

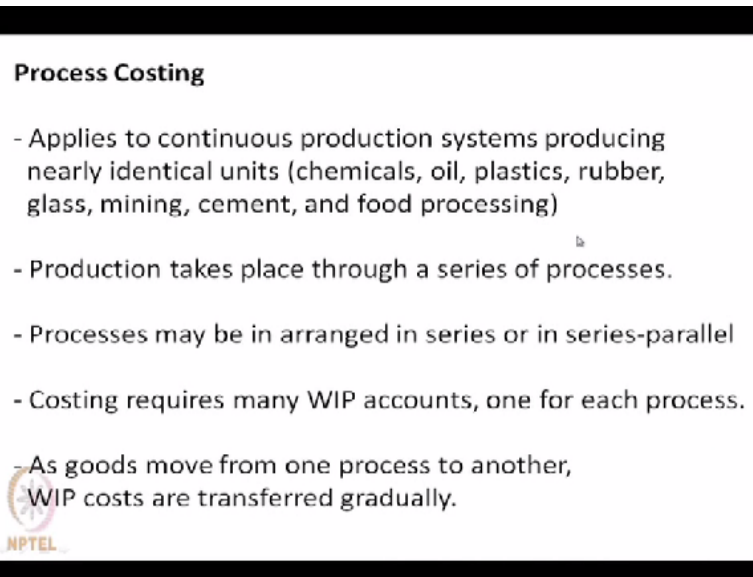
Economics, Management and Entrepreneurship
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Lecture – 14
Process Costing

Good morning. Welcome to the 14th lecture on economics management and entrepreneurship. In the last class, we spoke about job costing. If you recall in the job costing systems, only one or a few jobs are manufactured and the few jobs are similar in nature. Thus the job costing system there requires that to each job various direct costs and indirect costs are applied and then they are transferred to cost of goods sold when the items are sold.


Today, we are discussing about process costing. Process costing systems are applied to continuous production systems. Continuous production systems basically mean that identical items are produced in large numbers. Now we will find various examples of continuous production systems and it is interesting to see how costs are accounted for in production, in continuous production systems in contrast to those in the job costing systems.

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Process Costing

- Applies to continuous production systems producing nearly identical units (chemicals, oil, plastics, rubber, glass, mining, cement, and food processing)
- Production takes place through a series of processes.
- Processes may be in arranged in series or in series-parallel
- Costing requires many WIP accounts, one for each process.
- As goods move from one process to another, WIP costs are transferred gradually.

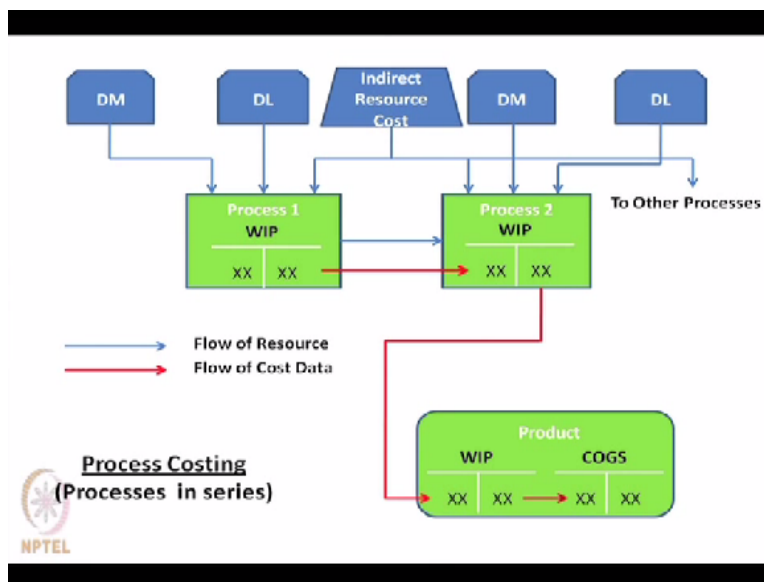
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First of all, what we mean by process costing. It applies to continuous production systems producing identical or nearly identical units. Examples are plenty. Chemicals, oil, plastics, rubber, glass, mining, cement and food processing. These are various examples. Now in such

systems, production takes place through a series of processes. Processes are usually arranged in series but in some cases, they may be also arranged in different configurations.

Certain items can be done in parallel and later on they are assembled together in a serial fashion. So that is a parallel series configuration. Now here that is because of this sequential nature of processes, costing requires recognition of work in process accounts. One for each process. As goods move from one process to another, work in process costs are transferred gradually from one process to another.

