Foundations of Accounting & Finance

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Lecture – 25

Classification of Costs Preparation of Cost Sheet - Part I

Introduction

Welcome to the next session on cost accounting. In the previous session, we explored various types of costs: variable, fixed, direct, and indirect. Variable costs vary, while fixed costs remain constant regardless of production levels. Direct costs have a linear relationship with output, while indirect costs may vary and lack a direct correlation with output.

Direct costs are directly traceable to the end product. For instance, in the example of manufacturing a pen, each granule of plastic directly contributes to the production of the pen. Direct material costs, like tires in car assembly, are visible in the final output. Direct labour costs, such as paying a labourer to produce a certain number of units, are directly attributable to each unit's production.

Indirect costs, on the other hand, cannot be directly linked to the end product. They include expenses such as factory lighting, rent, and helper salaries. These costs, though not directly associated with production, are essential for manufacturing operations. In this session, we try to understand the classification of manufacturing cost and preparation of a cost sheet.

Classifications of Manufacturing Costs

In the classification of manufacturing costs, there are three fundamental aspects to remember.

1) Direct Materials

Direct materials are raw materials that become an integral part of the product and that can be conveniently traced directly to the output . For example, a car radio installed in an automobile or tires in an automobile are all direct costs that can be traced back directly to the product.

2) **Direct Labour**

Direct labour costs are those labour costs that can be easily traced to individual units of product. For example, if I pay a labourer $100 for 10 units, then for every unit he manufactures, I pay him $10. These costs are directly traceable to the output, known as direct labour costs.

3) **Manufacturing Overhead**

Manufacturing overhead includes all manufacturing costs except direct material and direct labour. These costs cannot be readily traced to finished products. Examples includes indirect materials that cannot be easily or conveniently traced to specific units of product and indirect labour costs that cannot be easily or conveniently traced to specific units of product.

Manufacturing Overhead – Examples

Examples of manufacturing overhead:

- Depreciation of manufacturing equipment - Depreciation occurs with usage and the passage of time, regardless of whether the machine is actively used
- Utility costs
- Property taxes
- Insurance premiums incurred to operate a manufacturing facility

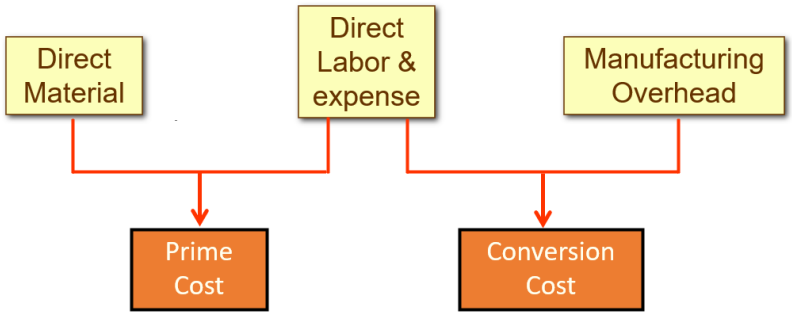
Only those indirect costs associated with manufacturing are included in manufacturing overhead.

4) **Direct expenses**

Direct expenses are costs that can be directly traced back to the product. These expenses are distinct from direct material and direct labour costs. For instance, consider the lighting mounted on a machine. The light is activated when the machine is in operation and switched off when idle. The power consumption of this light directly correlates with the output because each job performed on the machine requires the light to be on for a certain duration. Therefore, the power consumed can be directly attributed to the production output. These types of expenditures, which are directly traceable to the end product, are known as direct expenses.

Prime Costs and Conversion Costs

Manufacturing costs are often classified as follows:



1) Prime cost

Prime cost refers to the sum of direct material (DM), direct labour (DL), and direct expenditure (DE). These three components combined represent the core cost of a product, often referred to as the prime cost. The term "prime" signifies the essence or core of something. Therefore, prime cost captures the fundamental costs involved in producing a product. When manufacturing overhead and other manufacturing-related expenses are added to these three components, the total represents the cost of production, accounting for adjustments related to inventory.

2) Conversion cost

Conversion cost refers to the total expenditure incurred in converting raw materials into finished goods, excluding the cost of direct materials. It encompasses the expenses associated with direct labour, direct expenditure, and manufacturing overhead. Direct labour and direct expenditure are the costs directly involved in the transformation process from raw materials to finished products, while manufacturing overhead includes other indirect costs related to production.

