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Elements of Cost

In any factory, the cost of the products manufactured is calculated, so that the exact idea about the amount of profit can be made. We know that there are hundreds of different items of expenditure, which are made in the factory and all these are charged on the product manufactured. No item of expenditure should be left, while calculating the total cost of any product. The total cost is divided into different headings known as "Elements of Cost".

Total cost of a product can be divided into three main "Elements". These are :

1. Materials, 2. Labour and 3. Expense.

1. MATERIALS COST

These can be further classified into:

(*i*) Direct materials, and (*ii*) Indirect materials.

(*i*) *Direct materials*. These are those materials which when operated or processed in the factory shops through various stages form the final useful shape of the main product or component part of the main product. These are also known as "Productive Materials".

(*ii*) *Indirect materials*. These are those materials which are essentially needed in various shops for helping the direct materials to be converted into the final useful shapes. Difference between direct and indirect forms of materials can be easily understood by the following example.

For example, a person continuously working in Milling Machine Shop is cutting gear teeth on cast iron blanks. Now the cast iron blank, of which the gear is made, will be the direct material while the coolant required for cooling the cutter, grease and lubricating oil needed for lubricating and kerosene oil, cotton waste etc. for cleaning the machine are known as "Indirect Materials".

Calculation of Materials Cost

For the calculation of materials cost following procedure should be adopted :

(*i*) Calculate the volume of each component by applying the mensuration. For the calculation of volume, necessary machining allowance must be added on the sides which are required to be machined.

(*ii*) Add the volume of all components to get the total volume of the product.

(*iii*) Multiply this volume by the density to get the weight of the material.

(*iv*) Multiply the cost per unit weight to the total weight of the material to get cost of the material.

2. LABOUR COST

Labour employed in any factory may be of two classes :

(*i*) Direct labour, and (*ii*) Indirect labour.

(*i*) *Direct Labour* The workers, who actually work and process the different materials ma or with the aid of machines are known as "Direct Labour" This is also called "Productive La The nature of duties is such that their wages can be directly charged to the job, they are mac turing.

Workers engaged for operating various production machines in machine shop, welding pattern making shop, electric winding shop and assembly shop etc. are known as "Direct La

(*ii*) *Indirect Labour* Any other labour, which helps the productive labour in performing duties is known as "Indirect Labour" The nature of duties is such that their wages cannot be ch directly to a particular job but are charged on the total number of products produced in the during a particular period.

Foremen, Supervisors, Inspectors, Chowkidars, Gate-keepers, Store-keeper, Crane Driver, men etc. are classified as "Indirect Labour"

Now again consider the above example of Milling Machine Shop. The worker who is produ gears continuously on the milling machine is known as Direct Labour, while the foreman, super ing in the milling machine shop, the inspector checking the accuracy of gears and helper, wh bringing and taking away the gear blanks from the worker are examples of Indirect Labour

Calculation of Direct Labour Cost

For the purpose of calculation of labour cost, estimator must have knowledge of all operations carried out for the production of the product and the tools and machines used production. Estimator should also take the advice of production department about the co estimated time for each operation. He should also consider various allowances like :

(*i*) Set-up time

(*ii*) Operation time

(*a*) Handling time (*b*) Machine time

(*iii*) The tear-down time

(*iv*) Miscellaneous allowances

(*a*) Personal allowances (*b*) Fatigue allowances

(*c*) Tool changing and grinding allowances (*d*) Measurement checking allowances

(*e*) Other allowances for cleaning, oiling, getting stocks etc.

3. EXPENSES

We have discussed, direct material cost and direct labour cost but apart from this, you will find that, in each factory there are several other expenditures such as cost of advertisement, building rent depreciation charges of plant and factory building, cost of packing, cost of transportation, salaries and commission to salesman etc. All these expenditures are known as "Expenses". So we can say except direct materials and direct labour cost, all other expenditures, which occur in factory are known as "Expenses".

The cost of Indirect material and Indirect labour is also included in expenses.

Expenses may be of two classes :

(*i*) Direct for chargeable expenses, and (*ii*) Indirect Expenses.

(*i*) Direct Expenses

These are those expenses, which can be charged directly to a particular job and incurred for that specific job only. For example, cost of special jigs and fixtures, cost of some special patterns, cost of experimental work on a particular job etc.

(*ii*) Indirect Expenses

These are also known as overhead charges, on-costs, burden, indirect charges, indirect costs, secondary costs or supplementary costs. These can be further classified as :

(*a*) Factory expenses. (*b*) Administrative expenses.
(*c*) Selling expenses. (*d*) Distribution expenses.