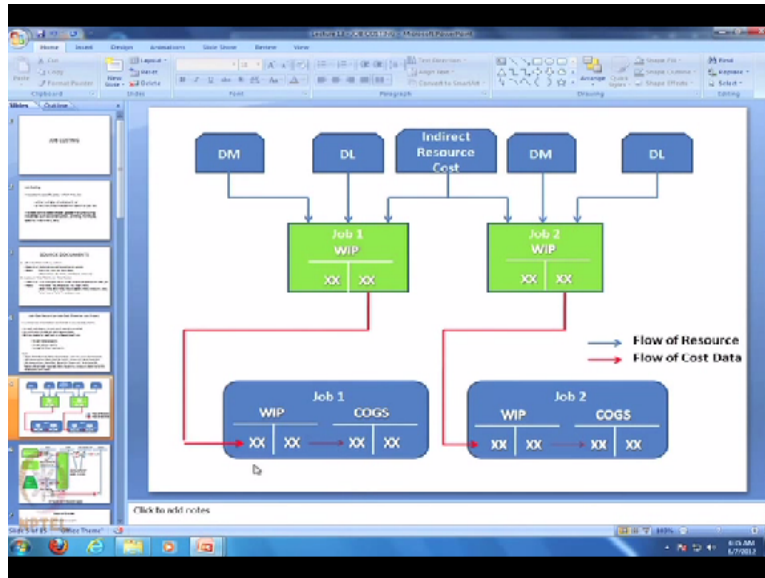
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So this is what we shall see in this flow diagram. Just as we had in the job costing system, the direct labour, direct material and indirect cost. Similarly, also in process costing systems, we have direct material, direct labour and indirect resource cost. Here those direct and indirect costs are applied to different processes. Process 1, process 2.

But unlike in job costing system, the products move from process 1 to process 2 in a continuous production system; therefore, the work in process cost is moved to work in process in process 2 before finally after a series of such process transfers, the final product work in process or final product in the work in process and cost of goods sold are prepared.

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This if you compare with the job costing system, this was for the job costing system, here direct material, direct labour, indirect resource cost. Now these were applied to one job and they are also, they were applied to a different job. So the costs were shown in this fashion for every job. So for every job, we have a work in process and cost of goods sold. Similarly, for job 2, we had another.

So here directly, all the direct and indirect costs were applied to the job and they were shown in this fashion. In contrast in process costing, we have these costs applied to individual processes and then since the goods move from one process to another in a serial fashion, the costs also are transferred from the work in process account of one process to the work in process account of another process and finally to the work in process account of the completed product.

So here we are assuming that the processes are in series. As before, the resources are applied not only to this processes but to other processes as well. These are flow of our resources, direct and indirect and these are the flow of costs. So as items or goods are transferred from one process to another, costs are also transferred. They are credited here and debited to the account of WIP of the next process.

Similarly, when it is moving to the final product inventory, this becomes, this is credited to the work in process account of process 2 and debited to the work in process of the final product.

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Example:

Assume that there are only two processes in a continuous production system: (1) Cooking and (2) Freezing

Costs of Cooking Dept are transferred to the Freezing Dept.

Cost driver: Amount of cooked food (kg)

Cost driver unit

= (Accumulated Cost in the Cooking Dept)/(kg of cooked food)

Amount transferred to the Freezing Dept

= (Cost driver unit)

(kg of cooked food physically transferred to the Freezing Dept)



Now we straight away take a simple example to start with and later on we shall give more realistic example. Here we are assuming that there are only 2 processes in a continuous production system. Cooking of an item and then freezing it for future use. So when the items are cooked, they are transferred to the freezing department. The costs of cooking department are transferred to the freezing department as well when the goods are transferred.

So here we are assuming that the cost allocation base or cost driver is amount of cooked food that is in kilogram. The cost driver unit that is the rate at which the cost driver will be calculated is accumulated cost in the cooking department/quantity of cooked food in kilogram. This ratio gives rupees per kilogram as the cost driver unit. So as the items are cooked in the cooking department and they are transferred to the freezing department, the costs are also similarly transferred.

And the amount transferred is the cost driver unit that is the amount of, that is rupees per kilogram of cooked food as the unit cost of cooked food being transferred*the quantity of cooked food physically transferred to the freezing department. So this is quite a simple example of how costs are transferred.

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WIP - Cooking		T- Accounts	
Dr.		Cr.	
DM	14	Transferred cost of	
DL	4	Goods Completed	
FOH	<u>8</u>	to Freezing Dept	24
Total	<u>26</u>		
Ending Inv	<u>2</u>		

WIP - Freezing			
Dr.		Cr.	
Cost Transferred from Cooking Dept	24	Transferred cost of	
DL	1	Goods Completed	
FOH	<u>2</u>	to Fin Goods	25
Total	<u>27</u>		
Ending Inv	<u>2</u>		

This if we write the T accounts for cooking work in process and freezing work in process. So on the debit side, we have direct material 14, okay Rs. 14,000, direct labour 4 or 4000, factory overhead 8, so totalling 26. Now actually less quantity of goods was transferred. So let it be 24,000. So this 24 comes as debit amount to the work in process in the freezing department. The remaining inventory lying in the cooking department that is not transferred to the freezing department is Rs. 2000.

