

LESSON 2:
**THE COST OF
PRODUCTIVE
FACTORS**



LESSON 2: THE COST OF PRODUCTIVE FACTORS



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COST OF MATERIALS AND SUPPLIES

When we talk about cost factors, we are referring to the first of the three fundamental concepts of the process of generating the business charges that are, **classes or elements, centers or places and cost carriers**, to which reference has already been made.

Specifically, the **classes or cost factors** respond, as we saw, to an idea of **classification** of the elements that, from an economic point of view, will become part of the product or that collaborate in the productive process for the elaboration of the same.

In this lesson we will refer to the problem generated by the factors or elements necessary to obtain the product, its different aspects and the treatment that will be given regarding the calculation of its consumption and cost. Within these, leaving aside the differentiation between fixed and variable costs, we will distinguish two large groups, those that maintain a direct relationship with the product or cost object and those that do not.

The activity of the company begins with the purchase of goods and services necessary for production, which can be of different kinds. In this first question, we will focus on Purchases which as an effect are specified in *the set of elements obtained because of any supply action*. To study them, we will consider two large groups: Materials and Supplies.

1.1. MATERIALS

We can define the materials as a **"Set of tangible elements and susceptible to storage, that the company acquires abroad, for its own consumption or for its subsequent sale without any transformation"** . The monetary equivalent of these will be the cost of the materials.

Within these we will distinguish between those that are direct to the product of those that are not.

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1.1.1. Direct Materials:

- **Commodities or goods:** they are the elements that, in the commercial companies, constitute the base of what will be the product, that are acquired for sale without physical transformation.

Ex.: The wool yarn in a distributor haberdashery; wooden boards in a DIY company; shoes in a shoe store; iron ore in an iron distribution company, etc.

- **Raw materials:** are the basic elements for production, in the case of industrial companies, and on them is carried a physical transformation prior to its sale.

Ex.: Woolen yarn in the making of a sweater; wooden boards in the manufacture of furniture; leather in a shoe manufacturing company; iron ore in a steel furnace; flour for making bread, etc.

- **Incorporable materials, elements or sets:** elements that are incorporated in the final product but are not manufactured or are subject to transformation by the company, are substitutable and easily identifiable. They do not constitute the essence of the product because they do not define it and its substitution does not entail variation in it.

Ex.: Handles, locks, tails, screws and hinges, in the manufacture of furniture; buttons, zippers, automatic in the manufacture of jerseys; eyelets, laces and buckles, in the footwear industry; packaging manufacturing soft drinks, colony, etc.¹; cases, labels, leaflets, in the pharmaceutical industry; battery, wheels, dashboard gauges in the manufacture of cars, etc.

- **Packages:** containers, covers or wrappings of all kinds, generally non-recoverable, intended to contain the products or safeguard their transport.

Ex.: Cardboard boxes, wooden pallets , bubble wrap, etc.

¹ In this exaple, the packaging are considered incorporable materials because they are necessary containers, normally intended for sale together with the product they contain. In the PGC, account 327 is considered "containers" within the subg. 32 "other supplies".

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1.1.2. Indirect Materials:

- **Auxiliary Materials:** elements that are not in the final product, are not identifiable or its treatment as a direct cost would cause an excessive work, but its consumption depends variably of production level.

Ex.: lubricants in the metallurgical industry, sandpapers, paints, to acids, glues, welds, bolts, screws, nails, or any tool that is not part of a machine and is not considered as immobilized, safety elements such as gloves, glasses, etc. since in this last case, the law obliges its renewal.

- **Diverse materials:** elements that are not in the final product or are not identifiable and their use does not depend of the activity.

Ex.: Costume pieces (uniforms of cleaning staff), personal hygiene items (soap from sinks, paper towels), etc.

The diverse materials should not be confused with the auxiliary materials, since, although the latter are not in the final product either, their use depends on the level of production, unlike the different materials that do not depend on it.

- **Office material:** any element related to this functionality

Ex.: Pen graphs, ink cartridges for printers, paper, etc.).

- **Materials for maintenance:** those for the maintenance of the goods included in group 2 "Active non-current" of the PGC.

Ex.: any type of paints, antioxidant fats, etc.

- **Materials for repair:** elements for the repair, that is to say, that can replace other similar ones that are already incorporated in the good or that serve for their repair, as long as they do not have the consideration of immobilized.

