Process Costing

Meaning

- Process costing is a method of operation costing which is used to ascertain the cost of production at each process, operation or stage of manufacture, where processes are carried in having one or more of the following features:

  - Where the product of one process becomes the material of another process or operation
  - Where there is simultaneous production at one or more process of different products, with or without by product,
  - Where, during one or more processes or operations of a series, the products or materials are not distinguishable from one another, as for instance when finished products differ finally only in shape or form.

- Process costing is defined by Kohler as: "**A method of accounting whereby costs are charged to processes or operations and averaged over units produced; it is employed principally where a finished product is the result of a more or less continuous operation, as in paper mills, refineries, canneries and chemical plants; distinguished from job costing, where costs are assigned to specific orders, lots or units.**

Characteristics

- Process Costing Method is applicable where the output results from a continuous or repetitive operations or processes.
- Products are identical and cannot be segregated.
- It enables the ascertainment of cost of the product at each process or stage of manufacture.
- The output consists of products, which are homogenous.
- Production is carried on in different stages (each of which is called a process) having a continuous flow.
- The input will pass through two or more processes before it takes the shape of the output. The output of each process becomes the input for the next process until the final product is obtained, with the last process giving the final product.

- The output of a process except the last may also be saleable in which case the process may generate some profit.
- The input of a process except the first may be capable of being acquired from the outside sources.
- The output of a process is transferred to the next process generally at cost to the process. It may also be transferred at market price to enable checking efficiency of operations in comparison to the market conditions.
- Normal and abnormal losses may arise in the processes.

Advantages

- It is possible to determine process costs periodically at short intervals. Average unit cost can be computed weekly or even daily.
- It is simple and less expensive to find out the process costs.
- It is possible to have managerial control by evaluating the performance of each process.
- It is easy to allocate the expenses to processes in order to have accurate costs.
- It is easy to quote the prices with standardization of process. Standard costing can be established easily in process type of manufacture.

Disadvantages of Process Costing

- Cost obtained at the end of the accounting period are only of historical value and are not very useful for effective control.
- Valuation of work-in-progress is generally done of estimated basis which introduces further inaccuracies in total cost.
- Where different products arise in the same process, it is not possible to exactly ascertain the total cost of the products.
- If any error occurs while calculating average costs, it will be carried through all the processes to the valuation of work in process and finished goods.
- The computation of average cost is more difficult in those cases where more than one type of product is manufactured and a division of the cost element is necessary.

Difference between Process and Job Costing

Basis for Comparison	Job Costing	Process Costing
Meaning	Job costing refers to calculating the cost of a special contract, work order where work is performed as per client's or customer's instructions.	A costing method, in which the costs which are charged to various processes and operations is ascertained, is known as Process Costing.
Nature	Customized production	Standardized production
Assignment of cost	Calculating cost of each job.	First of all, cost is determined for the process, thereafter spread over the produced units.
Cost Center	Job	Process
Scope of cost reduction	Less	High
Transfer of Cost	No transfer	Cost is transferred from one process to another
Identity	Each job is different from another.	Products are manufactured consecutively and so they lose their identity.

Basis for Comparison	Job Costing	Process Costing
Cost Ascertainment	Completion of the job.	End of the cost period.
Industry type	Job costing is suitable for the industries which manufactures products as per customer's order	Process costing is perfect for the industry where mass production is done.
Losses	Losses are usually not segregated.	Normal losses are carefully ascertained and abnormal losses are bifurcated.
Work-in-progress (WIP)	WIP may or may not exist at the beginning or at the end of the financial year.	WIP will always be present in the beginning or at the end of the accounting period.

Practical

The manufacture of product "Fanta" requires three distinct processes. On completion of the product is passed from Process 3 to finished stock. During the month of December 1992, the following information was obtained:

Elements of Costs	Total	Process I	Process II	Process III
	Rs.	Rs.	Rs.	Rs.
Direct materials	26,000	15,000	11,000	–
Direct labour	26,500	12,500	6,000	8,000
Direct expenses	8,000	3,000	–	5,000
Production Overhead	79,500			

Production Overhead is absorbed by processes at a percentage of direct wages. Production during the period was 1,000 kgs. There was no stock of raw materials or work-in-progress at the beginning or at the end of the month.