Now in the freezing department, it has its own direct labour and in this case, there is no direct material. There is a cost transferred from the cooking department which is 24,000, direct labour we are assuming 1000 and there is a factory overhead as 2000, totalling 27,000. Now if not the full amount is sold, only to the extent of 25,000 is sold out, then the ending inventory in the freezing department is $27-25=2000$. So this is a simple example and these are the T accounts for the 2 departments.

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WIP – Cooking DM inventory	14	14	
WIP – Cooking Accrued payroll	4	4	
WIP – Cooking FOH	8	8	
WIP – Freezing WIP – Cooking	24	24	
WIP – Freezing Accrued payroll	1	1	
WIP – FOH FOH	2	2	
Fin Goods Inventory WIP – Freezing	25	25	

Journal Entries

These are the journal entries. They are very simple. All the items that are mentioned here, 14, 4 and 8 and thus side 24, 1 and 2. So 14, 4 and 8, so they are debited to the cooking department and of course, they are credited to the inventory, direct material inventory. Suppose we show also the T account for direct material inventory, then we would credit that amount because that is then gets transferred to the work in process account of the cooking department.

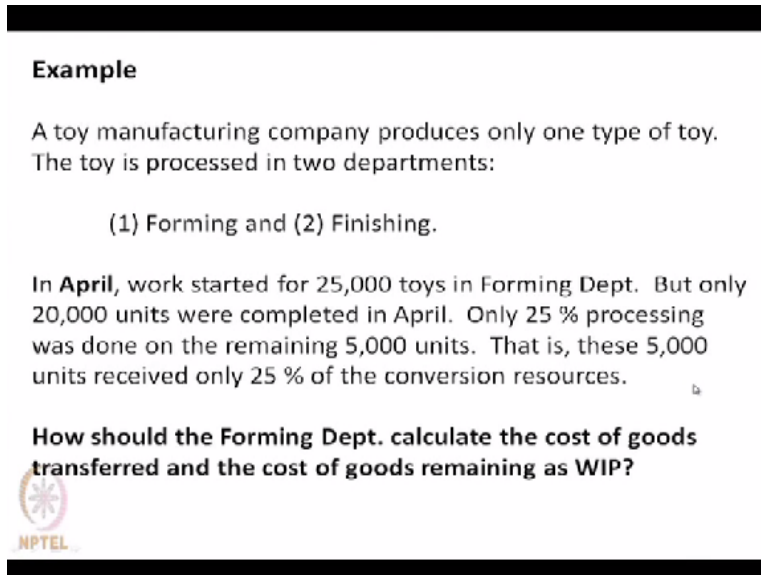
Similarly, for labour, it is 4000 or 4 and that is credited to the accrued payroll. Similarly, for factory overhead, so just as we are putting the debit amount in the work in process account. Similarly, we will have to put the credit amounts in the respective accounts. Then Rs. 24,000 worth of goods are transferred to the freezing department. So the freezing department WIP is debited.

The cooking department's WIP is credited, that already we have shown it here, 24 is credited here and 24 is debited here. The journal entry is like that and similarly for freezing department, similar to the cooking department, we also have direct labour, factory overhead, they are charged to work in process in the freezing department but they are credited to their respective accounts. Finally, this is the amount sold out.

So accordingly the WIP reduces by 25 and finished goods inventory increases by 25. So these are the journal entries. We have of course not shown the finished goods inventory in our earlier slide.

We just wrote transferred cost of goods completed to finished goods. So this is a simpler example.

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Example

A toy manufacturing company produces only one type of toy. The toy is processed in two departments:

(1) Forming and (2) Finishing.

In **April**, work started for 25,000 toys in Forming Dept. But only 20,000 units were completed in April. Only 25 % processing was done on the remaining 5,000 units. That is, these 5,000 units received only 25 % of the conversion resources.

How should the Forming Dept. calculate the cost of goods transferred and the cost of goods remaining as WIP?



Now take a little more complicated example where we are considering that items in the first process are not completely made and are not completely transferred to the next process. Some are semi-finished or semi-processed. So when certain items are semi-processed and were therefore not transferred to the next process, the question is how to account for such transfer because the items that are semi-processed, they have consumed the direct material.

But they have not fully the factory overhead expenses or labour charges were not fully applied to them. So this is the case that we shall study in this particular example. Here we are considering a toy manufacturing company that produces only one type of toy in large number. Therefore, it is something like a continuous production or a mass production system one type of toy being manufactured by the company.