By focusing solely on labour, expenditure, and overhead, conversion cost represents the expenses specifically attributed to the conversion process itself. This concept helps isolate and analyse the costs directly associated with the manufacturing process, providing insights into the efficiency and effectiveness of production operations.

To calculate conversion cost, one would add up the expenses related to direct labour, direct expenditure, and manufacturing overhead, excluding the cost of direct materials. This metric serves as a key indicator for evaluating the efficiency of the production process and identifying areas for potential cost optimization.

Calculation of prime cost (Exercise 1)

Determine the prime cost from the following information:

- Raw materials purchased $20,000
- Opening stock of raw materials $2,000
- Raw material transportation costs $1,500 (from the supplier)

- Cleaning supplies purchased $3800
- Closing stock of raw materials $4500
- Direct labour costs incurred $45,000
- Accrued labour costs for the current production $5000.

In exercise one, the task is to determine the prime cost. Prime cost consists of direct materials, direct labour, and direct expenditure that are consumed. To calculate the prime cost, we need to identify the costs associated with these three elements.

1) Direct Materials

In analyzing the cost of raw materials, we start with the initial purchase amounting to approximately $20,000. This figure represents the materials procured for production purposes. Additionally, there is a transportation cost associated with the raw materials, totaling $1,500. In financial accounting, it is normal to include freight expenses in the total material cost, similar to the concept of 'landed cost.' This entails factoring in all expenses till the materials reaches the warehouse. Consequently, we add the freight cost of $1,500 to the raw material purchase cost.

To determine the total material cost, we consider the sum of material purchases and freight expenses, adjusting for any returns. This calculation involves subtracting any returned materials from the total purchases. Following this, we focus on calculating the direct material consumed, which necessitates accounting for both opening and closing stock levels. Firstly by adding the purchases to the opening stock of materials to arrive at total materials available and then subtracting the closing stock from the sum of material to arrive at materials consumed. In this scenario, the opening stock amounts to $2,000, while the closing stock is at $4,500. Therefore, the direct material consumed equals the material purchased plus the opening stock minus the closing stock, resulting in a final figure that reflects the materials utilized in production.

Direct Materials		
Materials purchased	A	20,000
Freight	B	1,500
Less: Returns	C	-
Cost of new materials	*D = A+B-C*	*21,500*
Opening inventory of RM	E	2,000
Closing inventory of RM	F	4,500
Total material consumed	**G = D+E-F**	**19,000**

2) Direct labour

Examining the next component essential for determining the prime cost, we focus on direct labour expenses. The actual direct labour cost incurred amounts to approximately $45,000 in this scenario, denoted as 'H.' Additionally, there's an accrued labour cost of $5,000, marked as 'I.' To

calculate the total direct labour cost, we sum up the actual incurred labour cost ('H') and the accrued labour cost ('I'). This yields the total direct labour cost ('J'), representing the combined expenses associated with labour in the production process.

Direct labour		
Actual incurred	H	45,000
Accured labour cost	I	5,000
Total Direct labour cost incurrred	**J = H+I**	**50,000**

3) Direct Expenses

In the context of direct expenses, we need to ascertain their relevance to the production process. Direct expenses refer to costs directly attributable to the manufacturing of goods. For instance, if we consider a garment manufacturing unit, expenses on items such as washing and dyeing liquids, which are integral to the production process, qualify as direct expenses. However, if the expenses involve general cleaning products for maintaining the shop floor, unrelated to the production process, they do not qualify as direct expenses. In the case at hand, where the nature of the cleaning supplies is not specified, and it is unclear whether they are directly related to production, I will assume they are not integral to the production process.

Therefore, I consider the actual and accrued direct expenses as zero, denoted as 'K.' Consequently, the total direct expenses incurred in this scenario remain zero. Instead, such cleaning supplies expenses would typically be categorized under manufacturing overhead costs, as they lack direct traceability to the production process. Only when an expense is an integral part of production can its direct attribution be established, warranting its classification as a direct expenditure. Thus, without clear traceability to production, these expenses are not considered direct expenditures in this instance.

Direct Expenses		
Actual	K	
Total cost of direct expenses	**L**	**-**

Prime cost

The prime cost encompasses the essential expenses directly tied to the production process. To calculate the prime cost, we sum up several key components: direct material (G), direct labour (J), and direct expenses (L), denoted as G + J + L. These elements represent the core costs involved in manufacturing, excluding any overhead expenses. By adding these components together, we arrive at the prime cost incurred during the production process.

