

Online Course Manual

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Module 3

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Module 3 Summary

I. Process Cost Accounting

- A. As explained previously, companies with continuous production flows or with large numbers of products are unable to use job order cost systems. Instead they must rely upon *process cost accounting systems*. In process cost systems, costs are accumulated and applied to *processes* (work stations, departments, etc.) rather than to individual jobs.
- B. The major differences between job order cost systems and process systems are as follows:
1. *Multiple Work-in-Process Inventory accounts are maintained* under process systems (one for each of the processes for which costs are accumulated). This is because, under process costing, costs are accumulated for specific *processes* (departments) instead of separate jobs. Separate labor, materials and overhead records are kept for each of the processes.
 2. Since the costs are accumulated for the process rather than for individual batches of production (jobs), *product costs must then be averaged* over the number of units handled in the process during the period (rather than being assigned directly to the units making up the job). Therefore, process costing is most appropriate when the units produced are all of one type (homogenous production runs) and individual batches of production cannot be identified. Examples would include soft drink bottling operations, gasoline refiners, or the milling of flour.
 3. In job-order systems, job cost sheets are used to account for production flows from *Work-in-Process* to *Finished Goods* and to *Cost of Goods Sold*. In process cost systems, cost application schedules (called Production Reports) are prepared to summarize the costs incurred in each process and to apply them to (1) the process's ending Work-in-Process Inventory balance and to (2) the units that were completed and transferred to the next process.
 4. Process costing is a perpetual inventory system, so costs are accumulated and averaged over the units produced at various times during the accounting period. Therefore, since only the actual materials and labor cost information is known when the allocation of costs is done on the production reports, *it is again necessary to use a predetermined overhead application rate* to estimate the overhead cost incurred. However, this time the overhead is being applied to the *process* (or department) where the work occurred, rather than to the *job* that was being produced.

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II. Comprehensive Process Cost System Journal Entries. This section presents the entries required to record manufacturing activity under a process cost system.

- A. As explained above, direct costs (direct labor and direct materials) are accumulated by *process* (department) and charged to each process's individual *Work-in-Process (W-I-P)* account. Indirect overhead cost is *applied* to the process. Keep the following points in mind:
1. During the period, the balance of each *W-I-P* account will be equal to the total direct labor and direct materials costs incurred in that process, along with the overhead costs applied to the process during the period.
 2. A process's direct labor, direct materials and applied overhead costs are averaged over the units produced when the production report is prepared. *Until the production report is completed, the unit cost is not known and no entry can be made.* The production report makes it possible to record the transfer of units out of the process and into the following process.
- B. Accounting for manufacturing transactions under process systems.

1. As was done in previous modules, the *purchase of materials* is recorded directly in the *Materials Inventory* account:

<i>Materials Inventory</i>	<i>\$X</i>	
<i>Accounts Payable</i>		<i>\$X</i>

2. When *direct materials* are utilized in a particular production process, the individual process's *W-I-P* account is charged for the materials cost. Note that these illustrations assume only 2 processes, A and B, but there could be any number of them:

<i>Work-in-Process--Department A</i>	<i>\$X</i>	
<i>Materials Inventory</i>		<i>\$X</i>

<i>Work-in-Process--Department B</i>	<i>\$X</i>	
<i>Materials Inventory</i>		<i>\$X</i>

Once again, if *indirect materials* are issued into production from the raw materials inventory, *Factory Overhead* must be debited:

<i>Factory Overhead</i>	<i>\$X</i>	
<i>Materials Inventory</i>		<i>\$X</i>

3. **Direct labor** costs incurred in the process are recorded similarly:

Work-in-Process--Department A	\$X	
Wages Payable (or Cash)		\$X

Work-in-Process--Department B	\$X	
Wages Payable (or Cash)		\$X

Again, if **indirect labor** costs are recorded, the *Factory Overhead* account must be debited for these overhead costs:

Factory Overhead	\$X	
Wages Payable (or Cash)		\$X

4. When the company is ready to do so, the overhead costs are applied to each of the processes and charged to the process's W-I-P account:

Work-in-Process--Department A	\$X	
Factory Overhead		\$X

Work-in-Process--Department B	\$X	
Factory Overhead		\$X

Note the similarity to job-order accounting. Under job-order, the individual job cost sheets and the one *W-I-P* account are debited for the applied (estimated) overhead as jobs are completed. This way, the job costs can be determined and they may be moved into *Finished Goods*. In process costing, overhead costs are applied to the *process's W-I-P* account so that the *production report* may be prepared, the units can be costed, and the entry can be made to record the transfer of the units to the next *W-I-P* account (or to *Finished Goods*). The only difference is that costs are applied to a *process* rather than a *job*.

5. Once the entries above have been made, each *W-I-P* account balance will be equal to the direct materials and direct labor costs incurred in the processes plus the overhead that was applied to them. It is now necessary to move the costs of the units that were completed in the various processes from their individual *W-I-P* accounts into the next process's *W-I-P* account. Eventually the cost of the units will enter the *Finished Goods Inventory* account and then *Cost of Goods Sold*.

The previously described *production report* must be prepared for each process in order to determine the cost of the units completed and transferred out. The following entries will be made to record the transfers:

<i>Work-in-Process--Department B</i>	\$X	
<i>Work-in-Process--Department A</i>		\$X
<i>Finished Goods</i>	\$X	
<i>Work-in-Process--Department B</i>		\$X

6. After recording the above cost flows, the cost of the goods that were sold during the period must be removed from *Finished Goods Inventory* and charged to *Cost of Goods Sold*. The cost of the goods sold is simply the cost that was determined on the *production report* for the last process that handled the units before they were moved into the finished goods inventory (department B in our example).

<i>Cost of Goods Sold</i>	\$X	
<i>Finished Goods</i>		\$X

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III. Preparing the Production Report

- A. The *production report* is a schedule in which the costs accumulated for each process are charged to (1) the units that were completed in the process during the period, and to (2) the units still in process at the end of the period (this will be the ending balance of *W-I-P* for that process).
- B. The assignment of costs to units completed and to ending *W-I-P* requires an averaging of total cost over the units involved. However, for most costs it is not "fair" to charge partially completed units (those in the beginning or ending *W-I-P* inventory) with the same cost per unit as those that were started and fully completed. This problem may be handled by averaging the costs over the ***equivalent units (EU's) of production***, instead of the actual number of units processed.
- C. What is an "***equivalent unit***?" This is difficult concept to put into words, but we will attempt to do so. Pretend that we are examining a bundle of 1,000 units. These units might be units that were started and completed during the current period; they might be units that were started last period and finished this period (the beginning *W-I-P* inventory); or they might be units that were started this period but were not finished (the ending *W-I-P* inventory). The question is then asked, "*how many of this period's fully completed units do these units represent?*" Or, in other words, "*how many units are they the equivalent of having fully completed this period?*" If the 1,000 units were only partially completed this period, then they will not "count" as the equivalent of 1,000 fully completed units. After all, completed units will have more time, effort and cost invested in them than these units do.