For simplicity, we are assuming that the toy is processed in 2 departments. One, the forming department and 2, the finishing department. We will consider 2 months, April and May. We are assuming that to start with in April, there is no work outstanding either in the forming or in the finishing department. So work started in April 1st in the forming department for 25,000 toys but at the end of April, only 20,000 units were completed.

Therefore 5000 units were semi-processed and it is assumed that only 25% of the processing work could be done on the remaining 5000 units. That means only after some more processing to the extent of 75%, these 5000 units would be considered to have completed and then they could be transferred to finishing but 75% work remains to be done. So only 25% processing work was done on the remaining 5000 units.


That is these 5000 units received only 25% of the conversion resources. By conversion resources, we mean all the resources that are required apart from direct material. That means the direct labour and other overhead charges, put together is called the conversion cost or the conversion resources and their cost is called conversion cost. So if this is the situation, then the question is how should the forming department calculate the cost of goods transferred and the cost of goods remaining in its own department as work in process.

This is the question and this work is for April. Let us see how we go about it.

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Forming Dept's costs in April are as follows:

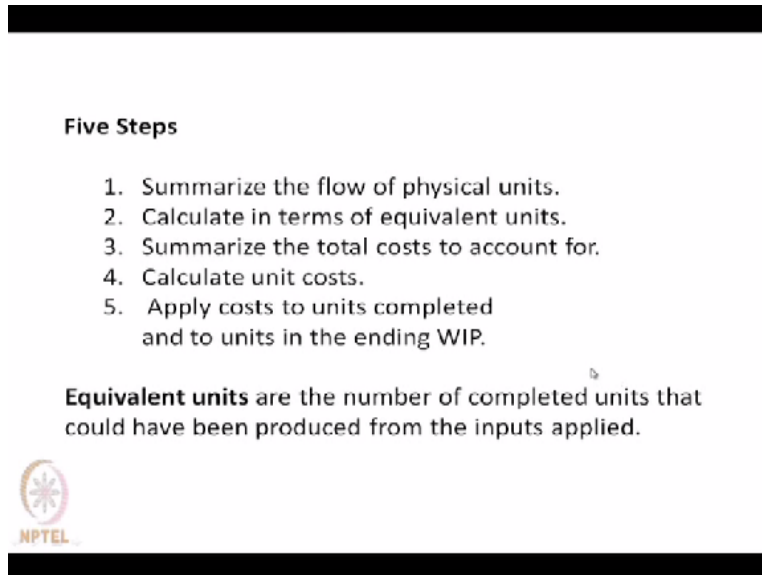
DM		70,000
Conversion Costs		
DL	10,625	
FOH	<u>Rs 31,875</u>	<u>42,500</u>
Costs to account for		<u>Rs 112,500</u>



First of all, we collected the data, we found out that the direct material that was requisitioned and used in the forming department for the 25,000 toys cost Rs. 70,000 and that in the forming department in April, direct labour charges were Rs. 10,625. Factory overhead was Rs. 31,875. Together they came to Rs. 42,500. The conversion cost were Rs. 42,500 and therefore, the total

cost in April that occurred in the forming department and which has to be accounted for is the sum of the direct material cost and the conversion cost that came to Rs. 112,500. So up to this, there is no problem.


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Five Steps

1. Summarize the flow of physical units.
2. Calculate in terms of equivalent units.
3. Summarize the total costs to account for.
4. Calculate unit costs.
5. Apply costs to units completed and to units in the ending WIP.

Equivalent units are the number of completed units that could have been produced from the inputs applied.



Now to account for this Rs. 112,500, we normally consider 5 steps in process costing and they are the following. First of all, summarise the flow of physical units. Calculate in terms of equivalent units. We have defined equivalent units are the number of completed units that could have been produced from the inputs applied, could have been completed units, actually the completed units are 20,000.

But the remaining 5000 units are in semi-finished or semi-completed stage to the extent of 25%. So we will consider this and find out the equivalent units, summarise the total cost to account for, calculate the unit costs and apply the costs to units completed and to units in the ending work in process. Now let us apply each one of these steps to finally know how the costs are applied to the completed units and to the work in process.

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Step 1: Summarize the flow of physical units.

Completed number: 20,000 units
Partially completed: 5,000 units
(receiving 25% conversion resources)

Step 2: Calculate the output in terms of equivalent units.

Equivalent number of units completed
 $= 20,000 + (0.25)(5,000) = 20,000 + 1,250 = 21,250$ units

Note:

- DM was received by all the 25,000 units.
- Conversion resources were received by 21,250 equivalent units.




