

SOLUTIONS MANUAL

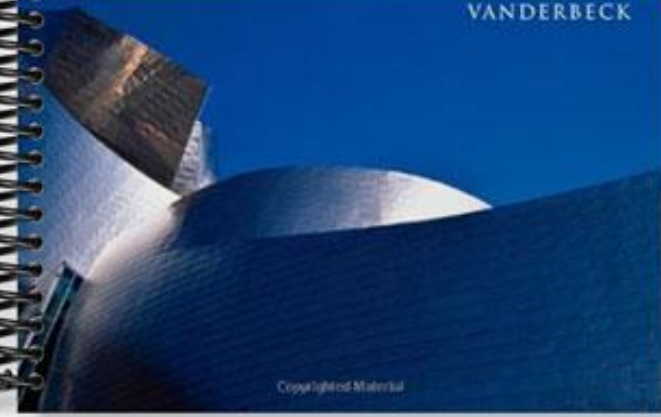
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Principles of **COST
ACCOUNTING**

VANDERBECK

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CHAPTER 2

QUESTIONS

1. The two major objectives of materials control are (1) physical control or safeguarding the materials and (2) control of the investment in materials.

2. The controls established for safeguarding materials include limiting access to the materials area, segregating the duties of employees involved with materials, and assuring that materials records are being maintained accurately.

Limiting access involves placing inventories in storage areas that can be entered only by authorized personnel and restricting the release of any material or finished goods to individuals who have properly authorized documents. Control procedures that limit access to work in process areas should be established within each department or production station.

The segregation of duties involves assigning different people to different functions. Employees assigned to purchasing should not also be assigned to receiving, storage, or recording functions, etc.

The accurate recording of purchases and issuances of materials facilitates comparing the recorded materials on hand to the actual materials on hand. If a substantial difference between the recorded and actual quantities is discovered, it can be quickly determined and investigated.

3. Management should consider production and working capital requirements along with alternative uses of available funds which might yield a greater return. Consideration should also be given to the cost of materials handling, storage, and insurance protection against fire, theft, and other casualty losses. In addition, the possibility of loss from damage, spoilage, and obsolescence should not be overlooked.

4. *Order point* is the time to place an order for additional material because the level of stock has reached a predetermined minimum established by management.

5. In order to determine an order point, the information available should include the:

- (1) anticipated daily usage of the material,
- (2) lead time interval, and
- (3) safety stock required.

The anticipated usage requirement should be founded upon the number of units expected to be completed daily and the quantity of material each completed unit will require.

The lead time interval involves the typical period of time required between placing the order and receiving the shipment.

The safety stock is the minimum stock on hand needed to prevent running out of stock due to errors in calculations of usage, delivery delays, poor quality of merchandise received, and so on.

6. The *economic order quantity (EOQ)* is the calculated size of an order which minimizes the total cost of ordering and carrying the inventory over a specified period of time. It is a function of the cost of placing an order, the number of units required annually, and the carrying cost per unit of inventory

7. The cost of placing an order, the number of units required annually, and the annual carrying cost per unit in inventory are the items needed to calculate the economic order quantity.

8. The cost of an order includes the salaries and wages of employees who purchase, receive, and inspect materials; the expenses incurred for telephone, fax usage, postage, and forms; and the accounting and record keeping associated with inventories.

9. The *carrying cost* of materials inventory includes the cost of storage and handling; the amount of interest lost on alternative investments; the losses due to obsolescence, spoilage, and theft; the cost of insurance and property taxes; and the cost of maintaining accounting records and controls over the inventory.

10. a. Purchasing agent duties include:

(1) Coordinating materials requirements with production to prevent delays in production due to inadequate materials supply on hand.

(2) Compiling and maintaining a vendor file from which materials can be promptly obtained at the best available prices. (*Note to Instructor:* You may take this opportunity to explain to the student that the "lowest" price

may not always be the "best" price.) The purchasing agent should also consider the quantity to be ordered at one time to get a lower unit price, the quality of the material, the time lapse before delivery, the credit terms, and the reliability of the vendor.

- (3) Placing purchase orders for materials needed.
 - (4) Supervising the purchase order process until materials are received.
 - (5) Verifying purchase invoices and approvals for payment.
- b. The receiving clerk is responsible for supervising the receipt of incoming shipments. These duties include checking the quantity and quality. At times, the assignment may include checking the process.
 - c. The storeroom keeper's usual duties include properly storing all materials received, issuing materials only when proper authorization is presented, and keeping the purchasing agent informed of the quantities on hand.
 - d. The production supervisor is responsible for maintaining production and for preparing or approving requisitions for the quantities and kinds of materials needed for current production.
11. A *purchase requisition* is used by the storeroom keeper to provide the purchasing agent with information concerning the materials to be ordered. A *purchase order* is a document completed by the purchasing agent and sent to a vendor to order the materials.
 12. The purchasing agent compares the vendor's invoice to the purchase order to ascertain that there is agreement between the description of the materials, the prices, and the terms of purchase. The method of shipment and the date of delivery are checked to see that they conform with the instructions on the purchase order.
 13. Many manufacturing firms use forms somewhat similar to those shown in the text; however, most firms design forms to meet their specific requirements. These specially designed forms usually perform the same functions as those depicted in the text but may vary in appearance. For example, a purchase order will provide for recording all essential information to obtain materials from selected vendors, regardless of the design or format. Also, many firms now use electronic data interchange to communicate with suppliers and expedite the receipt of orders.
 14. The internal control procedures established for incoming shipments should provide the following safeguards:
 - a. A receiving report prepared by the receiving clerk authenticates the quantity of specific items ordered and verifies that they were received in good condition.
 - b. A copy of the receiving report should accompany the materials received when they are moved from the receiving area to the storeroom. As materials are placed in location, the storeroom keeper should review and substantiate the quantities received per the receiving report.
 - c. The cost and quantity of each item on the approved invoice are independently recorded in the materials ledger.
 - d. The total of the invoice is independently recorded in the purchases journal to be subsequently posted to the appropriate general ledger accounts.
 - e. The invoice for materials purchased should not be approved for payment until the purchasing agent reviews and approves the following details on the invoice:
 - (1) The unit prices and materials descriptions on the invoice are compared with similar data on the purchase order.
 - (2) The extensions of unit prices and totals are verified.
 - (3) The terms of payment and any other charges are verified with the purchase order.
 - (4) The method of shipment and date of delivery are verified.
 15. The purpose of a *debit-credit memorandum* is to inform the vendor that an adjustment has been made to the vendor's account. The information on the memo includes the amount of the adjustment, the reason for the adjustment, and the type and quantity of materials involved.
 16. The originators of the various forms are:

Forms	Source
a. Purchase requisition	Storeroom keeper
b. Purchase order	Purchasing agent

- c. Receiving report Receiving clerk
- d. Materials requisition Production supervisor
- e. Debit-credit memorandum Purchasing agent

17. A *materials ledger* is a subsidiary ledger in which individual accounts are kept for each item of material carried in stock. The materials account in the general ledger is the control account for the materials ledger.
18. a. *First-in, first-out*: It is assumed that materials issued are from the oldest materials in stock. They were the first purchased and are costed at the prices paid for these earliest purchases. The cost of the ending inventory will reflect the most recent prices paid for the most recent purchases.
- b. *Last-in, first-out*: It is assumed that materials issued are from the most recent stock. The last purchased will be the first used at the prices paid for these latest purchases. The ending inventory will be costed at the prices paid for the earliest purchases.
- c. *Moving average*: Under this method, no attempt is made to identify the materials issued as to the time of purchase. The average unit price of all materials in stock is maintained; therefore, materials issued are costed on a basis of average prices. Unit cost changes each time unit purchase prices change; therefore, ending inventory will be priced at the latest average cost.
19. In a period of rising prices, the LIFO method estimates the cost of goods sold using the material purchased at the highest prices. Such costs, when matched to sales for the period are believed to more accurately reflect the gross margin earned. The lower income, resulting from the use of LIFO, means that a smaller amount of taxes will be paid than if some other method were used. Since LIFO leaves the earlier costs of purchases in inventory, the overall value of the material on hand at the end of a period will be more conservatively stated than if FIFO were used. This lower valuation of materials inventory, which affects both the income statement and the balance sheet, may be an advantage or a disadvantage depending on the use made of the balance sheet. The lower valuation is an advantage when property taxes are assessed on the dollar amount of inventory on hand. However, it

may be a disadvantage if the financial statements are to be used with a loan application and a larger dollar value of inventory would add to the appearance of the company's financial position.

Many companies, when prices are rising, adopt LIFO to minimize the income tax effects and believe that in such economic trends the costs charged against sales more accurately depict reality.

- | 20. | Entries | Source of Data |
|-----|---|------------------------|
| a. | Debits in materials ledger to record materials purchased | Receiving report |
| b. | Credits in materials ledger to record materials requisitioned | Materials Requis. form |
| c. | Debits in job cost ledger to record materials placed in process | Materials Requis. form |
21. In a just-in-time manufacturing system, materials are not received from suppliers until they are ready to be put into process. The work is not done in one department until the subsequent department is ready to work on it. This approach differs from a traditional manufacturing system where materials are ordered and stored well in advance of production, and departments stockpile partially completed units until the next department is ready for them.
22. A traditional "push" manufacturing system produces goods for inventory in the hope that the demand for these goods will then be created. In a JIT "pull" manufacturing system, the credo is "Don't make anything for anybody until they ask for it".
23. Disadvantages of a "push" manufacturing system include having too many dollars invested in inventory; defects not being detected because partially completed goods are inventoried rather than completed immediately; obsolete products due to the long lead time from start to finish.
24. The *throughput time* is the time that it takes a unit to make it through the production system, and it is computed by dividing the number of units in work in process by the number of units completed each day to obtain a measure in days. *Velocity* also measures the speed with which units are produced in the system, but in percentage

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terms relative to past production; for example, velocity increased by 50%.

25. Advantages of producing all units in a single cell include: fewer and shorter movements of materials; production in smaller lot sizes because other products do not have to be made in the same cell; more worker motivation and satisfaction due to the teamwork approach within the cell.
26. Critics of "backflush" costing argue that it is not consistent with GAAP because it does not accurately account for inventories. Proponents of "backflush" costing argue that Work in Process and Finished Goods are immaterial in a lean production environment and, therefore, their omission does not materially misstate the financial statements.
27. If the value of the scrap is high, an inventory file should be prepared showing the quantity and market value. If both quantity and market value are known, an inventory account should be debited while an account such as Scrap Revenue is credited. If the market value of the scrap is unknown, a journal entry cannot be made until the scrap is sold, at which time Cash (or Accounts Receivable) is debited and Scrap Revenue is credited.
28. *Spoiled work* represents products which are not first quality by the company's standards and have imperfections that will not be corrected. They are sold as irregular units, called *seconds*. *Defective work* also includes goods that are not first quality by the established standard but have imperfections that will be corrected, making them first-quality products.

EXERCISES

E2-1

- a. 500 lbs. x 7 days 3,500 lbs.
 Required safety stock..... 2,500
 Order point 6,000 lbs.
- b. 500 lbs. x 4 days = 2,000 lbs.