1. **Calculating EU's for units started and fully completed.** If the 1,000 units we are examining were started and 100% completed this period, the answer to the question "how many fully completed units of production do these units represent?" would of course be 1,000. In this case, the 1,000 units in the bundle would "count" as 1,000 equivalent whole units of production.
2. **Calculating EU's for partially completed units.** In the case of partially completed units (the beginning and ending W-I-P balances), the answer to the question depends on how much work was done on them this period. If the 1,000 units in question were 50% of the way completed this period the answer would be 500, since finishing 1,000 units half of the way requires just as much time, effort and work as finishing 500 units all the way. If the 1,000 units were completed only 25% of the way this period, they would be the equivalent of 250 fully completed units, and so on.

This process seems simple enough, but we must be careful to distinguish between beginning W-I-P inventory units and ending W-I-P inventory units:

- a. **Beginning Balance, WIP.** Suppose the beginning balance of WIP is composed of 1,000 units that were 30% of the way finished at the beginning of this period. This means they must have been finished the remaining 70% of the way this period. They would "count" as 700 equivalent units of complete production.
- b. **Ending Balance, WIP** Now suppose the ending balance of WIP is composed of 1,000 units 30% of the way done. This means that only 30% of the work required to complete them has been done during this period. They would count as 300 equivalent units of complete production.

- D. **Equivalent Units and the Cost Type.** To make matters even more complicated, *the calculation of equivalent units is affected by the type of cost that is being averaged over the units that were produced.* Our calculations above are appropriate if the cost that will be averaged over the equivalent units is one that is incurred uniformly through the production process (direct labor and overhead costs usually behave this way). However, consider a cost that is incurred at the *beginning* of the production process, such as direct materials cost.

If 1,000 units are started but are only 30% completed during the period, the number of equivalent units of production is equal to 300 – but *only in terms of their direct labor and overhead costs.* These units have all the materials in them that will ever be added to them, so as far as materials cost is concerned they are fully completed. The number of equivalent units of production is equal to 1,000 – *if we are considering only their materials costs.* Therefore, the same 1,000 units "count" as both 300 equivalent units of full production (for purposes of averaging labor and

overhead costs) and 1,000 equivalent units of full production (when averaging materials costs).

1. *The equivalent units of materials production that the beginning and ending inventories of W-I-P represent (since materials costs enter the production process in a different way than labor and overhead costs), will always differ from the number of equivalent units of labor and overhead production that they represent.*
2. *The number of equivalent units of production will be calculated as follows:*
 - a. **Beginning Balance, WIP.** Since the beginning balance of WIP is composed of 1,000 units that were 30% of the way finished at the beginning of the period, no additional materials costs were incurred in the period to finish them. This means they were 100% completed last period, as far as materials costs are concerned, and they will “count” as 0 equivalent units of materials production in the current period. However, the final 70% of the work was done on the units during the period, so they will count as 700 equivalent units of labor and overhead cost production.
 - b. **Ending Balance, WIP.** Now suppose the ending balance of WIP is composed of 1,000 units 30% of the way done. This means that only 30% of the work required to complete them has been done during this period, but all the materials they will ever need were added to them this period. As far as materials costs are concerned, they are finished, so they will count as 1,000 equivalent units of completed production. In terms of labor and overhead costs, they are only 30% complete and so will count as 300 equivalent units of production.
 - c. **Units Started and Completed.** If the 1,000 units are units and were started and completed during the current period, then all of the materials, labor and overhead costs required to complete them were added to them in the current period. They will count as 1,000 equivalent units of materials production, and 1,000 equivalent units of labor and overhead cost production. *The number of equivalent units of production will be the same for materials, labor and overhead production when we are dealing with units that were started and completed during the same period.*
 - d. As we will see in the example below, cost averaging over equivalent units of production has the effect of ensuring the following:
 1. Costs that are incurred uniformly during production (labor and overhead) are charged to the units in proportion to their state of completion (for example, a unit 20% completed is charged with just 20% of the cost that a fully completed unit

- must carry; one 30% completed carries 30% of a fully completed unit's cost, and so on).
2. Costs that are incurred at the beginning of the production process (materials) are charged to the units equally no matter what their state of completion (e.g., a unit 20% completed is charged with just as much cost as that of a fully completed unit, etc.).
 3. Costs that are incurred at the end of the production process are not charged to the units until they are completed (this type of cost is not considered in this course).

Here's an Example! Roy's Brewery manufactures beer. Hops, malt and water are added at the beginning of the brewing process, and labor and overhead costs are incurred evenly during the production process. At the beginning of the accounting period, Roy's had 100 gallons of beer in process, 20% complete, with a cost of \$2,000. During the period, Roy's finished this beer, and started another 500 gallons. At the end of the period, 200 gallons of this beer was still in process. The cost of the hops, malt and water used in production this period was \$5,000; and the labor and overhead cost totaled \$46,000. Use equivalent units to determine the cost of the production that was completed and transferred into the finished goods inventory, and the cost of the ending Work-In-Process inventory.

Step 1 - Calculate the Equivalent Units of Production (FIFO)

	Equivalent Units of Materials Production	Equivalent Units of DL and OH Production
Beginning Inventory (100 gallons 20% complete)	0	80
Started and Completed During the Period	300	300
Ending Inventory (200 gallons 40% complete)	<u>200</u>	<u>80</u>
Total Equivalent Units	500	460

Step 2 – Calculate Average Costs Per Equivalent Unit (using FIFO)

	Materials Cost	DL & OH Cost
Total Costs Incurred this Period	\$5,000	\$46,000
Divide by Equivalent Units	<u>÷ 500</u>	<u>÷ 460</u>
Cost Per Equivalent Unit	\$10	\$100

Step 3 – Determine Cost of Finished Production

<u>Beginning Balance, WIP</u>		\$2,000
Materials Cost Applied to Beginning WIP (0 EU's x \$10)	\$ 0	
DLOH Cost Applied to Beginning WIP (80 EU's x \$100)	<u>\$8,000</u>	\$ 8,000
Materials Cost Applied to Units Started and Completed (300 EU's x \$10)	\$3,000	
Materials Cost Applied to Units Started and Completed (300 EU's x \$100)	<u>\$30,000</u>	<u>\$33,000</u>
Total Cost of Units Completed During Period		<u>\$43,000</u>
<u>Ending Balance, WIP</u>		
Materials Cost Applied to Ending WIP (200 EU's x \$10)	\$2,000	
DLOH Cost Applied to Beginning WIP (80 EU's x \$100)	<u>\$8,000</u>	<u>\$10,000</u>

Summary. This example has illustrated the way that production costs are averaged over the units produced, based upon the equivalent units of production. Note the following effects of the use of equivalent units in applying the period's production costs:

1. We applied \$3,000 of materials cost to the 300 units that were started and finished during the period (\$10 per unit). We also applied \$2,000 of materials cost to the 200 units in the ending WIP inventory (again, \$10 per unit). This is appropriate, since a unit completed during the period has just as much materials cost in it as a unit that was started but has not been finished. (Remember, materials are added at the beginning of the production process.)
2. We applied \$30,000 of labor and overhead cost to the 300 units that were started and finished during the period (\$100 per unit). We also applied \$8,000 to the 200 units in the ending WIP inventory (only \$40 per unit). In this case, the units in the ending WIP inventory were assigned 40% as much in labor and overhead cost as a unit that was started and completed. This is appropriate, since these units only 40% finished, and would have only required 40% as much labor and overhead as a fully completed unit.