First of all, step 1 states summarises the flow of physical units. It is very simple, the completed number of toys in the forming department, this is all about forming department, is 20,000 units, this of is meaningless and partially completed units are 5000, totalling 25,000 for which the work started. For this 5000 units have received on an average 25% of the conversion resources. Knowing this, we calculate the output in terms of the equivalent units.

So the completed units are 20,000, so we write that as it is and then we say that 25% of 5000 which is this*by this=1250, this should be added to 20,000. So the equivalent amount of units that have received the complete direct material and conversion costs are 21,250 units. But let us understand that direct material was received by all the 25,000 units because material has been issued to the forming department but the labour charges were not fully applied.

So the conversion resources were received by only the equivalent number which is 21,250 equivalent units, the direct material was received by all the 25,000 units where as only 21,250 equivalent units received the conversion resources of labour and other, power and other resources, indirect resources.

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Forming Dept – Month Ended April 30				
		Total Costs	Details	
			DM	Conversion Costs
Step 3	Costs to account for (Rs)	<u>112,500</u>	70,000	42,500
Step 4	Unit costs (Rs/unit)	4.80*	2.80**	2.00***
Step 5	Application of costs			
	To units completed and transferred to Fin Dept (20,000 units @ 4.80 Rs/unit)	<u>96,000</u>	70,000	
	To units not completed		(25,000	
	DM 14,000		– 20,000)	
	Con Costs <u>2,500</u>		= 5,000	
	WIP, April 30	<u>16,500</u>	(@2.80	(5000)(0.25)
			Rs/unit)	= 1,250
	Total Costs accounted for	<u>112,500</u>		(@2.00
				Rs/unit)


NPTEL (112,500)/(25,000) ** (70,000)/(25,000) *** (42,500)/(21,250)

Once we know this, we can then go for forming departments month ended April 30th. Now this is, this right down step 3, 4 and 5, 5 of course is quite big, 3 and 4 not so difficult. So here we are writing the details of the total cost. If you remember the direct material cost used in the forming department was 70,000 and all the conversion costs put together is 42,500, let us see that. This one, the direct material cost in the forming department was 70,000 and the conversion cost was 42,500, total cost to account for was 112,500. So that is what is shown here.

Direct material 70,000, conversion cost 42,500, total cost is 112,500. Now from this figure and from the knowledge of how many units received the direct material cost, direct material cost was received by all the 25,000; therefore, unit costs as for as the direct material is concerned is $70,000/25,000$, we have given 2 asterixis, there is a footnotes $70,000/25,000$. So this divided by this, gives me this divided by 25,000, gives me the unit cost as for as the direct material is concerned.

Unit direct material cost is Rs 2.80 per unit. Similarly, conversion cost. Recall that conversion cost is applied only to 21,250, this is the equivalent number of units which we calculated in this slide. Equivalent number of minutes that received the conversion resources where all the items that were transferred and 25% of the remaining items and that gave a sum of 21,250 units. So we divide that to get the unit cost, that is cost of conversion resources that was consumed by one equivalent unit.

Adding it up, we get this as 4.80 which is also this/25,000. This work is written here. So this is the cost to account for and this step 4 is find out the unit cost by considering the equivalent units. Now we apply the cost finally. To apply the costs, there are 2 items, one to units that are completed and transferred to finishing department and the other is units not completed that remains with the forming department.

Now here we write, is very simple, of the completed item, it is Rs. 4.80 paisa and 20,000 units were completed; therefore, the amount transferred is $20,000 \times 4.80$ which is Rs. 96,000. So this is quite straightforward but the units that remained, so how many remained, $25,000 - 20,000$ is 5000 and at the rate of 2.80, the direct material has been consumed. So 5000×2.80 that gives 14,000 as units not completed, consuming direct material.

So 2.8 multiplication, 5000 remaining items and as far as the conversion cost is concerned, we know that there are 5000 items remaining but they received on an average 25% of the conversion was only done. So equivalent unit is 1250 and at the rate of Rs. 2, the conversion cost was consumed and therefore, the product of these 2 gave us the conversion cost for the items that are not completed, remains in WIP as 2500.

When we sum up, it gives us 16,500. So the 2 costs are one transferred to the finishing department, the cost is 96,000, the one that remains as WIP in the forming department is 16,500. So together they add up to 112,500 and incidentally this was the cost to account for and now we have actually accounted for that. So what will happen? This amount will be therefore credited to the finishing department. This amount will remain in the forming department. So I think this slide has been fully explained.

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Journal Entries

WIP – Forming	70,000	
DM inventory		70,000
WIP – Forming	10,625	
DL – Forming		10,625
WIP – Forming	31,875	
FOH		31,875
WIP – Finishing	96,000	
WIP – Forming		96,000



The journal entries would now be in this form, the direct material 70,000 and the inventory account is credited because from the inventory, this inventory was brought to the forming department. The labour charges and the overhead charges in the forming department were, look at the, here, the direct labour charges and the factory overhead cost in the forming department in April were 10,625 and 31,875, that is what we have written down here.