(*a*) **Factory Expenses.** These overheads include all the expenditure made on the actual operation of a product in the plant such as Indirect material and Indirect labour. It is also named as "Works on-cost".

(*b*) **Administrative Expenses.** These overheads include all the expenditure made on the salaries of general office staff and executive staff telegraph and telephone charges, depreciation of office building and equipment etc.

These are also known as "establishment oncost" or "office expenses".

(*c*) **Selling Expenses.** These overheads include all the expenditure made on the salaries of persons working on sales department, advertising expenses, agency expenses etc.

(*d*) **Distribution Expenses.** These overheads include all the expenses made on holding finished stock, despatching them to the customer, packing cost etc.

Fixed and Variable Overheads

All the overheads described above can be classified into following two forms :

(*i*) Fixed overheads and (*ii*) Variable overheads.

1. Fixed Overheads

These are those indirect expenses, which remain constant whatever may be the volume of production. Examples of these overheads are :

(*a*) **Salaries of Staff.** These charges are for the salaries and allowances paid to the Supervisors, Officers, Engineers etc. These are known as Supervisory charges and are generally calculated in terms of expenses per machine hour.

(*b*) **Depreciation of machines and equipment.** This is the dimination in value of machine due to age and wear and tear. Various methods of calculating depreciation have been described in detail in next chapter.

(*c*) **Interest on capital invested.** The interest on capital invested is calculated assuming if this capital is deposited in some bank.

(*d*) Rent of building and insurance.

2. Variable overheads

These are those indirect expenses, which vary with volume of production. Examples of these overheads are :

(*a*) **Power or fuel consumed.** The expenses on power (*i*) if generated in the factory includes expenditure on coal or other fuel, salary of powerhouse staff, expenditure on running and maintenance, depreciation of powerhouse building, plant etc. (*ii*) if bought from other agency, includes charges paid to them.

(*b*) **Consumable store supplies.** The expenditure made on the salary of stores staff, stationary etc. required in stores, lighting charges for stores and other similar expenses are included in this category.

(*c*) **Repairs and maintenance.** This includes the expenditure incurred on the repair and maintenance of the machinery in the factory. This expenditure is converted into expenditure per machine hour and then charged to various departments of the factory.

(*d*) **Expenses on tools.** Generally the tools have very short life and are required to be purchased frequently. Hence they are charged in two ways. Firstly, the expenditure incurred on the purchase of such tools are directly charged. Secondly, these are depreciated.

Now, from above we can see that variable overheads increase proportionately with the pr production, but fixed overheads remain almost constant. So by increasing the amount of produc the total cost of the product can be reduced. It is also essential that there should be at least a minimum amount of production which can cover the fixed overheads.

COMPONENTS OF COST

The various components of cost are :

1. Prime cost.
2. Factory cost.
3. Office cost.
4. Total cost.

1. *Prime Cost.* It consists of direct material cost, direct labour cost and direct expenses.
i.e. Prime cost = Direct material cost + Direct labour cost + Direct expenses.
Prime cost is also named as "Direct Cost'.

2. *Factory Cost.* It consists of prime cost and factory expenses.
i.e. Factory cost = Prime cost + Factory expenses.
Factory cost is also named as "Works Cost".

3. *Office Cost.* It consists of factory cost and administrative expenses.
i.e. Office cost = Factory cost + administrative expenses.
Office cost is also named as manufacturing cost or cost of production.

4. *Total Cost.* It includes office cost and selling and distribution expenses.
i.e. Total cost = Office cost + Selling expenses + Distribution expenses.

Selling Price

If the profit of factory is added in the total cost of a product it is called selling price. So t customers get the articles, by paying the price which is named as "selling price".