Click the link below to play a video that walks you through the solution to the sample problem above.

[Link to Equivalent Unit Illustration](#)

IV. Steps in Completing the FIFO Production Cost Report

- A. To apply the FIFO method, (1) determine the number of units in the department's beginning W-I-P inventory; the number of units that were started and fully completed in the period; and the number of units in the department's ending W-I-P (and their percentage of completion). Next, (2) calculate the equivalent units (EU's) of production for the units in the beginning W-I-P inventory, the EU's of production for the units started and completed, and the EU's of production for the units in the ending W-I-P inventory.
 1. Remember that the determination of the percentage of completion (and therefore the number of EU's of production) depends upon the kind of cost that is being assigned to the units. If we are dealing with different cost types (materials versus conversion costs), then different EU's for W-I-P_{beginning} and W-I-P_{ending} must be calculated for each cost type.
 - a. If the cost to be assigned is one that is *incurred only at the beginning of the process* (materials cost often behaves this way):
 1. *The EU's of production for the beginning W-I-P should be 0, since no additional cost would be required in the current period to complete them.*

2. *For the units started and completed, the EU's should be equal to 100% of the number completed, since 100% of the cost needed to complete a unit went into them during the period.*
 3. *The EU's for the units in the ending W-I-P should also be equal to 100% of the number of units in the ending W-I-P since they, too, received 100% of the cost needed to complete a unit during the period.*
- b. If the cost to be assigned is one that is ***incurred uniformly through the production process*** (the ***conversion costs*** -- direct labor and overhead -- often behave this way):
1. *The EU's for the beginning W-I-P should be equal to the number of units in the beginning WIP inventory times the percentage of completion that occurred during the current period (since they would have received that percentage of the cost needed to complete the unit fully).*
 2. *For the units started and completed, the EU's should be equal to 100% of the number completed (since 100% of the necessary cost has gone into them).*
 3. *The EU's for the units in the ending W-I-P inventory should be equal to the number of units times the percentage of completion (since they, too, will have received that percentage of the cost needed to complete the unit fully).*
- c. Since costs ***incurred at the end of the production process*** are not involved in any of the problems you will work in this course, no explanation will be given here except to say that the EU's for the beginning W-I-P and the units started and completed should be 100% of the number of units involved; and that the EU's for the ending W-I-P should be zero.
2. The table below summarizes the equivalent unit calculation rules under the FIFO method.

Equivalent Unit Calculation (FIFO) – Process #1 (equal to number of units multiplied by percentage value in table)			
Unit Type	Costs Incurred At Beginning of Process (often Materials and always Transferred-in Costs)	Costs Incurred Uniformly During Process (often Labor and Overhead)	Costs Incurred At the End of The Process
Beginning W-I-P Units	0%	e%	100%
Units Started & Completed	100%	100%	100%
Ending W-I-P Units	100%	e%	0
e% = percentage completed during the current period			

- C. Under the FIFO method, the beginning balance of the W-I-P inventory (costs incurred last period in working on these units) “attaches” to just the units in the beginning W-I-P. These costs are not added to the current period's costs and averaged over the equivalent units of production.
- D. Once the EU's of production for materials costs (EU_M) and for conversion costs (EU_C) have been calculated, it is time to calculate the direct materials and the conversion costs per equivalent unit of production. The process is as follows:

Unit Cost Analysis Schedule – Process #1			
	Direct Materials Cost	Conversion (DL + OH) Costs	Total Costs Accounted For
Costs from Beginning Inventory	\$ 0	\$ 0	
Costs from Current Period	$\$M_{\text{current}}$	$+\$C_{\text{current}}$	$= \text{Total}_{\text{current}}$
Total Costs to Account For	$\$M_{\text{total}}$	$= \$C_{\text{total}}$	$= \text{Total Costs}$
Divide by Equivalent Units	$\div EU_M$	$\div EU_C$	
Cost Per Equivalent Unit	$= \$M/EU_M$	$= \$C/EU_C$	

- E. We may now assign costs to the units that were started and completed, and to the ending W-I-P Inventory:

Cost Application Schedule – Process #1		
	Costs Assigned To Production	Total Cost Assigned
Beginning Inventory Units:		
Beginning Balance, W-I-P	\$ WIP_{beg}	
Costs to complete (in current period):		
Materials (None Applied)	\$ 0	
Conversion cost (EUc x \$C/EUc)	+ \$C	
Units Started and Completed:		
Materials (EUm x \$M/EUm)	+ \$M	
Conversion cost (EUc x \$C/EUc)	+ \$C	
Total Cost of Units Completed		= <u>\$Total_{completed}</u>
Ending Balance, W-I-P:		
Materials (EUm x \$M/EUm)	\$M	
Conversion cost (EUc x \$C/EUc)	+ \$C	
Total Cost of Units in Ending W-I-P		= <u>\$Total_{W-I-P}</u>
Total Costs Assigned to Production		<u>\$Total_{completed} + W-I-P</u>

V. Multiple Processes – FIFO

- A. When more than one process is being accounted for, each of the processes must have its own W-I-P account where its own direct materials, direct labor and applied overhead costs are recorded. Before the cost of the goods produced during the period can be determined, it will be necessary to prepare individual unit cost analysis schedules and cost application schedules for each process.
- B. The only differences between the schedules prepared above and those that would be prepared for other departments and processes further along in the production flow concern *transferred-in costs*. These are the costs from previous processes that are “transferred in” with the units when they are passed along to the next process in line.
 - 1. Since these costs come with the units when they are transferred into a particular process, they are costs that behave like materials costs do. They “appear” at the beginning of the production process and are not added uniformly during the process as the conversion costs are.
 - 2. In accounting for them, they will be treated just like the materials costs were earlier. As regards transferred-in costs, the equivalent units of production for the beginning W-I-P is zero. For the units started and completed, and the ending W-I-P, the EU’s are equal to 100% of the number of units involved.

- C. For comparison purposes the cost analysis and production reports for Process #2 are given below. In these illustrations it is assumed that no materials costs are incurred in Process #2, but transferred-in cost would, of course, have to be accounted for in the same way as materials. The differences between these schedules and those prepared for Process #1 are highlighted.

Unit Cost Analysis Schedule – Process #2			
	Transferred-In Cost	Conversion (DL + OH) Costs	Total Costs Accounted For
Costs from Beginning Inventory	\$ 0	\$ 0	
Costs from Current Period	$\$T_{\text{current}}$	+ $\$C_{\text{current}}$	= $\text{Total}_{\text{current}}$
Total Costs to Account For	$\$T_{\text{total}}$	= $\$C_{\text{total}}$	= Total Costs
Divide by Equivalent Units	÷ EU_T	÷ EU_C	
Cost Per Equivalent Unit	$=\$T/\text{EU}_T$	= $\$C/\text{EU}_C$	