They are debited to the work in process account of the forming department but credited to the direct labour and factory overhead accounts. Finally, we have calculated this Rs. 96,000 as the cost of goods, 20,000 units, that had transferred to the finishing department. So Rs. 96,000 will be going as, will be debited to the WIP finishing department but credited to the WIP of forming department. So I think this part is also fully explained.

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WIP – Forming Account

	Dr.		Cr.
DM	70,000	Transferred out to	
DL	10,625	Finishing	96,000
FOH	<u>31,875</u>		
Costs to account for	<u>112,500</u>		
Balance April 30	<u>16,500</u>		



Now naturally we can write the work in process of the forming account, forming department and direct material is 70,000, direct labour is 10,625, factory overhead is this, costs to account for was 112,500, transferred out to finishing department was 96,000, what remains in balance for the work in process in the forming department at the end of April is 16,500. This is the key account work in process of the forming department.

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Now consider the production of Forming Dept in May.

The Company had a May beginning WIP of 5,000 units.

It started production on 26,000 items.

It could complete production and transfer of 24,000 items to the Finishing Dept.

The remaining 7,000 items could receive only 60 % of the conversion resources.

How should the Forming Dept. calculate the cost of goods transferred and the cost of goods remaining as WIP?



Now consider May. recall that in April, there was no inventory, no work in process in the forming department. There was no work in process but at the end of April, there is a work in process now available to the extent of Rs. 16,500 or in terms of units, 5000 units which were semi-finished and they are retained in the forming department because the work was not

completed; therefore, they could not be transferred to the finishing department and now May have started.

Therefore, the April end inventory in the forming department becomes the May beginning inventory in the same department. Now the situation is a little different from what we had or what we have done in April to this extent. The presence of WIP or inventory in the forming department, not inventory, work in process because the items, 5000 items were in semi-finished condition.

That is what we are writing here. Consider the production of forming department in May. Recall that the company had the May beginning inventory. April end is May beginning. The company had a May beginning inventory of 5000 units. It started production in May. It started production on 26,000 items. So this is a new information. It had 5000, it started production on 26,000 items but at the end of May, it could only complete production and transfer of 24,000 items to the finishing department.

So $5000+26,000=31,000$ were being processed in May of which 24,000 items were completed and 7000 items remained as work in process and it is estimated that on an average each of these items that remain with the forming department received only 60% of the conversion resources. In April, the 5000 items had received 25% of the conversion resources but in May, it is estimated that much more work has been done but there are 7000 items that could not be completed.

They received on an average 60% of the conversion resources. Now the question is how should the forming department calculate the cost of goods transferred and the cost of goods remaining as work in process. The situation is little different from that in April in the sense that now there is a beginning inventory or work in process of 5000 units. So in fact I should say this as work in process and not inventory. This should be called work in process, yes. So this also should be work in process.

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Effects of Beginning Inventory

Now consider the production of Forming Dept in May.

The Company had a May beginning WIP of 5,000 units.

Step 1: Summarize the flow of physical units.

Completed number :	24,000 units
Partially completed:	7,000 units
	(receiving 60 % conversion resources)
	(7,000 = 5,000 + 26,000 – 24,000) units.

Step 2: Calculate the output in terms of equivalent units.

Equivalent number of units completed
= 24,000 + (0.60)(7,000) = 28,200 units



• DM was received by all the 31,000 units.
Conversion resources were received by 28,200 equivalent units.

Now here we have to consider the effect of the beginning inventory in May. The company had a May beginning work in process of 5000 units. Now as before the 5 steps are to be applied. First step is summarise the flow physical units, completed number 24,000, partially completed items are 7000 units on averages that have received 60% of the conversion resources, 7000 comes because 5000 units were there, 26,000 units production started, 24,000 units production completed and transferred, 7000 remains with the forming department.

Now as before we calculated the equivalent units. It is 24,000 equivalent units completed. So 6000*60%, no there is a mistake here. This should be 7000, because 7000 units are in a semi-finished stage receiving 60% conversion resources; therefore, 7000*0.6 is 4200 and when added to 24,000 that have been completed and transferred, the sum becomes 28,200 units.

Now as we had done in the case of April, direct material was received by all the 31,000 units, whereas the conversion resources have been received by only 28,200 units, 200 equivalent units, equivalent completed units.