E2-2

$$\begin{aligned}
 \text{a. EOQ} &= \sqrt{\frac{2 \text{ CN}}{K}} \\
 &= \sqrt{\frac{2 \times \$72 \times 360,000}{\$4}} \\
 &= \sqrt{\frac{\$51,840,000}{\$4}} \\
 &= \sqrt{12,960,000} \\
 &= 3,600 \text{ gallons}
 \end{aligned}$$

- b. 360,000 gals. (annual usage) ÷ 3,600 gals. (per order) = 100 orders
- | | |
|---|-----------------|
| Ordering cost: 100 orders @ \$72 per order | \$ 7,200 |
| Carrying cost: (3,600 gals. ÷ 2) @ \$4.00 per gals..... | <u>7,200</u> |
| Total order and carrying cost | <u>\$14,400</u> |

E2-3

- Storeroom keeper
- Purchasing agent
- Receiving clerk
- Purchasing agent
- Production department supervisor

E2-4

Work in Process	68,000	
Factory Overhead	4,800	
Materials		72,800
To record materials used during the month of June.		

E2-5

a.	Materials.....	200,000	
	Accounts Payable		200,000
b.	Work in Process.....	175,000	
	Materials.....		175,000
c.	Factory Overhead	12,000	
	Materials.....		12,000
d.	Materials.....	2,500	
	Work in Process.....		2,500
e.	Accounts Payable	1,800	
	Materials.....		1,800
f.	Accounts Payable	165,000	
	Cash		165,000

E2-6

First-in, first-out method

Date	RECEIVED			ISSUED			BALANCE		
	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
7/1							1,000	4.00	4,000.00
7/3				250	4.00	1,000.00	750	4.00	3,000.00
7/5	500	4.50	2,250.00				750	4.00	}
							500	4.50	
7/6				150	4.00	600.00	600	4.00	}
							500	4.50	
7/10				110	4.00	440.00	490	4.00	}
							500	4.50	
7/11				(10)	4.00	(40.00)	500	4.00	}
							500	4.50	
7/15	500	5.00	2,500.00				500	4.00	}
							500	4.50	
							500	5.00	
7/20	(300)	5.00	(1,500.00)				500	4.00	}
							500	4.50	
							200	5.00	
7/26				500	4.00	2,000.00	400	4.50	}
				100	4.50	450.00	200	5.00	

Cost of materials used (issued): \$4,450

Cost of 7/31 inventory: \$2,800

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E2-7

Last-in, first-out method

Date	RECEIVED			ISSUED			BALANCE		
	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
7/1							1,000	4.00	4,000.00
7/3				250	4.00	1,000.00	750	4.00	3,000.00
7/5	500	4.50	2,250.00				750	4.00	} 5,250.00
							500	4.50	
7/6				150	4.50	675.00	750	4.00	} 4,575.00
							350	4.50	
7/10				110	4.50	495.00	750	4.00	} 4,080.00
							240	4.50	
7/11				(10)	4.50	(45.00)	750	4.00	} 4,125.00
							250	4.50	
7/15	500	5.00	2,500.00				750	4.00	} 6,625.00
							250	4.50	
							500	5.00	
7/20	(300)	5.00	(1,500.00)				750	4.00	} 5,125.00
							250	4.50	
							200	5.00	
7/26				200	5.00	1,000.00			
				250	4.50	1,125.00			
				150	4.00	600.00	600	4.00	2,400.00

Cost of materials used (issued): \$4,850

Cost of 7/31 inventory: \$2,400

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E2-8

Moving average method

Date	RECEIVED			ISSUED			BALANCE		
	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
7/1							1,000	4.00	4,000.00
7/3				250	4.00	1,000.00	750	4.00	3,000.00
7/5	500	4.50	2,250.00				1,250	4.20	5,250.00
7/6				150	4.20	630.00	1,100	4.20	4,620.00
7/10				110	4.20	462.00	990	4.20	4,158.00
7/11				(10)	4.20	(42.00)	1,000	4.20	4,200.00
7/15	500	5.00	2,500.00				1,500	4.4667	6,700.00
7/20	(300)	5.00	(1,500.00)				1,200	4.3333	5,200.00
7/26				600	4.3333	2,600.00	600	4.3333	2,600.00

Cost of materials used (issued): \$4,650

Cost of 7/31 inventory: \$2,600

E2-9

Inventory Method	Cost Transferred to Work in Process	Cost of Ending Inventory
FIFO	\$4,450	\$2,800
LIFO	4,850	2,400
Moving average	4,650	2,600

In a period of constantly rising prices as illustrated in the problem, the LIFO method of inventory pricing will result in the highest cost being charged to revenue; the FIFO method will result in the lowest cost being charged against revenue; and the moving average method will result in a cost between the other two. Theoretically, LIFO provides a better “matching of costs with revenue” because the inventory sold will have to be replaced at current prices. In a period of falling prices, the reverse will be true, with the moving average method again falling in between the other two.

E2-10

- The FIFO method which results in the most recent purchases being costed in ending inventory indicates that materials costs have continued to increase over the three-year period.
- FIFO would show the highest net income for 2011. The information given indicates that prices rose during the year. Using FIFO, the cost of goods sold would be charged with the oldest materials costs, which during a time of rising prices would be the lowest materials costs.
- LIFO would show the lowest net income for 2013, because it would continue to charge the latest and highest costs to the products sold while the other two methods would be less affected by the rising cost of the more recent purchases.
- FIFO would show the highest net income for the three years combined, because it consistently charges the earliest, lower costs to the product, thereby increasing the yearly net income.

E2-11

a.	1.	Materials	23,750	
		Accounts Payable.....		23,750
	2.	Work in Process	19,250	
		Materials.....		19,250
	3.	Materials	1,200	
		Work in Process		1,200
	4.	Factory Overhead	2,975	
		Materials.....		2,975
	5.	Materials	385	
		Factory Overhead.....		385

b.