Cost Application – Process #2		
	Costs Assigned To Production	Total Cost Assigned
Beginning Inventory Units:		
Beginning Balance, W-I-P	\$ WIP_{beg}	
Costs to complete (in current period):		
Transferred-In (None Applied)	\$ 0	
Conversion cost ($\text{EU}_c \times \$C/\text{EU}_c$)	+ $\$C$	
Units Started and Completed:		
Transferred-In ($\text{EU}_T \times \$T/\text{EU}_T$)	+ $\$T$	
Conversion cost ($\text{EU}_c \times \$C/\text{EU}_c$)	+ $\$C$	
Total Cost of Units Completed		= $\underline{\$Total_{\text{completed}}}$
Ending Balance, W-I-P:		
Transferred-In ($\text{EU}_T \times \$T/\text{EU}_T$)	$\$T$	
Conversion cost ($\text{EU}_c \times \$C/\text{EU}_c$)	+ $\$C$	
Total Cost of Units in Ending W-I-P		= $\underline{\$Total_{\text{W-I-P}}}$
Total Costs Assigned to Production		$\underline{\$Total_{\text{completed}} + \text{W-I-P}}$

VI. Just-In-Time Production Systems

- A. Modern manufacturing companies often utilize *Just-in-Time* production methods. Under *Just-in-Time* (JIT) inventory systems products are manufactured only when orders are received for them. Thus, JIT is characterized by "demand-pull" (or "pull-through") production. The idea is to avoid, as much as possible, the costs of carrying inventories. This differs from traditional approaches to manufacturing which involve large-scale production runs and the manufacture of more product than needed to satisfy immediate demand. The manufacture of large lots of a given product does reduce labor costs per unit, but it also results in large inventory balances (and large inventory carrying costs), down time as the line is set up to produce another product, and monotony since workers are often kept at the same machine doing the same repetitive task no matter what item is being produced.
1. Under JIT, the customer's order initiates production and "pulls" the item through the production process. Since production must occur quickly and without defects in order to satisfy the customer, defects (waste) must be minimized and efficiency must be maximized if the system is to work. The goal in JIT is to minimize "through-put time" (the time required to produce a defect-free product).
 2. JIT can be applied to merchandising operations as well as manufacturing processes.
- B. Under JIT, the goal is to eliminate materials and finished goods inventories. This may not be practically possible, but in JIT systems these inventories will be kept at very low levels. Work-in-process inventory levels depend on the number of customers' orders and the amount of time required to complete them.
- C. The requirement that a manufacturer be able to order and receive raw materials "just in time" to fill the customers' orders leads to the concept of *JIT Purchasing*. The company must:
1. Make its materials purchases from very reliable suppliers, who will...
 2. ...make timely delivery of small quantities...
 3. of high-quality goods that will result in a defect-free product for the customer.
- D. Because products are manufactured as orders are received, the workers and the machinery on the production floor must be able to rapidly shift from the production of one item to the production of another.
1. This often requires that companies redesign their plant layouts (the way machines and departments are arranged on the plant floor), shortening the manufacturing flow line (the path followed from operation to operation as goods are completed) to ensure efficiency.
 2. This, in turn, requires that the lengthy production lines of the past be converted into a series of *work cells* (banks of machines operated by a

single worker). Often, the manufacture of a given product requires the use of only a few work cells and its production is kept entirely within a small area of the plant (this is referred to as a “focused factory” or “factory-within-a-factory” concept). Individual work cells are capable of manufacturing some products from start to finish.

3. The “focused factory” requires that workers be highly trained, flexible individuals, since they are given the authority to make many decisions that were once reserved for supervisors. For example, workers are often responsible for quality control, setup, and production scheduling within their work cells.

E. The 4 major benefits of JIT production systems are:

1. Recovery of funds (working capital) previously tied up in inventories, and inventory carrying cost savings.
2. Recovery of space previously lost to storage areas for inventory.
3. Improved throughput time, resulting in more efficient production, cost savings, and better customer service.
4. Enhanced product quality, resulting in greater customer satisfaction and competitive advantage.

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Instructor’s Lecture Notes.

Operation Costing is a hybrid costing system that combines both job-order and process costing approaches in order to account for production. Most companies actually use both job-order and process accounting systems, or combinations of both methods, to account for production.

Operation costing utilizes job order costing for different products in operations where the costs vary depending on the product type that is being processed. However, process costing is used in accounting for operations that share common characteristics (i.e., where the costs per unit are the same no matter which product item is being processed).

For example, assume that a furniture producer uses mahogany and applies intricate carving in manufacturing its top-of-the-line furniture, but uses pine and only fine-sands its bottom-of-the-line items. In this case materials and finishing activities do *NOT* share common characteristics and a job-order approach should be taken in accounting for these costs. However, if both types of product receive the same varnish and it is applied in the same way, then the products *DO* share common characteristics as far as the cost of varnishing them is concerned and a process approach could be used to apply the varnishing cost to them.

Process Cost Illustration Problem
Journal Entries and Production Reports - Process Cost Inventory Systems

The section below presents a comprehensive process cost problem and solution. Two processes are involved, so two production reports must be prepared in order to fully account for production. After doing the problem, compare your answers to the solution that is provided. Another solution, using the Average Cost method, is also provided, but only as a supplement to our course coverage. Remember that the Average Cost method is not required in our course.

Process Corporation manufactures its product in two departments, Assembly and Polishing. Materials enter at the beginning of the assembly process, and labor and overhead are added uniformly through both processes. No materials are added in the polishing process. The beginning balance in the Materials and Finished Goods inventory accounts are zero. Work-in-Process-Assembly has a beginning balance of \$32,600, and Work-in-Process Polishing has a beginning balance of \$66,000. Record the transactions listed below:

- a. Purchased direct materials for \$85,000.
- b. Issued \$85,000 of direct materials to the Assembly Department for production.
- c. Paid factory wages of \$150,000. This was composed of \$60,000 of direct labor cost incurred in the Assembly Department and \$80,000 of direct labor cost incurred in the Polishing Department. The remaining \$10,000 was indirect labor cost.
- d. Applied \$123,400 of overhead cost to production based upon direct labor hours. Charged \$98,400 of overhead to the Assembly Department and \$25,000 to the Polishing Department.
- e. Recorded actual overhead costs as follows:

Depreciation of Plant Assets	\$ 30,000
Expiration of Insurance	20,000
Accrued Utilities	20,000
Miscellaneous Cash Expenses	<u>43,400</u>
Total	<u>\$123,400</u>

- f. Posted entries to the general ledger accounts. Accumulated the following production information and used it to prepare production reports for the Assembly and the Polishing departments. Note that transferred-in cost cannot be listed for the Polishing Department, since it is determined from the Assembly Department’s Production Cost Report.

ASSEMBLY DEPARTMENT			
PRODUCTION INFORMATION		COST INFORMATION	
(Physical Units)	<u>Units</u>	Beginning WIP Inventory:	
Beg. Inv., 70% complete	1,000	Materials	\$17,000
Started During Month:	<u>9,000</u>	Conversion Costs	15,600
Total	10,000	Costs Added During Month	
Completed and Transferred	<u>7,000</u>	Materials	85,000
End. Inv, 60% complete	3,000	Conversion Costs	<u>158,400</u>
		Total Cost	\$276,000

POLISHING DEPARTMENT			
PRODUCTION INFORMATION		COST INFORMATION	
(Physical Units)	<u>Units</u>	Beginning WIP Inventory:	
Beg. Inv., 20% complete	2,000	Transferred-In Costs	\$60,000
Started During Month:	<u>7,000</u>	Conversion Costs	6,000
Total	9,000	Costs Added During Month	
Completed and Transferred	<u>7,000</u>	Transferred-In Costs	?
End. Inv, 40% complete	2,000	Conversion Costs	<u>105,000</u>
		Total Cost	?