Solution

Process I A/C

Particulars	₹	Particulars	₹
To Material	15,000	By Process II	68,000
To Direct Labour	12,500		
To Direct Expense	3,000		
To Production O/H	37,500		
	68,000		68,000

Process II A/C

Particulars	₹	Particulars	₹
To Process I A/C	68,000	By Process III A/C	103,000
To Materials	11,000		
To Direct Labour	6000		
To Production O/H	18,000		
	1,03,000		103000

Process III A/C

Particulars	₹	Particulars	₹
To Process II A/C	103000	By Finished stock A/C	1,40000
To Direct Labour	8,000	1000 kg	
To Direct Expense	5,000		
To Production O/H	24,000		
	140,000		140000

Losses in Process

Normal Loss: The fundamental principle of costing is that the good units should bear the amount of normal loss. Normal loss is anticipated and in a process it is inevitable. It is included in total cost of the product due to which cost per unit is increases. The cost of normal loss is therefore not worked out. The number of units of normal loss is credited to the Process Account and if they have some scrap value or realizable value the amount is also credited to the process account. If there is no scrap value or realizable value, only the units are credited to the process account.

Abnormal Loss: If the units lost in the production process are more than the normal loss, the difference between the two is the abnormal loss. It is excluded from total cost due to which it does not affect the cost per unit of the product. The relevant process of account is credited and abnormal loss account is debited with the abnormal loss valued at full cost of finished output. The amount realized from sale of scrap of abnormal loss units is credited to the abnormal loss account and the balance in the abnormal loss account is transferred to the Costing Profit and Loss Account.

Abnormal Gain: If the actual production units are more than the anticipated units after deducting the normal loss, the difference between the two is known as abnormal gain. It is excluded from total cost due to which it does not affect the cost per unit of the product. The valuation of abnormal gain is done in the same manner like that of the abnormal loss. The units and the amount is debited to the relevant Process Account and credited to the Abnormal Gain Account.

Treatment of Normal Loss

- The cost of normal loss is considered as part of the cost of production in which it occurs. If normal loss units have any realizable scrap value, the process account is credited by that amount. If there is no abnormal gain, then there is no necessity to maintain a separate account for normal loss.

- Generally the cost of normal loss is absorbed by the cost units.

Normal Output = Units introduced – Units of normal loss

Normal Cost of Normal Output = Total Cost – Scrap value of Normal Loss.

- In process A/c units of normal wastage is shown in unit column of credit side and if there is any scrap value then that will be shown in amount column of the credit side corresponding to lost units.

Treatment of Abnormal Loss

Abnormal loss is transferred directly to P/L Account.

Value of Abnormal wastage =

Normal cost of normal output/Normal output * Units of abnormal Wastage

Here,

Normal Cost of Normal Output = Total Cost – Scrap value of Normal Loss.

Units of abnormal Wastage = Normal Output – Actual Output

Normal output = Units introduced – Units of normal loss

Practical Problem – Abnormal Loss

The Bharat Manufacturing Company's product passes through two distinct processes, X and Y, and then to the finished stock. It is known from the past experience that wastage occurs in the process as under:

In Process X, 5% of the units entering the process.

In Process Y, 10% of the units entering the process.

The scrap value of the wastages in process X is Rs.8 per 100 units and in process Y is Rs.10 per 100 units.

	Process X	Process Y
	Rs.	Rs.
Materials Consumed	6,000	3,000
Wages	7,000	4,000
Manufacturing expenses	2,000	2,000

10,000 units were brought into Process X, costing Rs. 5,000. The outputs were :

Process X	9,500 units
Process Y	8,500 units

Prepare Process Cost Accounts showing the cost of the output.

Solution

Process X Account

Dr. *Cr.*

	Qnt.	Rate	Amount		Qnt.	Rate	Amount
		Rs.	Rs.		Rs.	Rs.	
To Units introduced	10,000	0.50	5,000	By Normal Loss			
" Materials			6,000	Scrap - 5% of			
" Wages			7,000	10,000	500	0.08	40
" Manufacturing				" Process Y A/c	9,500	2.10	19,960
Expenses			2,000	(output			
				transferred)			
	10,000		20,000		10,000		20,000