Materials				Factory Overhead			
Bal.	5,000	(2)	19,250	(4)	2,975	(5)	385
(1)	23,750	(4)	2,975				
(3)	1,200		22,225		2,590		
(5)	385						
	30,335						
	8,110						
Work in Process				Accounts Payable			
(2)	19,250	(3)	1,200		(1)	23,750	
	18,050						

c. \$8,110

E2-12

1. $40,000/10,000 = 4$ days
2. $40,000 - (40,000 \times .75) = 10,000$
 $10,000/10,000 = 1$ day

E2-13

a. Raw and In-Process	80,000	
Accounts Payable		80,000
b. No entry.		
c. Conversion Costs	10,000	
Payroll		10,000
d. Conversion Costs	60,000	
Various Credits		60,000
e. Finished Goods	150,000	
Raw and In-Process		80,000
Conversion Costs		70,000
f. Accounts Receivable	225,000	
Sales		225,000
Cost of Goods Sold	150,000	
Finished Goods		150,000

E2-14

e. No entry		
f. Cost of Goods Sold	150,000	
Raw and In-Process		80,000
Conversion Costs		70,000

E2-15

a. Scrap Materials	125	
Factory Overhead (Scrap)		125
Cash	125	
Scrap Materials		125
b. No entry at the time scrap is identified		
At the time of sale:		
Cash	75	
Factory Overhead (Scrap)		75

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c. No entry at the time scrap is identified		
At the time of sale:		
Accounts Receivable	85	
Work in Process		85
d. No entry at the time scrap is identified		
At the time of sale:		
Cash	40	
Scrap Revenue		40

E2-16

a. Work in Process	108,000	
Materials.....		36,000
Payroll		48,000
Factory Overhead		24,000
Spoiled Goods	995	
Factory Overhead (Loss Due to Spoiled Work)	355*	
Work in Process		1,350
*Unit cost of completed work:		
\$108,000 ÷ 8,000 skirts	\$13.50	
Sale of spoiled work as seconds	<u>9.95</u>	
Loss due to spoiled work	<u>\$3.55</u>	
100 units x \$3.55 = \$355		

b. Work in Process	108,000	
Materials.....		36,000
Payroll		48,000
Factory Overhead		24,000
Spoiled Goods	995	
Work in Process		995

E2-17

a. Factory Overhead (Loss Due to Defective Work)	300	
Materials.....		150
Payroll		100
Factory Overhead		50
b. Work in Process	300	
Materials.....		150
Payroll		100
Factory Overhead		50

PROBLEMS

P2-1

$$\begin{aligned}
 1. \text{ Order Point} &= \text{Expected Usage During Lead Time} + \text{Safety Stock} \\
 &= (200 \text{ units per day} \times 5 \text{ days}) + 500 \text{ units} \\
 &= 1,500 \text{ units}
 \end{aligned}$$

$$\begin{aligned}
 2. \text{ EOQ} &= \sqrt{\frac{2 \text{ CN}}{K}} \\
 &= \sqrt{\frac{2 \times \$50 \times 25,000}{\$.10}} \\
 &= \sqrt{25,000,000} \\
 &= 5,000 \text{ units}
 \end{aligned}$$

$$\begin{aligned}
 3. \text{ 25,000 units (annual usage)} \div 5,000 \text{ units (per order)} &= 5 \text{ orders} \\
 \text{Ordering cost: 5 orders @ \$50 per order} &= \underline{\$250}
 \end{aligned}$$

$$\begin{aligned}
 \text{Average number of units in inventory} &= (1/2 \times \text{EOQ}) + \text{Safety Stock} \\
 &= (1/2 \times 5,000) + 500 \\
 &= 3,000
 \end{aligned}$$

$$\begin{aligned}
 \text{Carrying Cost} &= \text{Average Inventory} \times \text{Carrying Cost per Unit} \\
 &= 3,000 \times \$.10 = \underline{\$300}
 \end{aligned}$$

$$\begin{aligned}
 \text{Total Cost} &= \text{Order Costs} + \text{Carrying Costs} \\
 &= \$250 + \$300 = \underline{\$550}
 \end{aligned}$$

(Note that when there is safety stock, the carrying cost does not equal the order cost at the EOQ.)

P2-2

Order Size	Number of Orders	Order Cost	Ave Inv	Carrying Cost	Order & C. C.
300	67	\$1,340	150	\$ 750	\$2,090
400	50	1,000	200	1,000	2,000
500	40	800	250	1,250	2,050
600	34	680	300	1,500	2,180
700	29	580	350	1,750	2,330
800	25	500	400	2,000	2,500

P2-3

1. Average number of gals. In inventory = $(1/2 \times \text{EOQ}) + \text{Safety Stock}$
 $= (1/2 \times 400) + 500 = 700 \text{ gals.}$
2. Carrying costs = Average inventory x Carrying Cost per Unit
 $= 700 \text{ gals.} \times \$5 = \$3,500$
3. The total order cost is still \$1,000. It does not differ from the answer in P2-2, because the number of orders will be the same.

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P 2-4

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1. a. FIFO costing

MATERIALS LEDGER											
Description <u>Rubber gaskets</u>								Materials Ledger Account No. <u>11,216</u>			
RECEIVED					ISSUED				BALANCE		
Date	Rec. Rep. No.	Quantity	Unit Price	Amount	Mat. Req. No.	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
11/1									30,000	3.00	90,000.00
11/4	112	10,000	3.10	31,000.00					30,000	3.00	} 121,000.00
									10,000	3.10	
11/5					49	30,000	3.00	90,000.00	10,000	3.10	31,000.00
11/8	113	50,000	3.30	165,000.00					10,000	3.10	} 196,000.00
									50,000	3.30	
11/15					50	10,000	3.10	} 64,000.00			
						10,000	3.30		40,000	3.30	132,000.00
11/22	114	25,000	3.50	87,500.00					40,000	3.30	} 219,500.00
									25,000	3.50	
11/28					51	30,000	3.30	99,000.00	10,000	3.30	} 120,500.00
									25,000	3.50	