- g. Working from the information on the production reports, recorded the transfer of the units from WIP-Assembly to WIP-Polishing; and the transfer of the units from WIP-Polishing to Finished Goods Inventory.
- h. Determined the unit cost of a finished product and recorded the cash sale of 5,000 units to a customer for \$300,000. Posted to the general ledger accounts.
- i. Prepared the income statement through gross profit.



You may click the link below to play a video that illustrates and discusses the solution to the sample problem (solution begins on following page).

[Link to Production Report Illustration – Department I](#)

[Link to Production Report Illustration – Department II](#)

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Solution to Module 2 Process Cost Problem Illustration

a. Materials Inventory	85,000	
Cash or Accounts Payable		85,000
b. Work-in-Process - Assembly	85,000	
Materials Inventory		85,000
c. Work-in-Process - Assembly	60,000	
Work-in-Process - Polishing	80,000	
Factory Overhead	10,000	
Cash		150,000
d. Work-in-Process - Assembly	98,400	
Work-in-Process - Polishing	25,000	
Factory Overhead		123,400
e. Factory Overhead	113,400	
Accumulated Depreciation		30,000
Prepaid Insurance		20,000
Utilities Payable		20,000
Cash		43,400

Posting the accounts produces the following balances:

Work-in-Process Assembly		Work-in-Process Polishing		Factory Overhead	
bal.	32,600	bal	66,000	c.	10,000
b.	85,000	c.	80,000	e.	113,400
c.	60,000	d.	25,000		0
d.	98,400				
	276,000		171,000		

The balances in the W-I-P accounts represent the total production costs that must be applied to the units produced in the two departments. This is done on the Production Cost Reports that are prepared for the departments (see below).

Production Report - Assembly Department			
FIFO Cost			
Quantity Schedule and Equivalent Units			
<u>Units to be Accounted for:</u>		Quantity (Units)	
Work-in-Process <small>beginning balance</small>		1,000	
Started into Production		9,000	
Total Units to Account For		10,000	
<u>Units Accounted for as Follows:</u>		Equivalent Units	
<u>Transferred to the Next Department:</u>		<u>for Materials</u>	<u>for Conversion</u>
W-I-P <small>beg. (70% previous, 30% current period)</small>	1,000	0	300
Started and Completed	6,000	6,000	6,000
Total Units Transferred	7,000		
<u>Remaining in the Department:</u>			
W-I-P <small>ending (60% completed in current period)</small>	3,000	3,000	1,800
Total	10,000	9,000	8,100
Equivalent Unit Costs		<u>Total Cost</u>	<u>Materials Cost</u>
<u>Cost to be Accounted For:</u>			<u>Conversion Cost</u>
W-I-P <small>beginning balance</small>	\$ 32,600	\$ -	\$ -
Cost Incurred in Current Period	\$ 243,400	\$ 85,000	\$ 158,400
Total Cost to Apply to Production	\$ 276,000	\$ 85,000	\$ 158,400
Divide by Total Equivalent Units of Production		÷ 9,000	÷ 8,100
Cost per Equivalent Unit of Production		\$ 9.4444	\$ 19.5556
		per EU	per EU
Cost Allocation			
<u>Units Accounted for as Follows:</u>			
<u>Transferred to the Next Department:</u>			
W-I-P <small>beginning balance</small>	\$ 32,600		
Materials Cost Applied	\$ -		
Conversion Cost Applied (300 x \$19.5556)	\$ 5,867		
Started and Completed			
Materials Cost Applied (6,000 x \$9.4444)	\$ 56,667		
Conversion Cost Applied (6,000 x \$19.5556)	\$ 117,333		
Total Cost of Units Transferred Out	\$ 212,467		
<u>Remaining in the Department:</u>			
W-I-P <small>ending balance</small>			
Materials Cost Applied (3,000 x \$9.4444)	\$ 28,333		
Conversion Cost Applied (1,800 x \$19.5556)	\$ 35,200		
Total Cost of W-I-P <small>ending balance</small>	\$ 63,533		
Total Cost Applied to Production	\$ 276,000		

Production Report - Polishing Department					
FIFO Cost					
Quantity Schedule and Equivalent Units					
<u>Units to be Accounted for:</u>	Quantity (Units)				
Work-in-Process <small>beginning balance</small>	2,000				
Started into Production	7,000				
Total Units to Account For	9,000				
		Equivalent Units			
<u>Units Accounted for as Follows:</u>		<u>Transferred-In</u>	<u>Conversion</u>		
<u>Transferred to the Next Department:</u>					
W-I-P <small>beg.</small> (20% previous, 80% current period)	2,000	0	1,600		
Started and Completed	5,000	5,000	5,000		
Total Units Transferred	7,000				
<u>Remaining in the Department:</u>					
W-I-P <small>ending</small> (40% completed in current period)	2,000	\$2,000	800		
Total	9,000	7,000	7,400		
Equivalent Unit Costs					
	<u>Total Cost</u>	<u>Transferred Cost</u>	<u>Conversion Cost</u>		
<u>Cost to be Accounted For:</u>					
W-I-P <small>beginning balance</small>	\$ 66,000	\$ -	\$ -		
Cost Incurred in Current Period	\$ 317,467	\$ 212,467	\$ 105,000		
Total Cost to Apply to Production	\$ 383,467	\$ 212,467	\$ 105,000		
Divide by Total Equivalent Units of Production		÷ 7,000	÷ 7,400		
Cost per Equivalent Unit of Production		\$ 30.3524	\$ 14.1892		
		per EU	per EU		
Cost Allocation					
<u>Units Accounted for as Follows:</u>					
<u>Transferred to the Next Department:</u>					
W-I-P <small>beginning balance</small>	\$ 66,000	Unit Cost = \$311,411/7,000 Unit Cost = \$44.49			
Transferred-In Cost Applied	\$ -				
Conversion Cost Applied (1600 x \$14.1892)	\$ 22,703				
Started and Completed					
Transferred-In Cost Applied (5,000 x \$30.3524)	\$ 151,762				
Conversion Cost Applied (5,000 x \$14.1892)	\$ 70,946				
Total Cost of Units Transferred Out	\$ 311,411				
<u>Remaining in the Department:</u>					
W-I-P <small>ending balance</small>					
Transferred-In Cost Applied (3,000 x \$30.3524)	\$ 60,705				
Conversion Cost Applied (1,800 x \$14.1892)	\$ 11,351				
Total Cost of W-I-P <small>ending balance</small>	\$ 72,056				
Total Cost Applied to Production	\$ 383,467				

Solution to Module 2 Process Cost Problem Illustration, Continued

From the Production Cost Reports it can be seen that the cost of the units transferred from Assembly to Polishing is \$212,467, and the cost of the units transferred from Polishing to Finished Goods is \$311,411. This means that each finished unit has a cost of \$44.49 (\$311,411 ÷ 7,000 units completed). It is this cost that can be used to determine the cost of goods that were sold when sales are recorded

Solution to Module 2 Process Cost Problem Illustration, Continued

g. Work-in-Process - Polishing	212,467	
Work-in-Process - Assembly		212,467
Finished Goods	311,411	
Work-in-Process - Polishing		311,411
h. Cash (5,000 x \$60)	300,000	
Sales		300,000
COGS (5,000 x \$44.49)	222,450	
Finished Goods		222,450