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In May, the following costs were incurred by the Forming Dept:

DM:	82,100	
Conversion cost:		
DL: 14,560		
FOH: <u>42,160</u>	<u>56,720</u>	
May Manufacturing Cost:	<u>138,820</u>	Rs

Costs to account for can be calculated as follows:

May Initial Inventory in the Forming Dept:	16,500	
May manufacturing costs:	<u>138,820</u>	
Costs to account for:	<u>155,320</u>	Rs



So keeping this in mind, we now proceed in May the following costs were incurred by the forming department. Now we consider all the cost aspect in May in the forming department, direct material consumed was 82,100 and the conversion costs were, direct labour was this much, factory overhead was this much, totalling this much and the May manufacturing cost was the direct material plus the conversion cost added together was Rs. 138,820.

So the costs to account for now is, this is the fresh cost, May cost and this was the work in process that remained in April, at the end of April. So April's outstanding cost of WIP and the new cost in May in the form of direct material and conversion which was 138,820 together is the cost that will now to be accounted for, accounted for means how much of this is transferred to the finishing department and how much remains with as WIP in the forming department at the end of May. This will now ought to be done.

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WIP in the Forming Dept. consists of

- items produced in April and
- items produced in May

The unit costs of manufacture of items made in April are different from those in May.

How to account for WIP then?

Two Methods:

1. Weighted Average Method
2. First-in, First-out Method



So inventory in the forming department consists of, instead of inventory, let us call it work in process in the forming department consists of items produced in April and those produced in May. The unit costs of manufacture of items made in April are different from those in May. How to account for, well not inventory again, it is WIP. Now there are 2 methods that are used, weighted average method and first-in, first-out method.

We shall be discussing weighted average method because of its simplicity and because it is highly popular. The FIFO or the first-in, first-out method is more complicated and is not preferred in practice.

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Weighted-Average Method

Unit costs (Rs/unit) are calculated as follows:

For DM

$$\frac{\text{April End Inv (Rs) + May DM (Rs)}}{\text{April End Inv (units) + May DM (units)}} = \frac{14,000 + 82,000}{5,000 + 26,000} = 3.10 \text{ (Rs/unit)}$$

For Conversion

$$\frac{\text{Con Cost in April (Rs) + Con Cost in May (Rs)}}{\text{Eq. units for conversion in May (units)}} = \frac{2,500 + 56,720}{28,200} = 2.10 \text{ (Rs/unit)}$$



Now let us study what this weight average method means. First of all, let us understand that this is April and this is, there is certain amount of direct material used in April and certain amount of direct material used in May. Therefore, what we have to find is the total amount spent in direct material in May and in April and inventory, that is remaining amount, 5000 and total amount, total quantity, if we divide that is the rupees per unit cost of direct material.

So we had 5000 units and the direct material cost was 14,000 associated with 5000 and now 26,000 items were started production and they received 82,000 as direct material cost. Now let us look at this figure. The costs in the month of May that were incurred by the forming department were as follows. The direct material cost was Rs. 82,100, direct labour was 14,560, factory overhead was 42,160.

Now totalling the conversion cost was 56,720. The May manufacturing cost was the sum of these 2 which came to Rs. 138,820. Now the cost to account for will then be not only the May cost which was incurred, which is Rs. 138,820 but also the work in process of April in the forming department which was Rs. 16,500. So this totals to Rs. 155,320. Recall that this 16,500 was the work in process in the forming department in the beginning of May at the end of April.

This you can see, this 16,500 was the work in process conversion cost, the direct material was 14,000 and the conversion cost was 2500 at the end of April which is same also as in the beginning of May. Now work in process in the forming department consists of items produced in April and those produced in May. The unit costs in April and May are different. The question then is how to account for work in process in such a situation.

There are 2 methods, one is weighted average method, the other is first-in, first-out which is also called FIFO method, first-in, first-out, FIFO method. As we shall see the weighted average method is simpler requiring less number of computations. First-in, first-out method requires more computation and is not preferred in practice; therefore, we shall cover only the weighted average method in our presentation here.

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Weighted-Average Method

Unit costs (Rs/unit) are calculated as follows:

For DM

$$\frac{\text{April End Inv (Rs) + May DM (Rs)}}{\text{April End Inv (units) + May DM (units)}} = \frac{14,000 + 82,100}{5,000 + 26,000} = 3.10 \text{ (Rs/unit)}$$

For Conversion

$$\frac{\text{Con Cost in April (Rs) + Con Cost in May (Rs)}}{\text{Eq. units for conversion in May (units)}} = \frac{2,500 + 56,720}{28,200} = 2.10 \text{ (Rs/unit)}$$



First of all, let us understand that for direct material, the cost was 14,000, the work in process for April and conversion cost for April was 2500, totalling 16,500. Now they are separately accounted for. 5000 items add Rs. 14,000 direct material cost. 26,000 items produced in May, the direct material cost was 82,100. Therefore, the unit cost in a weighted average method would be this+this/this+this. April end inventory+May direct material cost, this too added will be in the numerator and the actual amount in units will be in the denominator.