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P2-4 Continued

b. LIFO costing

MATERIALS LEDGER												
Description <u>Rubber gaskets</u>							Materials Ledger Account No. <u>11,216</u>					
RECEIVED					ISSUED				BALANCE			
Date	Rec. Rep. No.	Quantity	Unit Price	Amount	Mat. Req. No.	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	
11/1									30,000	3.00	90,000.00	
11/4	112	10,000	3.10	31,000.00					30,000	3.00	}	
									10,000	3.10		121,000.00
11/5					49	10,000	3.10	}				
						20,000	3.00		91,000.00	10,000	3.00	30,000.00
11/8	113	50,000	3.30	165,000.00					10,000	3.00	}	
									50,000	3.30		195,000.00
11/15					50	20,000	3.30	66,000.00	10,000	3.00	}	
									30,000	3.30		129,000.00
11/22	114	25,000	3.50	87,500.00					10,000	3.00	}	
									30,000	3.30		
									25,000	3.50		216,500.00
11/28					51	25,000	3.50	}				
						5,000	3.30		104,000.00	10,000	3.00	}
									25,000	3.30	112,500.00	

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P2-4 Continued

c. Moving average costing

MATERIALS LEDGER											
Description <u>Rubber gaskets</u>							Materials Ledger Account No. <u>11,216</u>				
RECEIVED					ISSUED				BALANCE		
Date	Rec. Rep. No.	Quantity	Unit Price	Amount	Mat. Req. No.	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
11/1									30,000	3.00	90,000.00
11/4	112	10,000	3.10	31,000.00					40,000	3.025	121,000.00
11/5					49	30,000	3.025	90,750.00	10,000	3.025	30,250.00
11/8	113	50,000	3.30	165,000.00					60,000	3.25417	195,250.00
11/15					50	20,000	3.25417	65,083.40	40,000	3.25417	130,166.50
11/22	114	25,000	3.50	87,500.00					65,000	3.34872	217,666.60
11/28					51	30,000	3.34872	100,461.60	35,000	3.34872	117,205.00

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P2-4 Concluded

2.

Inventory Method	Cost Transferred to Work in Process	Cost of Ending Inventory
FIFO	\$253,000	\$120,500
LIFO	261,000	112,500
Moving average	256,295	117,205

3. Probably LIFO because it will come closer to matching current costs with current revenues. When costs are rising, revenues are usually increasing; therefore, the resulting gross profit under LIFO will reflect the company's product profitability more accurately. Other inventory factors that should be given consideration in selecting any method are: the dollar amount of the inventories; the magnitude of the price changes; the direction of the price changes, whether rising or falling; and the length of the inventory cycle. Also, adopting LIFO in periods of rising prices will result in the minimization of income taxes.
4. In a period of rising prices, the balance sheet inventory under either method will most likely be less than the current market prices. However, as shown by the problem, the lowest figure for ending inventory will be reported when LIFO is used. LIFO charges the higher materials cost to Cost of Goods Sold whereas FIFO defers more of the higher cost to the inventory on hand.

P2-5

Commented [TU3]: Needs a LOT of formatting

apter 2

1. FIFO method

MATERIALS LEDGER											
Description Plastic tubing (ft.) _____							Materials Ledger Account No. <u>906</u>				
RECEIVED					ISSUED				BALANCE		
Date	Rec. Rep. No.	Quantity	Unit Price	Amount	Mat. Req. No.	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
2/1									1,200	2.76	3,312.00
2/5					108	60	2.76	165.60	1,140	2.76	3,146.40
2/11					210	200	2.76	552.00	940	2.76	2,594.40
2/14	634	800	2.80	2,240.00					940	2.76	} 4,834.40
									800	2.80	
2/15					274	400	2.76	1,104.00	540	2.76	} 3,730.40
									800	2.80	
2/16	Ret.	(90)	2.80	(252.00)					540	2.76	} 3,478.40
									710	2.80	
2/18	712	1,000	2.83	2,830.00					540	2.76	} 6,308.40
									710	2.80	
									1,000	2.83	
2/21					318	540	2.76	1,490.40			} 4,538.00
						100	2.80	280.00	610	2.80	
									1,000	2.83	

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P2-5 Continued

2. LIFO method

MATERIALS LEDGER											
Description <u>Plastic tubing (ft.)</u>								Materials Ledger Account No. <u>906</u>			
RECEIVED					ISSUED				BALANCE		
Date	Rec. Rep. No.	Quantity	Unit Price	Amount	Mat. Req. No.	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
2/1									1,200	2.76	3,312.00
2/5					108	60	2.76	165.60	1,140	2.76	3,146.40
2/11					210	200	2.76	552.00	940	2.76	2,594.40
2/14	634	800	2.80	2,240.00					940	2.76	} 4,834.40
									800	2.80	
2/15					274	400	2.80	1,120.00	940	2.76	} 3,714.40
									400	2.80	
2/16	Ret.	(90)	2.80	252.00					940	2.76	} 3,462.40
									310	2.80	
2/18	712	1,000	2.83	2,830.00					940	2.76	} 6,292.40
									310	2.80	
									1,000	2.83	
2/21					318	640	2.83	1,811.20	940	2.76	} 4,481.20
									310	2.80	
									360	2.83	

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P2-5 Concluded

3. Moving average method

MATERIALS LEDGER											
Description <u>Plastic tubing (ft.)</u>							Materials Ledger Account No. <u>906</u>				
RECEIVED					ISSUED				BALANCE		
Date	Rec. Rep. No.	Quantity	Unit Price	Amount	Mat. Req. No.	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
2/1									1,200	2.76	3,312.00
2/5					108	60	2.76	165.60	1,140	2.76	3,146.40
2/11					210	200	2.76	552.00	940	2.76	2,594.40
2/14	634	800	2.80	2,240.00					1,740	2.7784	4,834.42
2/15					274	400	2.7784	1,111.36	1,340	2.7784	3,723.06
2/16	Ret.	(90)	2.80	(252.00)					1,250	2.7768	3,471.06
2/18	712	1,000	2.83	2,830.00					2,250	2.8005	6,301.04
2/21					318	640	2.8005	1,792.32	1,610	2.8005	4,508.72

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P2-6

1.			
a.	Materials	74,000	
	Accounts Payable		74,000
b.	Work in Process	57,000	
	Factory Overhead	11,000	
	Materials		68,000
c.	Materials	1,100	
	Work in Process		1,100
d.	Accounts Payable	2,500	
	Materials		2,500
e.	Accounts Payable	68,500	
	Cash		68,500

2.