Work-in-Process Assembly		Work-in-Process Polishing		Finished Goods	
bal. 32,600		bal 66,000		g. 311,411	222,450
b. 85,000		c. 80,000		<u>88,961</u>	
c. 60,000		d. 25,000			
d. 98,400	212,467	g. 212,467	311,411	g.	
<u>63,533</u>		<u>72,056</u>			

Cost of Goods Sold	
h. 222,450	
<u>222,450</u>	

Income Statement	
Sales	300,000
Cost of Goods Sold	<u>(222,450)</u>
Gross Profit	<u>77,550</u>

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Supplement – Average Cost Method

(NOTE: The Average Cost method is not a course requirement. You should have a general understanding of the differences between the two methods, but you are only responsible for being able to actually apply the FIFO method in your assigned homework and on the exams. You will not be tested over the following material)

I. Comparing FIFO and Average Cost Process Cost Systems

- A. Two general approaches to process costing may be utilized, and they differ only in terms of the way that Equivalent Units are computed and in regard to which production costs are averaged over them. Under the **FIFO Cost Method** (“first-in, first-out”), the beginning WIP inventory units are assumed to have been finished and transferred out before any of the other units, those that were started during the period, were completed and transferred. Therefore, the beginning WIP inventory cost is calculated separately from the cost of the units that were started and completed, and it is the first of the costs that are charged to the next department. Under the **Average Cost Method**, no distinction is drawn between the beginning WIP inventory units and the units that were started and completed during the period. The two are thrown together and production costs are averaged equally over them.

Here’s an Example! Suppose Betty has 4 chocolate cakes. She baked two of them yesterday paying \$10 for the ingredients needed to bake them. She baked two more today, but she had to buy the ingredients from a convenience store, and paid \$20 for them. Clarence wants to buy two of them from her, and she agrees to sell them to Clarence at her cost. How much did she pay for the 2 cakes she is selling to Clarence?

Cost Analysis:

Beginning Inventory (2 cakes @ \$5 each)	\$10
Baked Today and Available for Sale (2 cakes @ \$10 each)	<u>\$20</u>
Total Cost of 4 Cakes Available to Sell to Clarence	\$30

- (a). **FIFO Cost Method.** Under the FIFO cost approach the two cakes that Clarence receives are assumed to be those that were baked yesterday at a cost of \$5 each. Therefore, Betty will charge Clarence \$5 each. The cost of the units transferred into COGS will be \$10; and the cost of Betty’s ending inventory will be \$20.
- (b). **Average Cost Method.** Under the Average Cost approach, the beginning inventory cost and today’s costs are added together, and the \$30 total is averaged over all 4 cakes. The average cost per cake is \$7.50 ($\$30/4$ cakes = \$7.50). Therefore, Betty will charge Clarence \$7.50 each. The cost of the units transferred into COGS will be \$15; and the cost of Betty’s ending inventory will be \$15.

Summary. This is a very simple example, but it does illustrate the differences between the two methods. Obviously, the greater the difference between the cost of the beginning inventory units and the cost of the units produced in the current period, the greater the difference in COGS and ending inventory will be under the two methods. Even with a substantial difference in costs, there would have to be a large number of units in the beginning inventory, compared to the units completed in the current period, to have much of an effect. Modern production companies utilizing a JIT production system, maintain very low inventory levels. For these companies the differences between Average Cost and FIFO will be minimal, and since Average Cost is easier to apply, it is more commonly used in practice

A Slightly More Complicated Example – Equivalent Units. Our simplified illustration above omitted something that real-world companies must consider in costing their inventories and determining COGS: the problem of partially completed units. Since Betty began the day with 2 completed cakes and ended the day with two completed cakes, her beginning and ending inventories were 100% complete.

Suppose Betty's mother, Martha, also began baking cakes yesterday. She purchased ingredients yesterday, paying \$10, and began baking 2 cakes. However, when she was mixing the batter she realized she was out of vegetable oil and had to wait until the following day to finish the cakes. She reckoned the cakes were 80% of the way done at the end of the day. The following day she purchased the oil and other ingredients, paying \$40 at a convenience store, and she finished baking the 2 cakes she had started the day before. She also began 4 more cakes. She finished 2 of them before running out of baking powder. So she again finished the day with 2 partially completed cakes that she again estimated were 80% of the way done. In this case Martha began the day with two partially completed cakes, finished them, and then ended the day with two partially completed cakes. Her beginning and ending inventories were both only 80% complete.

The problem of partially completed inventories requires the use of *equivalent units* in averaging costs. *Equivalent units* were discussed in [section III - B](#), above. If Martha applies a FIFO approach to determine the cost of her ending WIP inventory and the cost of the cakes that were finished, she will proceed as follows:

(a). *FIFO Cost Method*

1.	<i>Determine Product Costs to Average Over Units Produced</i>	
	Beginning Inventory Cost (2 cakes, 80% complete, cost incurred yesterday)	\$10
	Current Period Production Cost (4 new cakes started, beginning inventory finished)	<u>\$40</u>
	Total Cost of 6 Cakes in Production During the Period (Today)	\$50
2.	<i>Determine Equivalent Units of Production</i>	<i>EU's</i>
	Beginning WIP (2 cakes 80% completed last period; 20% completed this period)	0.4
	Units Started and Completed (2 cakes)	2.0
	Ending WIP (2 cakes 80% completed this period)	<u>1.6</u>
	Total Equivalent Units of Production Achieved Today	<u>4.0</u>
3.	<i>Averaging Production Cost Incurred This Period Over Equivalent Units</i>	
	Current Period Production Cost	\$40
	Divide by Total Equivalent Units of Production Today	<u>÷ 4</u>
	Production Cost Per Equivalent Unit of Production	<u>\$10</u>
4.	<i>Applying Cost to Production</i>	
	Beginning WIP (2 cakes 80% completed last period, finished this period):	
	Cost from Yesterday (Beginning Balance, WIP)	\$10
	Current Period's (today's) Cost Applied to Units (0.4 EU's x \$10 per EU)	<u>\$ 4</u>
	Total Cost of Beginning WIP Units (2 cakes)	\$14
	Units Started and Completed This Period (today) (2 EU's x \$10 per EU)	<u>\$20</u>
	Total Cost of Units Completed (4 cakes)	\$34
	Ending WIP (2 cakes 80% completed this period) (1.6 EU's x \$10 per EU)	<u>\$16</u>
	Total Production Cost Applied to Production	<u>\$50</u>

Now suppose Martha decides to use an Average Cost method to determine the ending WIP balance and the cost of the cakes that were finished. She will proceed as shown below. The differences in the steps under Average Cost, as opposed to FIFO, are displayed in boldfaced type.