Cost Sheet		
Direct Materials		
Materials purchased	A	20,000
Freight	B	1,500
Less: Returns	C	-
Cost of new materials	*D = A+B-C*	*21,500*
Opening inventory of RM	E	2,000
Closing inventory of RM	F	4,500
Total material consumed	**G = D+E-F**	**19,000**
Direct labor		
Acutal	H	45,000
Accrued	I	5,000
Total cost of direct labor	**J = H+I**	**50,000**
Direct Expenses		
Actual	K	
Total cost of direct expenses	**L**	**-**
PRIME COST	**M = G+J+L**	**69,000**

Cost of Goods Manufactured

Once we have established the prime cost, the next step is determining the cost of goods manufactured. To achieve this, we focus on two fundamental aspects.

1) Total manufacturing overhead

The first aspect involves identifying and totaling all manufacturing overhead related to the factory. This includes all expenses incurred in the manufacturing process, such as rent, utilities, equipment maintenance. These overhead costs are then added to the prime cost to determine the total manufacturing overhead.

2) Adjust for work in progress inventory

The next step involves adjusting for work in process (WIP) inventory. Work in process inventory represents products that are partially completed during the manufacturing process. When analysing the inventory section of a balance sheet, we typically come across three types of inventory: raw material inventory, work in process inventory, and finished goods inventory. While finished goods inventory can be further categorized based on location or distribution status, we will focus solely on work in process inventory for now.

Work in process inventory encompasses products that have undergone some manufacturing steps but are not yet finished. For instance, consider a car assembly line where cars are in various stages of completion. Some cars may have chassis assembled but lack tires or engines, representing semi-finished products or work in process inventory. To accurately determine the total cost of goods

manufactured, it is crucial to include the costs associated with work in process inventory. This adjustment ensures that all expenses related to the manufacturing process are properly accounted for in the cost sheet, facilitating a comprehensive analysis of the prime cost.

Variation of Exercise 1

Will the value of prime costs change if the firm had:

- an opening raw material inventory of $25,000?
- incurred a separate on-site material inspection cost of $3500?
- appointed an additional factory supervisor at a salary of $60,000?
- Incurred unexpected production machine maintenance of $20,000?

An opening raw material inventory of $25,000?

Yes, the value of prime costs will change if the firm had an opening raw material inventory of $25,000. This is because the opening raw material inventory directly affects the calculation of prime costs. Initially, if the opening raw material inventory was $2,000, the prime cost would be calculated accordingly. However, if the opening raw material inventory is increased to $25,000, the prime cost will also increase. For instance, if the initial prime cost was $92,000 with a $2,000 opening raw material inventory, it would increase to $95,000 when the opening raw material inventory is adjusted to $25,000 especially with the closing inventory being the same. This is because with higher opening inventory and the closing inventory being the same the consumption has increased. Therefore, any changes in the opening raw material inventory will impact the overall prime cost of the firm.

Incurred a separate on-site material inspection cost of $3500?

Separate on-site material inspection cost of $3,500 would not directly affect the prime cost. On-site material inspection is considered an independent activity and does not directly contribute to the production process. Therefore, it does not have any direct relationship with the calculation of prime costs. As such, this cost would not impact the prime cost of the firm.

Appointed an additional factory supervisor at a salary of $60,000*?*

The appointment of an additional factory supervisor at a salary of $60,000 would not directly impact the prime cost. While the supervisor oversees production activities, their salary remains fixed regardless of the production level. Since the salary of the factory supervisor is not directly tied to the production output and is not considered a variable cost, it is classified as an indirect expenditure and therefore not included in the calculation of the prime cost.

Incurred unexpected production machine maintenance of $20,000?

The unexpected production machine maintenance cost of $20,000 does not directly impact the prime cost. While machine maintenance is necessary for ensuring production efficiency, it does not necessarily have a linear relationship with the output. Unlike direct costs such as raw material purchases or labour expenses, maintenance costs do not directly contribute to the production process in a measurable way. Therefore, unexpected production machine maintenance costs do not affect the calculation of the prime cost, as they are not directly related to the production output.

Exercise: 1.1

Determine the prime costs.

- Raw materials purchased $20,000
- Opening stock of raw materials $2,000
- Raw material transportation costs $1,500 (from the supplier)
- Damaged Raw materials purchased returned to vendor $3,000
- Coolants used on the job while in operation $ 4,500
- Cleaning supplies purchased $3800
- Closing stock of raw materials $4500
- Direct labour costs incurred $45,000
- Accrued labour costs for the current production $5000.