Cash				Accounts Payable			
Bal.	82,250	(e)	68,500	(d)	2,500	Bal.	21,000
	13,750			(e)	68,500	(a)	74,000
					71,000		95,000
							24,000
Materials				Factory Overhead			
Bal.	29,500	(b)	68,000	(b)	11,000		
(a)	74,000	(d)	2,500				
(c)	1,100		70,500				
	104,600						
34,100							
Work in Process							
Bal.	27,000	(c)	1,100				
(b)	57,000						
	84,000						
82,900							

3. a.	Cash balance	\$ 13,750
b.	Inventory of materials on hand	34,100
c.	Accounts payable	24,000

P2-7

1. and 2.

- a. The company purchased materials costing \$22,000. (Forms used: receiving report and vendor's invoice.)
- b. The storeroom issued direct materials to the factory in the amount of \$19,000. (Form used: materials requisitions.)
- c. The direct labor cost was \$17,000.
- d. Factory overhead in the amount of \$12,000 was charged to jobs in process.
- e. Jobs having a total cost of \$47,500 were completed in the factory and transferred to the finished goods storeroom.
- f. Total cost of goods sold during the month was \$55,000.

3. Ending Inventories:

Materials.....	\$10,000
Work in Process.....	4,100
Finished Goods.....	4,150

P2-8

1.

	a.	b.	c.	d.
Date	Form	Journal Entry	Book of Original Entry	Subsidiary Ledger
Mar. 31	Purchase Requisition (for 1,800 aluminum sheets)	None	None	None
Apr. 1	Purchase Order	None	None	Materials Ledger (if "On Order" column is used)
Apr. 6	Receiving Report Vendor's Invoice	Materials..... 42,500 Accounts Payable.....42,500 (1,700 sheets @ \$25)	Purchases Journal	Materials Ledger
Apr. 11	Receiving Report Vendor's Invoice	Materials..... 2,500 Accounts Payable2,500 (100 sheets @ \$25)	Purchases Journal	Materials Ledger
Apr. 16	Approved Invoice	Accounts Payable.....42,500 Cash41,650 Purchases Discount..... 850	Cash Payments Journal	None

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P2-8 Concluded

	a.	b.	c.	d.
Date	Form Used	Journal Entry	Book of Original Entry Used	Subsidiary Records Affected
Apr. 30	Materials Requisition	Work in Process..... 46,500 Materials..... 46,500 $\left[\begin{array}{r} 500 \times \$23 = \$11,500 \\ 1,400 \times \$25 = \underline{35,000} \\ \hline \$46,500 \end{array} \right]$	General Journal	Materials Ledger Job Cost Ledger
Apr. 30	Returned Materials Report	Materials..... 500 Work in Process..... 500 (20 sheets @ \$25)	General Journal	Materials Ledger Job Cost Ledger
Apr. 30	Inventory Report	Factory Overhead (Inventory Short and Over).... 550 Materials..... 550 (22 sheets* @ \$25) *420 unused sheets - 398 sheets on hand	General Journal	Stores Ledger Factory Overhead Ledger

2.

$$\left[\begin{array}{r} 500 \times \$23 = \$11,500 \\ 1,380 \times \$25 = \underline{34,500} \\ \hline \$46,000 \end{array} \right]$$

a. \$9,950 (398 × \$25) b. \$46,000 (\$46,500 - \$500)

P2-9

1. $200,000/50,000 = 4$ days
2. $25\% \times \$1,000,000 = \$250,000$
3. $[(200,000 \times (1 - .50)]/50,000 = 2$ day
4. By reducing the average work in process by 50% while keeping the daily production constant, the velocity of production doubled.
5. $25\% \times (1/2 \times \$1,000,000) = \$125,000$

P2-10

1.			
a.	Raw and In-Process	150,000	
	Accounts Payable		150,000
b.	No entry		
c.	Conversion Costs	25,000	
	Payroll		25,000
d.	Conversion Costs	100,000	
	Various Credits		100,000
e.	Finished Goods	275,000	
	Raw and In-Process		150,000
	Conversion Costs		125,000
f.	Accounts Receivable	400,000	
	Sales		400,000
	Cost of Goods Sold	275,000	
	Finished Goods		275,000
2.			
e.	No entry		
f.	Cost of Goods Sold	275,000	
	Raw and In-Process		150,000
	Conversion Costs		125,000

P2-11

a. Factory Overhead (Inventory Over and Short)	26	
Materials.....		26
To adjust materials account to physical inventory count: $(10,000 - 9,950) \times \$0.52 = \$546$		
b. Materials.....	775	
Work in Process		775
c. Work in Process	770	
Factory Overhead (Repairs and Maintenance)		770
d. Accounts Payable	234	
Factory Overhead (Shipping Charges on Returned Materials)	35	
Materials.....		234
Cash.....		35
e. Sales Returns and Allowances	5,000	
Accounts Receivable.....		5,000
Finished Goods	2,500	
Cost of Goods Sold		2,500
f. Work in Process	20,200	
Factory Overhead (Supplies)	2,100	
Materials.....		22,300
g. Materials.....	25,685	
Accounts Payable.....		25,685
h. Materials.....	950	
Work in Process		950
i. Scrap Materials	685	
Factory Overhead.....		685
j. Spoiled Goods	60	
Work in Process		60
k. Cash	685	
Scrap Materials		685

P2-12

1.			
a.	Work in Process	7,500	
	Materials.....		3,500
	Payroll		1,500
	Factory Overhead		2,500
b.	Spoiled Goods	300	
	Factory Overhead (Loss Due to Spoiled Goods).....	150	
	Work in Process		450
c.	Cash	300	
	Spoiled Goods		300
2.			
a.	Same as 1a above.		
b.	Spoiled Goods.....	300	
	Work in Process		300
c.	Same as 1c above.		