Process Y Account

Dr. *Cr.*

	Qnt.	Rate	Amount		Qnt.	Rate	Amount
		Rs.	Rs.		Rs.	Rs.	
To Process X A/c	9,500	2.10	19,960	By Normal Loss			
" Materials			3,000	Scrap 10% of	950	0.10	95
" Wages			4,000	9,500			
" Manufacturing			2,000	" Abnormal Loss	50	3.376	169
Expenses				" Output trans-			
				ferred to Fini-	8,500	3.376	28,696
				shed Stock A/c			
	9,500		28,960		9,500		28,960

Working Notes :

Process X Cost per unit = $\frac{\text{Total Cost} - \text{Value of Scrap}}{\text{Normal Production}} = \frac{20,000 - 40}{9,500}$ = Rs. 2,101 approx.

Process Y Cost per unit = $\frac{28,960 - 95}{9,500 - 950} = \frac{28,865}{8,550}$ = Rs. 3.376

Treatment of Abnormal Gain

When Actual output is more than the normal output.

Value of Abnormal Gain =

Normal cost of normal output/Normal output* Units of Abnormal Effectives(Gains)

Here,

Units of Abnormal Effectives(Gains) = Units entered – Normal Wastage – Actual output.

Questions

The product of a company passes through 3 distinct process. The following information is obtained from the accounts for the month ending January 31, 2014.

Particulars	*Process – A*	*Process – B*	*Process – C*
Direct Material	7800	5940	8886
Direct Wages	6000	9000	12000
Production Overheads	6000	9000	12000

3000 units @ ₹ 3 each were introduced to process – I. There was no stock of materials or work in progress. The output of each process passes directly to the next process and finally to finished stock A/c.

The following additional data is obtained:

Process	*Output*	*Normal Loss in %*	*Realisable Value of Scrap*
Process 1	2,850	5%	2
Process 2	2,520	10%	4
Process 3	2,250	15%	5

Prepare Process Cost Account, Normal Loss Account and Abnormal Gain or Loss Account

VALUATION OF WORK-IN-PROGRESS

- Since production is continuous, there may be some units which are not finished at the end of an accounting period.
- Such incomplete production units are known as Work-in-Progress. Such Work-in-Progress is valued in terms of equivalent or effective production units.
- To show production process completely, we have to convert incomplete units into equivalent units.

Equivalent units of work in progress = Actual no. of units in progress x Percentage of work completed

Equivalent unit should be calculated separately for each element of cost (viz. material, labour and overheads) because the percentage of completion of the different cost component may be different.

The following procedure is followed when there is Work-in- Progress

(1) Find out equivalent production after considering, degree of completion of opening and / or closing stock.

(2) Find out net process cost according to elements of costs i.e. material, labour and overheads.

(3) Ascertain cost per unit of equivalent production of each element of cost separately by dividing each element of costs by respective equivalent production units.

(4) Evaluate the cost of output finished and transferred work in progress

Three statements are prepared:

- Statement of equivalent Production.
- Statement of Cost (per unit)
- Statement of evaluation.

And process account is to be made.

Normal Loss- equivalent units of normal loss are taken as nil. Normal loss is not added in the equivalent production. However, realisable value is deducted from the cost of material, this will give net material cost.

Abnormal Loss- Abnormal loss is added to equivalent production after considering the degree of completion specified, it may be assumed abnormal units are 100% complete.

Abnormal Gain – To obtain equivalent units, abnormal gain is deducted. Abnormal gain taken as 100% complete in respect of all elements of cost.

- When there is opening and closing stock of Work- in-Progress in the questions, to calculate equivalent production two methods can be used:
  - FIFO method
  - Average Cost Method

To practice on the above topic, questions from MN Arora and Maheshwari Mittal can be done.

BY-PRODUCTS AND JOINT PRODUCTS

- By-products are defined as “any saleable or usable value incidentally produced in addition to the main product”. By-products means secondary or subsidiary products arising in the course of manufacturing the main product(s).

- For example, in oil refinery crude oil is processed but by-products, i.e. bitumen, chemical fertilizer are obtained with the main product-refined oil. Similarly in coke ovens, gas and tar are incidentally produced in addition to the main product coke. Gas and tar are therefore treated as by-products.

Methods of Apportionment of Joint Cost over joint products:

- Sales Value Method
- Reverse Cost Method
- Physical Units Method
- Average Unit Cost Method
- Survey Method