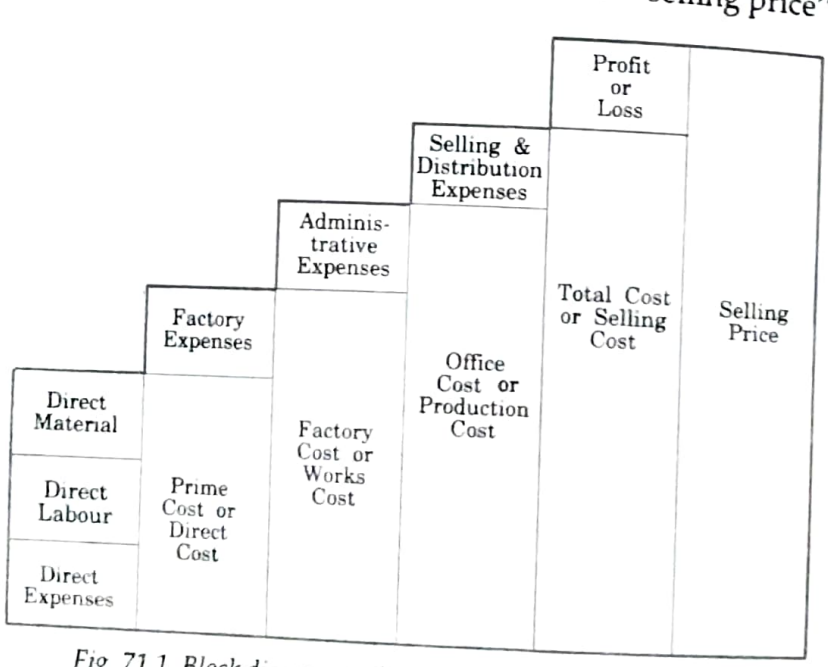

Fig. 71.1. Block diagram to illustrate the relation between "Elements of Cost and Components of Cost".

The relation between the elements of cost and components of cost can be illustrated by the chart given on next page :

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Indirect Expenses and Depreciation

Apart from direct labour cost and direct material cost, we find that, there are several o expenditures in every factory *e.g.* cost of advertisement, building rent, depreciation charges of p and factory building, cost of packing, cost of transportation, salaries and commission to sales etc. All other expenses, except direct material and direct labour cost, which occur in the concern known as expenses. These expenses are of two types, namely (*i*) Direct expenses and (*ii*) Indi expenses.

These Indirect expenses are also known as Overhead Expenses or oncost. These overh expenses are further classified into following three groups.

1. Factory Expenses.
2. Administrative Expenses.
3. Sales and Distribution Expenses.

1. Factory Expenses

These overheads include all indirect expenditure incurred during production, *e.g.* from receipt of order until the product is complete and ready to dispatch. Factory expenses are termed as Factory overheads, Factory oncost or Works overhead. These expenses include:

(*a*) Indirect material cost *e.g.* consumable stores like Lubricants, Coolants, Cotton wa Grease etc.

(*b*) Indirect labour cost, *e.g.*, wages paid to the indirect labour like Supervisor, Foreman, Bo incharge, Storekeeper etc.

(*c*) Expenditure on maintenance and repairs of the factory building.

(*d*) Expenditure on maintenance and repairs of the plant and equipments.

(*e*) Rent, taxes and insurance.

(*f*) Expenditure on power, such as electricity, steam, gas, hydraulic and compressed air.

(*g*) Expenditure on internal transport for material and workers.

(*h*) Depreciation of the factory building and of the plant.

2. Administrative Expenses

All expenses incurred on direction, control and administration of a concern are know Administrative Expenses. These expenses, also known as office expenses or establishment on and include following overheads :

(*a*) Salaries and other expenditures incurred on General Manager, Managing Direc Secretary and other officers and their staff.

(*b*) Office rent and other expenses on maintenance and repairs of office building.

(c) Insurance of office, furniture etc.
(d) Expenses of stationary, printing, telephone, telegraph, postage etc.
(e) Charges for electric consumption.
(f) Depreciation of office building, furniture, equipment etc.

3. Selling and Distribution Expenses :

Selling Expenses. These expenses include the expenditure incurred by sales department on the staff, advertisement etc.

Distribution Expenses. These expenses comprise all expenditure incurred after the completion of the product till it reaches the destination.

Selling and distribution expenses mainly include the following :

(a) Salaries and other expenses like travelling etc. of the sales manager and staff, including salesmen and office staff.
(b) Expenses on advertisement.
(c) Discounts, commission and rebates allowed to the customers, agents, distributors etc.
(d) Expenses for preparing tenders and estimates.
(e) Expenses on stationery, telephone, postage, furniture etc.
(f) Expenditure on packing and forwarding.
(g) Expenditure on loading and unloading, freight, warfare and transportation
(h) Salaries and other allowances to the dispatch clerks etc.

Calculation of Various Overheads

Various overheads have been mentioned above, under the categories of Factory expenses, Administrative expenses and Sales expenses. From the list of overheads mentioned, most of them can easily be found out from various records, but some overhead charges require good knowledge and experience of the estimator. Following are such charges, and are being discussed hereunder :

1. Depreciation
2. Obsolescence
3. Interest on capital
4. Idleness
5. Repairs and maintenance.

1. DEPRECIATION

Whenever any machine or equipment performs useful work, its wear and tear is bound to occur. This can be minimised upto some extent by proper care and maintenance but cannot be totally prevented. Its efficiency also reduces with the lapse of time and at one time it becomes uneconomical to be used further and needs replacement by another new unit.