P2-13

1.	Spoiled Goods Inventory	1,350	
	Work in Process		1,350
2.	Work in Process	4,350	
	Materials.....		1,650
	Payroll		1,500
	Factory Overhead.....		1,200
3.	Work in Process	4,500	
	Materials (18 × \$117).....		2,106
	Payroll (18 × \$100)		1,800
	Factory Overhead (18 × \$83)		1,494
4.	Cash	1,350	
	Spoiled Goods Inventory		1,350

REVIEW PROBLEM FOR CHAPTERS 1 & 2

P2-14R

1. and 3.

Cash			
Bal.	12,000	(b)	1,000
(e)	72,500	(g)	31,000
	<i>84,500</i>	(j)	6,000
6,950		(k)	2,000
		(l)	1,800
		(n)	2,000
		(s)	33,750
			<i>77,550</i>

Accounts Receivable			
(d)	126,375	(e)	72,500
53,875			

Finished Goods			
(q)	98,290	(r)	84,250
14,040			

Work in Process			
Bal.	35,000	(q)	98,290
(a)	28,000		
(f)	54,340		
(p)	11,950		
	<i>129,290</i>		
31,000			

Materials			
Bal.	51,000	(f)	54,340
(c)	22,000		
	<i>73,000</i>		
18,660			

Factory Supplies			
(b)	1,000	(h)	650
350			

Prepaid Insurance	
Bal.	3,000
	(m) 400
2,600	

Machinery	
Bal.	125,000

Accum. Depr./Machinery	
	Bal. 10,500
	(o) 1,200
	11,700

Office Equipment	
Bal.	30,000

Accum. Depr./Office Equipment	
	Bal. 4,800
	(o) 400
	5,200

Office Furniture	
Bal.	20,000

Accum. Depr./Office Furniture	
	Bal. 2,500
	(o) 180
	2,680

P2-14R Continued

Accounts Payable		Payroll	
(s)	33,750	Bal.	30,000
		(c)	22,000
		(i)	3,000
			55,000
		21,250	
Capital Stock		Factory Overhead	
		(a)	3,000
		(h)	650
		(i)	3,000
		(l)	1,800
		(m)	300
		(n)	2,000
		(o)	1,200
			11,950
Retained Earnings		Selling and Admin. Expense	
		(j)	6,000
		(m)	100
		(o)	580
		(o)	
			8,680
Sales			
		(d)	126,375
Cost of Goods Sold			
(r)	84,250		

2.

a.	Work in Process	28,000	
	Factory Overhead	3,000	
	Payroll		31,000
b.	Factory Supplies	1,000	
	Cash		1,000
c.	Materials	22,000	
	Accounts Payable		22,000
d.	Accounts Receivable	126,375	
	Sales		126,375
e.	Cash	72,500	
	Accounts Receivable		72,500

P2-14R Continued

f.	Work in Process		54,340	
	Materials.....			54,340
	Chain:			
	12,000 lbs. @ \$2.00	\$24,000		
	2,000 lbs. @ \$2.20	<u>4,400</u>	\$28,400	
	Pulleys:			
	4,000 sets @ \$5.00	\$20,000		
	400 sets @ \$5.10	<u>2,040</u>	22,040	
	Bolts and taps:			
	4,000 pounds @ \$.50		2,000	
	Steel plates:			
	3,800 units @ \$.50		<u>1,900</u>	
			<u>\$54,340</u>	
g.	Payroll		31,000	
	Cash.....			31,000
h.	Factory Overhead		650	
	Factory Supplies.....			650
	(\$1,000 - \$350)			
i.	Factory Overhead		3,000	
	Accounts Payable.....			3,000
j.	Selling and Administrative Expense (Salaries).....		6,000	
	Cash.....			6,000
k.	Selling and Administrative Expense (Advertising)		2,000	
	Cash.....			2,000
l.	Factory Overhead		1,800	
	Cash.....			1,800
m.	Selling and Administrative Expense (Insurance)		100	
	Factory Overhead		300	
	Prepaid Insurance			400

P2-14R Continued

n.	Factory Overhead	2,000	
	Cash		2,000
o.	Selling and Administrative Expense (Depreciation of Office Equipment and Office Furniture)	580	
	Factory Overhead	1,200	
	Accumulated Depreciation/Office Equipment		400
	Accumulated Depreciation/Office Furniture		180
	Accumulated Depreciation/Machinery		1,200
p.	Work in Process	11,950	
	Factory Overhead		11,950
q.	Finished Goods	98,290	
	Work in Process		98,290
	(\$35,000 + \$28,000 + \$54,340 + \$11,950 - \$31,000)		
r.	Cost of Goods Sold	84,250	
	Finished Goods		84,250
s.	Accounts Payable	33,750	
	Cash		33,750

P2-14R Continued

4.

Lift-It, Inc.
Statement of Cost of Goods Manufactured
For the Month Ended October 31, 20—

Materials:

Inventory, October 1	\$51,000
Purchases	<u>22,000</u>
Total cost of available materials	\$73,000
Less inventory, October 31	<u>18,660</u>
Cost of materials used	\$ 54,340
Direct labor	28,000
Factory overhead	<u>11,950</u>
Total manufacturing costs	\$ 94,290
Add work in process inventory, October 1	<u>35,000</u>
	\$ 129,290
Less work in process inventory, October 31	<u>31,000</u>
Cost of goods manufactured	<u>\$ 98,290</u>

5.

