

JOINT PRODUCTS AND BY-PRODUCTS

Joint costs

- Joint costs are those costs, which are common to the processing of joint-products or by products up to the point of separation.
- In other words, joint costs represent pre-separation cost of joint products or by-products.
- These are the costs of a single process that yields multiple products simultaneously.
- After the point of separation, the products can be separately identified and post-separation costs can be readily attributed to individual products.
- Cost common to joint products or by-products before the point of separation of their identity, present a problem of allocation.

Split off point

- This is the point at which the joint products become separately identifiable.
- The costs incurred until this point cannot be identified to any particular product as they are incurred for producing all the products.
- The products arising at that split off point can either be sold at that point (if there is adequate market) or they can either be further processed (if no market is available at split off point).
- The costs incurred beyond point are called separable costs.
- After this point, the joint products or by-products gain individual identity.
- This point has a special relevance in the discussion about joint products and by-products, because the joint cost incurred before this points is to be apportioned appropriately in the jointly produced multiple product-group i.e. to the joint products or by products.

Joint products

- Joint products are the result of same raw materials & process operation.
- These products usually require further processing.
- The processing of a particular raw material may result in the output of two or more products.
- *If all the products are of equal economic importance and none of them can be termed as major products, these will be referred to as joint products.*
- Joint products cannot be produced separately.
- There can be various products arising from a single input.
- Out off such products, the products that have relatively higher sales value are treated as joint products and the products with relatively very lower sales value are called as by-products.
- The products with minimal sales value are treated as scrap.
- Among the joint products the product, which has a comparatively higher sales, value that the other joint products are called Main product.
- CIMA has defined it as *"two or more products separated in processing, each having a sufficiently high saleable value to merit recognition as a main product."*
- Some of the examples of joint products are given below.
 - (a) In dairy industry – skimmed milk, butter, cream and ice cream.
 - (b) In petroleum industry – petrol, diesel, liquid petroleum gas and kerosene.

NOTE: It should be noted that above categorization of products as joint products would not hold good in all situations. It changes from time to time and industry to industry with advancement of science and technology.
The relationship between by-product and main product changes with changes in economic or industrial conditions or with advancement of science.

By-product

- By-product is a secondary product.
- By-products are also produced from the same raw material and same process operations, but they are secondary result of operation.
- A joint product is usually of greater commercial importance than a by-product.
- A joint product principally differs from a by-product in importance.
- Examples of by-products are given below:
 - (a) In the dairy industry, the production of butter and cheese is accompanied by the production of butter milk (Butter-milk is the by-product)
 - (b) In the manufacture of soap, in the process of mixing and boiling ingredients, some rejections take place. These rejections are collected for recovery as by-products, such as glycerin.

Common cost

- Common cost is the cost of facilities or services employed in the output of two or more simultaneously produced operations, commodities and services.
- Common cost is the cost of indirect material, indirect labor and indirect services enjoyed by different products in a factory during the course of production.
- This cost is referred to as 'overhead' in costing terminology.
- It is necessary to make a reference to joint cost in the context of common cost.
- Joint cost is the pre-separation cost of commonly used input factors for the production of multiple products.
- Cost can be termed joint cost only when commonly used inputs result in the production of multiple products, which can be either joint products or by-products.
- *Common cost will not include elements of prime cost whereas joint costs do include prime cost.*

Co-products

- The term co-products are occasionally used synonymously with the term joint products.
- However, co-products and joint products are two different terms.
- Both co-products and joint products are common in the sense that both are multiple products.
- In case of co-products, the production of one or more co-products can proceed without the production of other products.
- In case of joint products it is not so.
- The production of the joint product is unavoidably associated with the production of other joint products.
- Thus it should be very clear that co-products may be neither joint products nor by-products.

Objectives of joint cost analysis (Why to allocate joint costs ?)

The main objectives of joint cost analysis and accounting of joint products and by-products are summarized below:

1. For cost control and decision-making.
2. For collecting reliable product cost information.
3. For valuation of stock and work-in-progress
4. For determination of product profitability
5. For setting selling prices and price structures for product ranges.
6. For pricing cost-plus contracts.
7. For determining the impact of change in product mix and output variations.

Methods of apportionment of joint costs

Following methods are commonly used for apportioning the cost up to the point of separation among joint products:



Average unit method.

- Under this method, total cost up to the point of separation is ascertained and divided with total units produced to get average cost per unit of production
- This method can be used only when resultant products are expressed in terms of same unit.
- When the output units are not comparable, the method cannot be used.

- ☞ **Physical unit method.**
 - Under this method, a physical base like raw material weight in physical output quantity is taken as basis for apportioning the pre-separation cost to joint products.
- ☞ **Survey Method.**
 - When this method is used joint products are multiplied by their weight factors prior to allocation of joint costs to individual joint products.
- ☞ **Standard cost method.**
 - If standard costing is in operation, it may be possible to apportion the joint costs on the basis of standard cost set for the respective joint products.
 - It has the advantage of measuring efficiency or otherwise of processes in producing joint products.
- ☞ **Contribution margin method.**
 - When this method is used, joint costs are divided in two categories, i.e., variable and fixed.
 - The variable costs are apportioned on the basis of units produced or other physical quantities.
 - Fixed cost on the basis of contribution made by the various products. (Contribution is the difference between sales and variable cost).
- ☞ **Market Value Method.**
 - Some cost accountants hold the view that market value method is the most common method of apportionment of joint costs up to the split-off point.
 - The rationale underlying this approach is that product with the higher sales value should be allocated a larger proportion of the joint costs than the products with the lower sales value.

Following variants of this method are commonly used in practice.

- ☞ **Market value at the point of separation**
 - Under this method, the market value of the individual joint products at the time of separation (split-off point) is ascertained
 - The joint costs are apportioned in the ratio, which the total sales value of each joint product bears to the total selling value of the joint products taken together.
- ☞ **Market value after further processing**
 - If determination of market value at the split-off point may be difficult, then joint costs are apportioned on this basis.
 - To overcome these difficulties, certain authors have suggested that joint cost should be apportioned in the ratio of market value after further processing.
 - The ascertainment of market values of the products at the final stage is easy, compared to that at the separation point.
- ☞ **Market values less to complete the individual joint product**
 - This method is used whenever there is not ready market price for individual joint products at split-off point.
 - This method is very simple.
 - Sales of units produced after further processing is taken for individual joint products and cost beyond split-off point is reduced from it to arrive at cost at split-off point.
- ☞ **Constant gross profit margin method**
 - This method assumes that all products produced will fetch a constant rate of gross profit.
 - Thus the overall GP rate will be calculated and the GP will be deducted from each of the product so as to ascertain their individual share of joint products.

Treatment of by products in cost accounts:

- ☞ **Other income method:** The sales value realized by sale of by products is treated as miscellaneous income if such value is negligible.
- ☞ **Deducting from the total cost:** Under this method, the sales realization should be reduced from the cost of the main product.
- ☞ **Deducting from the selling & distribution expenses of by products:** Under this method the sale value of by products is to be deducted from the S & D Expenses and the net expenses are taken into account.