Damaged Raw materials purchased returned to vendor $3,000

The damaged raw materials purchased and returned to the vendor for $3,000 will impact the prime cost. When damaged raw materials are returned to the vendor, it affects the total cost of materials incurred for production. Since the returned materials were initially included in the calculation of the prime cost as part of the materials purchased, deducting the value of the returned materials reduces the total cost of materials consumed in production. Therefore, the $3,000 returned to the vendor for damaged raw materials will decrease the prime cost accordingly.

Direct Materials		
Materials purchased	A	20,000
Freight	B	1,500
Less: Returns	C	3,000
Cost of new materials	*D = A+B-C*	*18,500*
Opening inventory of RM	E	2,000
Closing inventory of RM	F	4,500

Coolants used on the job while in operation $ 4,500

The expenditure of $4,500 for coolants used during job operation is directly related to the production activity. When the job is in operation, the coolant is utilized, but it cannot be traced back to the final product. Therefore, although it is an actual expenditure related to production, it is not considered a direct material cost because it doesn't become part of the final product. This expenditure is accounted for separately. With the inclusion of other costs like direct labour and accrued labour, the prime cost amounts to approximately $70,500 in this case.

Direct Materials		
Materials purchased	A	20,000
Add: Freight	B	1,500
Less: Purchase returns	C	3,000
cost of materials purchased	D= A+B-C	*18,500*
ADD: Opening inventory of Raw material	E	2,000
Less: Closing inventory of Raw material	F	4,500
Total direct materials consumed	**G = D+E-F**	**16,000**
Direct labour		
Actual incurred	H	45,000
Accured labour cost	I	5,000
Total Direct labour cost incurrred	**J = H+I**	**50,000**
Direct Expenses		
Actual & accured	K	4,500
Total direct expenses incurred	**L**	**4,500**
PRIME COST	**M = G+J+L**	**70,500**

Cost of production

Now, let us proceed to the next phase of this exercise to examine the cost of production. Before going into the specifics of production costs, it is essential to understand the concept of factory overhead or gross works cost in this context.

Determine the prime costs & factory overhead / works cost gross

- Raw materials purchased $20,000
- Opening stock of raw materials $2,000
- Raw material transportation costs $1,500 (from the supplier)
- Damaged Raw materials purchased returned to vendor $3,000

- Coolants used on the job while in operation $ 4,500
- Cleaning supplies purchased $3800
- Closing stock of raw materials $4500
- Direct labour costs incurred $45,000
- Accrued labour costs for the current production $5000
- incurred a separate on-site material inspection costs of $3500?
- appointed an additional factory supervisor at a salary of $60,000?
- Incurred unexpected production machine maintenance of $20,000?

Now, let us examine the factory overhead. Firstly, we have cleaning supplies, totaling $3800, which are assumed to be used for maintaining cleanliness on the factory shop floor. Next, there is the closing stock of raw material, accrued labour costs, and a separate on-site material inspection cost of $3500, which are all considered part of the factory overhead. Additionally, the appointment of a factory supervisor at a salary of $60,000 is included in the factory overhead expenses. Furthermore, unexpected production machine maintenance expenses amount to $20,000.

The sum of these expenses constitutes the total factory overhead, denoted as 'N' in this case.

PRIME COST	M = G+J+L	70,500
Factory overhead		
cleaning supplies		3,800
onsite materia inspection cost		3,500
appointed a factory supervisor		60,000
machine maintenance		20,000
depreciation of machines		12,500
heating lighting and water		22,000
Factory overhead	N	1,21,800

Works cost gross or Gross cost of production

Works cost is the summation of factory overhead and prime cost. It is termed 'gross' because we have not yet adjusted for the opening and closing work-in-process.

PRIME COST	**M = G+J+L**	**70,500**
Factory overhead		
cleaning supplies		3,800
onsite materia inspection cost		3,500
appointed a factory supervisor		60,000
machine maintenance		20,000
depreciation of machines		12,500
heating lighting and water		22,000
Factory overhead	**N**	**1,21,800**
Works cost GROSS (GROSS CoP)	O = M + N	1,92,300

Works cost/cost of production/cost of goods manufactured

After adjusting for opening and closing work-in-progress, we obtain the works cost or cost of production, also known as the cost of goods manufactured

Factory overhead	**N**	**1,21,800**
Works cost GROSS (GROSS CoP)	O = M + N	1,92,300
opening work in process	a	25,000
Closing work in process	b	35,000
WORKS COST/COST OF PRODUCTION/COST OF GOODS MANUFACTURED	**P = O+a-b**	**1,82,300**