Lift-It, Inc.
Income Statement
For the Month Ended October 31, 20—

Net sales	\$ 126,375
Cost of goods sold:	
Finished goods inventory, October 1	0
Add cost of goods manufactured (see statement)	<u>\$98,290</u>
Goods available for sale	\$98,290
Less finished goods inventory, October 31	<u>14,040</u>
Cost of goods sold	<u>84,250</u>
Gross profit on sales	\$ 42,125
Selling and administrative expenses	<u>8,680</u>
Net income	<u>\$ 33,445</u>

P2-14R Concluded

6.

Lift-It, Inc.
Balance Sheet
October 31, 20—

Assets

Current assets:

Cash		\$ 6,950
Accounts receivable.....		53,875
Inventories:		
Finished goods	\$ 14,040	
Work in process.....	31,000	
Materials	<u>18,660</u>	63,700
Factory supplies.....		350
Prepaid insurance		<u>2,600</u>
Total current assets		\$127,475

Plant and equipment:

Machinery	\$ 125,000	
Less accumulated depreciation	<u>11,700</u>	\$113,300
Office equipment.....	\$ 30,000	
Less accumulated depreciation	<u>5,200</u>	24,800
Office furniture	\$ 20,000	
Less accumulated depreciation	<u>2,680</u>	<u>17,320</u>
Total plant and equipment		<u>155,420</u>
Total assets.....		<u>\$282,895</u>

Liabilities

Current liabilities:

Accounts payable		\$ 21,250
------------------------	--	-----------

Stockholders' Equity

Capital stock.....		\$182,200
Retained earnings, October 1	\$ 46,000	
Net income for October	<u>33,445</u>	
Retained earnings, October 31		<u>79,445</u>
Total stockholders' equity		<u>261,645</u>
Total liabilities and stockholders' equity		<u>\$282,895</u>

MINI-CASE 1

1. Savings from implementing JIT:
- | | |
|--|----------------|
| Reduction in rework costs ($\$300,000 \times 25\%$)..... | \$75,000 |
| Reduction in storage and handling ($\$250,000 \times 40\%$)..... | 100,000 |
| Savings in carrying costs ($300,000 \times \$.35$)..... | <u>105,000</u> |
| Total savings..... | \$280,000 |
| Less: Increase in changeover costs..... | <u>200,000</u> |
| Net advantage of JIT..... | \$80,000 |
2. Non-financial advantages:
- * Anticipated improvement in product quality
 - * Frees up factory space for other uses.

Non-financial disadvantages:

- Interruptions in materials supply or strike by their own workers resulting in lost sales.
- Difficulty of workers to master JIT processes.

MINI-CASE 2

1. Inventory carrying costs such as storage space for raw materials, security, insurance, and spoilage and obsolescence should be reduced by a JIT system. Also, a JIT system can reduce nonvalue-added production activities such as moving materials and work in process, storage of work in process and finished goods, and inspection of work in process.
2. Yes, benefits to Francona's customers would include increased customer satisfaction due to quicker delivery, decreased cost of products due to some of the savings in carrying costs and production costs being passed on to the consumer, and higher quality products due to quality control techniques being practiced at the time an individual unit is produced.
3. Yes, inventory should not be accounted for using traditional job costing techniques. Products move through the system so rapidly in a JIT environment that it would not be cost effective to track production costs to them while in process. For example, a Raw and In-Process account may replace the Materials account, and the Work in Process and Finished Goods accounts may disappear in a backflush costing system.

INTERNET EXERCISE

1. The authors state that Whitney's biggest contribution to modern manufacturing was the development of interchangeable parts on a contract with the U.S. Army for the manufacture of 10,000 muskets.
2. Ford took all of the elements of a manufacturing system---people, machines, tooling, and products---and arranged them in a continuous system for manufacturing the Model T automobile.
3. The authors state that the breakdown of the "Ford system" resulted from: (a) the prosperity of the 1920's and the advent of labor unions which conflicted with the Ford system of marginalizing worker dignity and self esteem, and (b) product proliferation such as model changes, multiple colors, and options which did not fit well with Ford's standardization of manufacturing.
4. The authors contend that after World War II Toyota was more successful than Ford in implementing "lean manufacturing" because: (a) it discovered that factory workers had more to contribute than sheer muscle power, and (b) it reduced setups to minutes and seconds, thus allowing small batches to be produced at one time, and an almost continuous flow of production.
 1. General principles for using "lean metrics" include:
 - a. Keep it simple--- use metrics that are easy to compile and update.
 - b. Use tripwires---the daily or weekly metrics only need to alert you that a problem exists
 - c. Limit the metrics---each person or team should have no more than three to six metrics
 - d. Drill down when problems arise---when a "tripwire metric" indicates a deviation, you can investigate further to determine the source of the problem
 2. Materials handling benefits that result from using lean manufacturing principles include fewer moves, shorter travel distances, and simpler route structures. Also, the cellular layout reduces the queuing, delays, tracking effort, and confusion that accompany materials movement.
 3. Lot sizes tend to be larger in a functional environment due to the complexity of scheduling. It seems easier to schedule a small number of large lots rather than a large number of small lots.
 4. Employees benefit from a lean manufacturing environment because workcells are more self-contained and much information flow is within the cell. Workcells require teamwork to function effectively and instill motivations such as pride in the team and feelings of accomplishment.

5. Functional layouts require the product to move many times between departments with a separate operation at each. When the product is defective, it is often difficult to pinpoint where the defect occurred.
6. Customers benefit when a supplier adopts lean manufacturing by seeing improvement in quality. They also see faster response to requests for customized products or expedited delivery. In cellular layouts, it is easier and less costly to manufacture in smaller lots, thus more closely matching customer needs.