D)			1.15		1.68

- 3** By comparing the supplier performance index and the total cost of ownership per unit, Hot Exhausts is clearly a more cost effective supplier to deal with, despite Chrome having the cheaper purchase cost per unit. Even though 25 per cent additional material is purchased from Chrome, there are a disproportionately high number of orders, deliveries, late deliveries, invoices and disputes over invoices. The high number of late deliveries by Chrome is particularly expensive, as are the number of invoices processed.

- 4 A reduced number of late deliveries by Chrome Manufacturers would make it more competitive than Hot Exhausts in term of total purchase and supplier cost per unit, as the total costs per unit is \$211.475, about \$4 less per unit than Hot Exhausts. However, Chrome is still inefficient in term of supplier cost per unit, as it still has \$6 higher supplier costs per unit (\$121.475) than Hot Exhausts. The supplier performance index also shows a higher ratio (1.35) for Chrome, indicating its higher supplier costs. Supporting spreadsheet as follows:

	A	B	C	D	E	F
1		Activity cost per unit of activity driver (\$)	No. of activities	Hot Exhausts\$ (A*B)	No. of activities	Chrome Manufacturer \$ (A*C)
2	Activity					
3	Order components	300.00	90	27,000.00	130	39,000.00
4	Receive order	900.00	90	81,000.00	150	135,000.00
5	Return components	700.00	15	10,500.00	16	11,200.00
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7	Downtime: Late delivery	3,000.00	45	135,000.00	30	90,000.00
8	Downtime: Defective material	1,200.00	20	24,000.00	29	34,800.00
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11	Quality audit	50,000.00	1	50,000.00	2	100,000.00
12	Total supplier activity costs (A)			346,100.00		485,900.00
13	No. units purchased (B)			3,000.00		4,000.00
14	Supplier cost per unit (C) (A/B)			115.37		121.48
15	Purchase cost per unit (D)			100.00		90.00
16	Total cost of ownership per unit (C+D)			215.37		211.48
17	Supplier performance index (C/D)			1.15		1.35

- 5 There are several changes that could be made to save costs. For example, Chrome Manufacturers could be encouraged to send invoices that cover more than one delivery and to improve the timeliness of delivery and the accuracy of invoiced amounts. If this is not possible, Fast Lane may want to order exclusively from Hot Exhausts. Even though this company charges more per unit, it is clearly a more efficient supplier to deal with. If Hot Exhausts is able to supply the extra volume needed, then this could be the easiest solution to implement.

- 6 Fast Lane evaluates supplier performance using four criteria.

Performance Criteria	Measures
Delivery on-time	Percentage of orders delivered on schedule
	Hours of downtime due to late delivery
Accuracy of order received	Percentage of orders delivered in full
	Number of orders returned due to inaccurate order
Orders rejected on delivery	Percentage of orders rejected
	Decrease in no of orders rejected
Reduction in supplier production costs	Supplier's reduction in cost per component per year
	Increase in productivity per year

- 7 The implementation of electronic systems for transactions with suppliers would eliminate or reduce cost to both the supplier and manufacturer. These include costs associated with raising purchase orders, processing invoices, raising cheques and reduced inspection time. Other advantages that might accrue to both Fast Lane and suppliers from the electronic system are speedy communications and easy coordination in components' delivery and technical requirements. This could lead to a reduction of production downtime due to late delivery and to better quality components delivered.