So the unit of measure here becomes rupees per unit and that comes to Rs. 3.10. For conversion resources, we have equivalent number of units that received conversion was 28,200 and in May, the conversion cost was Rs. 56,720 and in April, the work in process that remained in inventory in the forming department was 2500. So this was in the numerator and this was in the denominator giving the unit cost for conversion as Rs. 2.10; therefore, the total cost, total unit cost became Rs. 5.20.

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Forming Dept – Month Ended May 31				
		Total Costs	Details	
			DM	Conversion Costs
Step 3	WIP, April 30	16,500	14,000	2,500
	Costs added in May	<u>128,820</u>	<u>82,100</u>	<u>56,720</u>
	Costs to account for (Rs)	<u>155,320</u>	<u>96,100</u>	<u>59,220</u>
Step 4	Equivalent units		31,000	28,200
	Unit costs (Rs/unit)	5.20	3.10	2.10
Step 5	Application of costs			
	To units completed and transferred to Fin Dept (24,000 units @ 5.20 Rs/unit)	<u>124,800</u>		
	WIP (7,000 units), May 31			
	DM 21,700		7,000	
	Con costs 8,820		(@3.10)	4,200
	Total WIP	<u>30,520</u>	Rs/unit)	(@2.10
	Total costs accounted for	<u>155,320</u>		Rs/unit)

Now we follow step 3, 4 and 5 exactly in the same way as we did in the month of April. Here for work in process in April end, the direct material was 14,000 and conversion cost was 2500, totalling 16,500. Costs added in May for direct material, it was 82,100 and conversion cost was 56,720, added up, it gives Rs. 128,820. Costs to account for is therefore this+this is 155,320 and direct material cost was 96,100 and conversion cost was 59,220.

Now already we have found out the equivalent units. For direct material, all the items have received the direct material but conversion cost, the equivalent cost is equivalent number of units is 28,200. Therefore, the unit cost is already we have calculated, this/this is 3.10, this/this is 2.10, totalling 5.20. Now this cost has to be applied to those who have completed their production and they have been transferred to the finishing department and those that remained as WIP in forming department.

We know that for those who have completed their cost, the unit cost is Rs. 5.20 and 24,000 units have been produced and transferred in May to the finishing department. Therefore, the product of this will be the cost that will be debited to the finishing department and credited to the WIP of the forming department at the end of May. As far as the work in process in May is concerned for the forming department, we now have 7000 items still left in the semi-finished stage in the forming department, is costing Rs. 3.10.

Therefore $7000 \times \text{Rs. } 3.10$ gives up Rs. 21,700. The conversion cost, conversion cost is Rs. 2.10 for equivalent number of unit produced and the conversion cost becomes 4200 that is this is coming as 7000 items that remained at the 60% completion stage. So 7000×0.6 is 4200 equivalent units, multiplication 2.10 that gives us 8820 as the conversion cost of the items remaining as WIP in the forming department.

Together the total work in process is 30,520 and the total cost then accounted for was $124,800 + 30,520$ and summing up will get this as Rs. 155,320. So the cost to accounted for has been accounted for in this manner, that is the cost that is transferred to the finishing department or charged to the finishing department is 124,800 and charged to the work in process account is 30,520.

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First-in, First-out (FIFO) Method

1. It distinguishes the current work done from the previous work done on the beginning inventory of WIP.
2. The equivalent units is calculated on the basis of work done in the current period.

That is, the equivalent units are:

For DM: $31,000 - 5,000 = 26,000$ units

For Conversion: $28,200 - 1,250 = 26,950$ units

3. It involves more computation compared to weighted-average method. That is why, it is almost never used in practice.



And the first-in, first-out method, it distinguishes the current work done from the previous work done on the beginning inventory of work in process. Here the equivalent units are calculated on the basis of work done in the current period that is the equivalent units are for direct material, it is 26,000 units whereas for conversion, it is 26,950 units. It involves more computation compared to the weighted average method that is why it is almost never used in practice.

So to sum up, we say that unlike in job costing, in process costing the jobs are transferred from one process to another and therefore, costs are also transferred accordingly and finally it gets

transferred to the finished product inventory, the final product or finished product inventory. The problem arises because there can be certain items that remain in a semi-finished stage in the predecessor process and therefore, we have to estimate the amount that should be debited to such a work in process in the predecessor process.

There are 2 methods, one is weighted average method, the other is first-in, first-out method. First-in, first-out method is more complicated and is rarely followed in practice; therefore, we cover only the weighted average method. Here when the goods are transferred in this particular example, when the goods were transferred from the forming department to the finishing department.

We assumed that we took that the certain work in process remained and therefore, from one period to another period when the inventory is transferred, then in that case costs are also accordingly transferred. We will take up this in our next lecture.