(b) *Average Cost Method*

1.	<i>Determine Product Costs to Average Over Units Produced</i>	
	Beginning Inventory Cost (2 cakes, 80% complete, cost incurred yesterday)	\$10
	Current Period Production Cost (4 new cakes started, beginning inventory finished)	<u>\$40</u>
	Total Cost of 6 Cakes in Production During the Period (Today)	\$50
2.	<i>Determine Equivalent Units of Production</i>	<i>EU's</i>
	Beginning WIP (2 cakes 100% completed last period and this period)	<u>2.0</u>
	Units Started and Completed (2 cakes)	2.0
	Ending WIP (2 cakes 80% completed this period)	<u>1.6</u>
	Total Equivalent Units of Production Achieved Today	<u><u>5.6</u></u>
3.	<i>Averaging Production Cost Incurred This Period and Last Period Over Equivalent Units</i>	
	Current Period Production Cost plus Beginning WIP Balance	\$50
	Divide by Total Equivalent Units of Production Today	<u>÷ 5.6</u>
	Production Cost Per Equivalent Unit of Production	<u><u>\$8.9286</u></u>
4.	<i>Applying Cost to Production</i>	
	Units Completed This Period:	
	(Beginning WIP plus Started & Completed (4 EU's x \$8.9286 per EU)	\$36
	Ending WIP (2 cakes 80% completed this period) (1.6 EU's x \$8.9286 per EU)	<u>\$14</u>
	Total Production Cost Applied to Production	<u>\$50</u>

Summary. As can be seen through this example, the two methods have produced different values for ending WIP inventory and for the cost of the units completed. These differences result from the increase in costs that occurred from the previous period (yesterday) to this period (today). Under FIFO, yesterday's lower costs were "attached" to the beginning WIP units, and carried entirely into the cost of the units completed. Only today's higher costs were left to be applied to the ending WIP inventory. Under average cost, however, yesterday's costs are "lumped in" with today's higher costs and all of them are averaged over all the production. This means that the ending WIP inventory has some of yesterday's lower costs along with today's higher costs applied to it, resulting in a lower valuation figure than the FIFO method produced.

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II. Steps in Applying the Average Cost Process Cost System. This section repeats the description given above regarding FIFO cost systems, but this time we apply the average cost method to the process. *Only FIFO is required in our course, so view the following discussion as supplementary to our course content.*

- A. In order to utilize the Average Cost method, we must once again begin by determining the number of units in the process's beginning W-I-P inventory; the number of units that were started and fully completed in the period; and the number of units in the process's ending W-I-P (and their percentage of completion at the end of the period).
- B. Next, we again calculate the EU's of production for the units in the beginning W-I-P inventory, the units started and completed, and the units in the ending W-I-P

inventory. As we know, the determination of the percentage of completion (and therefore the number of EU's of production) depends upon the kind of cost that is being assigned to the units. If there are different types of costs that must be assigned, then different EU's for W-I-P_{beginning}, Started and Completed, and W-I-P_{ending} must be calculated for each of the costs. The types of costs that might be dealt with were discussed above, but we must now repeat them since there are changes that occur under the Average Cost approach. The changes are underlined in parts 1, 2, and 3 below:

1. If the cost to be assigned is one that is ***incurred only at the beginning of the process*** (materials cost often behaves this way); then the EU's of production for the beginning W-I-P and for the units started and completed should be equal to 100% of the number completed (since 100% of the cost needed to complete a unit went into them during the period). The EU's for the units in the *ending W-I-P* should also be equal to 100% of the number in the ending W-I-P (since they, too, received 100% of the cost needed to complete a unit during the period).
2. If the cost to be assigned is one that is ***incurred uniformly through the production process*** (the ***conversion costs*** -- direct labor and overhead -- often behave this way); then the EU's for the beginning W-I-P and for the units started and completed should be equal to 100% of the number completed (since 100% of the necessary cost has gone into them). The EU's for the units in the *ending W-I-P* should be equal to the number of units times the percentage of completion (since they would have received that percentage of the cost needed to complete the unit fully).
3. Since costs ***incurred at the end of the production process*** are not considered in the text, no explanation will be given here except to say that the EU's for the beginning W-I-P and the units started and completed should be 100% of the number of units involved; and that the EU's for the ending W-I-P should be zero.
4. The table below summarizes the equivalent unit calculation rules under the Average Cost method.

Equivalent Unit Calculation (Average Cost) – Process #1 (equal to number of units multiplied by value in table)			
Unit Type	Costs Incurred At Beginning of Process (often Materials and always Transferred-in Costs)	Costs Incurred Uniformly During Process (often Labor and Overhead)	Costs Incurred At End of Process
Beginning W-I-P Units	100%	100%	100%
Units Started and Completed	100%	100%	100%
Ending W-I-P Units	100%	e%	0
e% = percentage complete at end of period			

- C. Under the Average Cost method, the cost of the beginning W-I-P inventory is added to the current period's costs and *averaged* over the equivalent units of full production.
- D. Once the EU's of production for materials costs (EU_M) and for conversion costs (EU_C) have been calculated, it is time to calculate the direct materials and the conversion costs per equivalent unit of production. The format of the schedule is as follows:

Unit Cost Analysis Schedule – Process #1			
	Direct Materials Cost	Conversion (DL + OH) Costs	Total Costs Accounted For
Costs from Beginning Inventory	$\$M_{beg}$	+ $\$C_{beg}$	= WIP_{beg}
Costs from Current Period	$\$M_{current}$	+ $\$C_{current}$	= $Total_{current}$
Total Costs to Account For	$\$M_{total}$	= $\$C_{total}$	= $Total\ Costs$
Divide by Equivalent Units	$\div EU_M$	$\div EU_C$	
Cost Per Equivalent Unit	= $\$M/EU_M$	= $\$C/EU_C$	

- E. We may now assign costs to the units that were completed and to the W-I-P.

Cost Application Schedule – Process #1		
	Costs Assigned To Production	Total Cost Assigned
Beginning Inventory Units:		
Costs to complete (current period):		
Materials (EUM x \$M/EUM)	\$M	
Conversion cost (EUc x \$C/EUc)	<u>+ \$C</u>	
Units Started and Completed:		
Materials (EUM x \$M/EUM)	+ \$M	
Conversion cost (EUc x \$C/EUc)	<u>+ \$C</u>	
Total Cost of Units Completed		= <u>\$Total_{completed}</u>
Ending Balance, W-I-P:		
Materials (EUM x \$M/EUM)	\$M	
Conversion cost (EUc x \$C/EUc)	<u>+ \$C</u>	
Total Cost of Units in Ending W-I-P		= <u>\$Total_{W-I-P}</u>
Total Costs Assigned to Production		<u>\$T_{completed + W-I-P}</u>

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VIII. Multiple Processes – Average Cost

- A. When more than one process is being accounted for, each of the processes must have its own W-I-P account where its own direct materials, direct labor and applied overhead costs are recorded. Before the cost of the goods produced during the period can be determined, it will be necessary to prepare individual unit cost analysis schedules and cost reconciliation reports for each process.
- B. The only difference between the schedules prepared above and those that would be prepared for other departments and processes further along in the production flow concerns *transferred-in costs*. These are the costs from previous processes that are “transferred in” with the units when they are passed along to the next process in line.
1. Since these costs come with the units when they are transferred into a particular process, they are costs that behave like materials costs do. They “appear” at the beginning of the production process and are not added uniformly during the process as the conversion costs are.
 2. In accounting for them, they will be treated just like the materials costs were earlier. As regards transferred-in costs, the equivalent units of production for the beginning W-I-P, the units started and completed, and the ending W-I-P are all equal to 100% of the number of units involved.