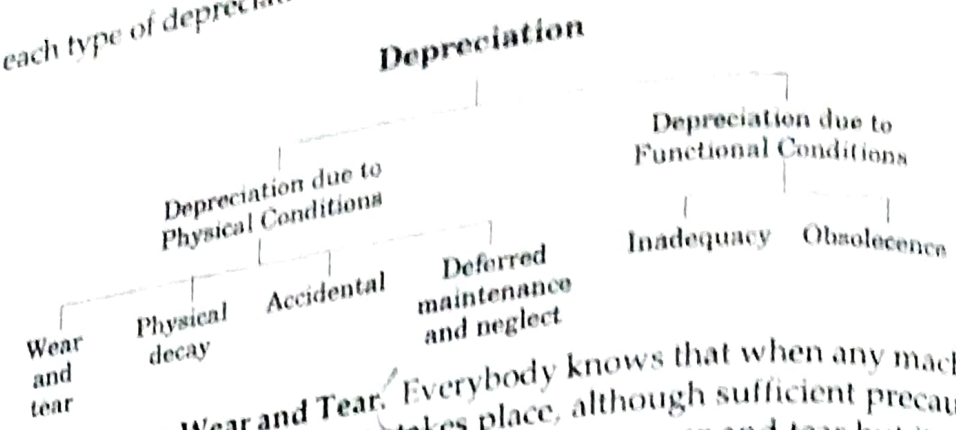
Therefore, we can say efficiency and value of machine or asset constantly reduces with the lapse of time during use, which is known as "Depreciation". So some money must be set aside yearly from the profits, so that when that equipment becomes uneconomical, it can be replaced by the new one. Therefore, the initial cost of machine plus installation charges + repair charges—scrap value is charged against overheads and spread over the machine's useful life.

For this purpose, depreciation account for the complete plant or individual equipment is opened in the Company's Books and is known as Depreciation Fund or "Sinking Fund". This amount is deducted yearly from the profits and kept separate to have sufficient money for replacement at the end of useful life.

Types of Depreciation :

For further understanding depreciation can be classified as under:

Now, each type of depreciation is explained in short below :



(*a*) **Depreciation due to Wear and Tear.** Everybody knows that when any machinery per work, wear and tear of certain components takes place, although sufficient precautions are tak *e.g.* proper lubricating and cooling is done, which minimise wear and tear but it cannot be tota prevented. Hence the cost of replacement because of this cause, is the value of depreciation due wear and tear.

(*b*) **Depreciation due to "Physical decay".** There arecertain items in a factory, such as insulat of materials, furnitures, electric cables, buildings, chemicals, vessels etc., which get decay, becau of climatic and atmospheric effect, with the result the value of these articles goes on reducing w the lapse of time. Although every effort is made by the owner to keep them in serviceable condit even then because of climatic and atmospheric effect, there will be reduction in their costs. T reduction in cost is depreciation due to physical decay.

(*c*) **"Accidental" Depreciation.** Although, the machine might have installed even few days b and sufficient care is taken to prevent accident, even then, accident may occur due to some wro operation, or some loose component or some other cause which may result in a heavy damages. T depreciation in a machine caused due to this reason is called accidental depreciation.

Now-a-days, to cover this risk most of the owners get their equipment insured with insurance companies. For this, owners have to pay certain premium yearly. The amount premium depends upon the estimated cost and life of equipment.

(*d*) **Depreciation due to "Deferred maintenance and neglect".** Every manufacturer suppl certain instructions for the smooth and efficient running of an equipment. For example, in the c of a vehicle, a manufacturer gave the following instructions :

(*i*) Lubricating oil of particular grade should be used in engine.

(*ii*) Oil should be drained and new oil should be refilled after first 1000 km running, and th every 5000 km.

(*iii*) All the bolts and nuts should be re-tightened after 5000 km running.

(*iv*) Decarbonising after 30000 km running and so on.

If these instructions are not followed because of neglect, and proper maintenance is not don recommended by manufacturer, then the life of the vehicle may be reduced and depreciation value because of this, is called depreciation due to deferred maintenance and neglect.

(*e*) **Inadequacy.** This is the form of functional depreciation. Inadequacy means reduction efficiency of an asset. This may result even if any equipment is servicing under proper precauti and sufficient maintenance is provided, there is fall in efficiency with the lapse of time.

Secondly, suppose after 2-3 years of running, the demand of products manufactured by cer plant is increased. But the plant cannot cope with the increased demand. This needs additio money either to replace with the bigger size machinery or installation of more similar size pl This is, what is called depreciation due to inadequacy.