- C. For comparison purposes the cost analysis and production reports for Process #2 are given below. In these illustrations it is assumed that no materials costs are incurred in Process #2, but transferred-in cost would, of course, have to be accounted for in the same way as materials. The differences between these schedules and those prepared for Process #1 are shown in italics.

Unit Cost Analysis Schedule – Process #2			
	<i>Transferred-In Cost</i>	Conversion (DL + OH) Costs	Total Costs Accounted For
Costs from Beginning Inventory	$\$T_{\text{beg}}$	+ $\$C_{\text{beg}}$	= WIP_{beg}
Costs from Current Period	$\$T_{\text{current}}$	+ $\$C_{\text{current}}$	= $\text{Total}_{\text{current}}$
Total Costs to Account For	$\$T_{\text{total}}$	= $\$C_{\text{total}}$	= Total Costs
Divide by Equivalent Units	$\div \text{EU}_T$	$\div \text{EU}_C$	
Cost Per Equivalent Unit	= $\$T/\text{EU}_T$	= $\$C/\text{EU}_C$	
Cost Application – Process #2			
	Costs Assigned To Production	Total Cost Assigned	
Beginning Inventory Units: Costs to complete (current period): <i>Transferred-In</i> ($\text{EU}_T \times \$T/\text{EU}_T$) Conversion cost ($\text{EU}_c \times \C/EU_c)	$\$T$ + $\$C$		
Units Started and Completed: <i>Transferred-In</i> ($\text{EU}_T \times \$T/\text{EU}_T$) Conversion cost ($\text{EU}_c \times \C/EU_c) Total Cost of Units Completed	+ $\$T$ + $\$C$	= $\underline{\$Total_{\text{completed}}}$	
Ending Balance, W-I-P: <i>Transferred-In</i> ($\text{EU}_T \times \$T/\text{EU}_T$) Conversion cost ($\text{EU}_c \times \C/EU_c)	$\$T$ + $\$C$		
Total Cost of Units in Ending W-I-P		= $\underline{\$Total_{\text{w-I-P}}}$	
Total Costs Assigned to Production		$\underline{\$T_{\text{completed}} + \text{W-I-P}}$	

Process Cost Illustration Problem, Continued

Under *Average Cost*, the cost reports from the illustration problem above would be prepared as follows:

Production Report - Assembly Department			
Average Cost			
Quantity Schedule and Equivalent Units		Quantity	
		(Units)	
Units to be Accounted for:			
Work-in-Process beginning balance		1,000	
Started into Production		<u>9,000</u>	
Total Units to Account For		<u><u>10,000</u></u>	
Units Accounted for as Follows:		Equivalent Units	
		<u>Materials</u>	<u>Conversion</u>
Transferred to the Next Department:			
W-I-P _{beg.} (30% previous, 70% current period)	1,000	1,000	1,000
Started and Completed	<u>6,000</u>	6,000	6,000
Total Units Transferred	7,000		
Remaining in the Department:			
W-I-P ending balance (60% current period)	<u>2,000</u>	<u>\$3,000</u>	<u>1,800</u>
Total	10,000	10,000	8,800
Equivalent Unit Costs		Materials	Conversion
Cost to be Accounted For:		Cost	Cost
W-I-P beginning balance	\$32,600	\$17,000	\$15,600
Cost Incurred in Current Period	<u>\$243,400</u>	<u>\$85,000</u>	<u>\$158,400</u>
Total Cost to Apply to Production	\$276,000	\$102,000	\$174,000
Divide by Total Equivalent Units of Production		<u>÷ 10,000</u>	<u>÷ 8,800</u>
Cost per Equivalent Unit of Production		\$ 10.20	\$ 19.7727
Cost Allocation			
Units Accounted for as Follows:			
Transferred to the Next Department:			
W-I-P beginning balance			
Materials Cost Applied (1,000 x \$10.20)	\$10,200		
Conversion Cost Applied (1,000 x \$19.7727)	\$19,773		
Started and Completed			
Materials Cost Applied (5,000 x \$10.20)	\$61,200		
Conversion Cost Applied (5,000 x \$19.7727)	<u>\$118,636</u>		
Total Cost of Units Transferred Out		\$209,809	
Remaining in the Department:			
W-I-P ending balance			
Materials Cost Applied (3,000 x \$10.20)	\$30,600		
Conversion Cost Applied (1,800 x \$19.7727)	<u>\$35,591</u>		
Total Cost of W-I-P ending balance		<u>\$66,191</u>	
Total Cost Applied to Production		\$276,000	

Production Report - Polishing Department			
Average Cost			
Quantity Schedule and Equivalent Units		Quantity	
Units to be Accounted for:		(Units)	
Work-in-Process beginning balance		2,000	
Started into Production		<u>7,000</u>	
Total Units to Account For		<u><u>9,000</u></u>	
Units Accounted for as Follows:		Equivalent Units	
Transferred to the Next Department:		<u>Transferred</u>	<u>Conversion</u>
W-I-P _{beg.} (20% previous, 80% current period)	2,000	2,000	2,000
Started and Completed	<u>5,000</u>	5,000	5,000
Total Units Transferred	7,000		
Remaining in the Department:			
W-I-P ending balance (40% current period)	<u>2,000</u>	<u>2,000</u>	<u>800</u>
Total	9,000	9,000	7,800
Equivalent Unit Costs		<u>Transferred</u>	<u>Conversion</u>
Cost to be Accounted For:		<u>Cost</u>	<u>Cost</u>
W-I-P beginning balance	\$66,000	\$60,000	\$6,000
Cost Incurred in Current Period	<u>\$314,809</u>	<u>\$209,809</u>	<u>\$105,000</u>
Total Cost to Apply to Production	\$380,809	\$269,809	\$111,000
Divide by Total Equivalent Units of Production		<u>÷ 9,000</u>	<u>÷ 7,800</u>
Cost per Equivalent Unit of Production		\$29.9788	\$14.2308
		per EU	per EU
Cost Allocation			
Units Accounted for as Follows:			
Transferred to the Next Department:			
W-I-P beginning balance	-		
Transferred-In Cost Applied (2,000 x \$29.9788)	\$59,958		
Conversion Cost Applied (2,000 x \$14.2308)	\$28,462		
Started and Completed			
Transferred-In Cost Applied (5,000 x \$29.9788)	\$149,894		
Conversion Cost Applied (5,000 x \$14.2308)	<u>\$71,154</u>		
Total Cost of Units Transferred Out		\$309,467	
Remaining in the Department:			
W-I-P ending balance			
Transferred-In Cost Applied (2,000 x \$29.9788)	\$59,958		
Conversion Cost Applied (800 x \$14.2308)	<u>\$11,385</u>		
Total Cost of W-I-P ending balance		<u>\$71,342</u>	
Total Cost Applied to Production		\$380,809	

Note that the cost of the units transferred out to Finished Goods is less under Average Cost than it is under FIFO (\$309,467 versus \$311,411). Because the costs in the beginning W-I-P inventories are averaged over the ending W-I-P inventory under Average Cost, rather than being assigned exclusively to Finished Goods, as is the case with FIFO, differences will always occur. Note, however, that the amount of the difference is very small, compared to the overall cost of the units

completed. Since the differences are usually small and the Average Cost method is easier to apply, many companies prefer to use it instead of FIFO.

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