Ex.: Bearings , pulleys, welds , glues, staples, a battery for a transport element, etc.

In any case, the typing of a material in one or another class will depend on the functional character that each of them has within the company. For example in the case of a car factory, the headlights of the headlights that incorporate these, would be incorporable material but, nevertheless, in a shoe factory if, these, only

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have for the maintenance of the trucks that are used for the transportation of the finished products, in that case they would be inside repair materials.

1.2. CONSUMPTION OF MATERIALS

In relation to the calculation of your consumption, we will have to take into account three issues:

- Valuation of supplies
- Valuation of consumption
- Contingencies in the handling of materials

1.2.1. Valuation of supplies:

Regarding Purchases, given that the external variables are known (prices, discounts, etc.), since the valuation appears in the invoice, this valuation will be made at the **purchase price**. That is, the cost or total value, will be calculated by summing the amount invoiced by the supplier plus the expenses inherent to the purchase and at the expense of the company (transport, insurance, non-recoverable taxes as customs duties or tariffs, etc), less discounts, bonuses and the like provided they are invoiced.

The unit cost, that is, the price of each unit quantity of material is calculated by dividing the total value of the (total amount at acquisition) and the net amount entering the store company (units actually received). With the application of this criterion, if any type of loss occurs during the transfer to the warehouse, for example, evaporation in the case of alcohol, the problem would be corrected.

1.2.2. Valuation of consumption:

At the time of exits or consumption, when making your assessment, we will have more problems because there may be different acquisition prices that correspond to different entries of materials and it is proposed which one to

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choose. For this you can use different the **criteria** to obtain the amount, not only of each consumption, but also that corresponding to the final stock.

To study this problema, we will classify them by distinguishing between two large groups: Real criteria or Political criteria

1.2.2.1. Real criteria:

Are those that allow the determination of the real value of the stocks at the end of the period, a value that will be different depending on the criterion applied. Thus, at all times it will be fulfilled:

$$Stock_i + Purchases - Consumption = Stock_f$$

Where:

S_i .- Initial stocks

Purchases.- Value of purchases made during the period - internally (AI) value of the imputations made from the external scope (AE) to the AI during the period-.

S_f .- Final stocks

So, in the case of stocks are exhausted (S_f = 0), the balance of the account will be zero.

Within them we can distinguish between:

1. Average prices criteria:

they are based on the calculation of weighted average prices (N° units x price / n° units total).

1.a. Continuous or current average Price:

it consists of calculating a new average price for each entrance to the warehouse with a price different from those that already existed. It will be, therefore, a weighted average between the previous Average Price and the price of the last purchase made. In this way it will vary for each purchase but not with the consumption or sales. Said average price will be

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applied to the following exits while it does not take place to calculate a new one.

In this case, stocks are valued homogeneously, regardless of the time of acquisition. This method is appropriate for periods of price stability as well as any real criterion, and it will have a buffer effect (average) in periods of monetary instability. If there were many entries with different prices, this homogeneity will not be such giving the phenomenon called "sawtooth".

1.b. Average price of the period:

in this case, the average Price is calculated at the end of the period, with all the purchases prices, and then, we apply this Price to all the consumption of the period.

2. Sorted rates criteria (or stockouts):

They are based on the orderly application of the acquisition price of each stock entry until they are exhausted or until new inventories enter. Therefore, it implies the need to have them separated chronologically. There are different modalities:

2.a. FIFO -First in First out- (first entry, first exit): Strict modality:

It is important to consider that the materials that entered first are the first that must leave, therefore, the oldest prices will be applied to the exits according to the exhaustion of the stocks to which they correspond. The final stocks must contain, therefore the detail of quantities and prices of each type of entry that still remains in the warehouse.

When they are perishable products, for example yoghurts or that are impossible to identify, as is the case with wheat stored in silos, the strict application of this criterion, as was already seen in the first one, is sometimes complicated or impossible to carry out. For this reason, it is usually done in the following way: *"the price of the materials that first entered will be that which applies to the first ones that leave"* independently

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of the batch to which they belong. The number of units that may be applied such price will be as many as those who entered it.

In times of price stability it will be as appropriate as any other real criterion, but it does not imply any advantage and if the disadvantage is that you must have stocks broken down chronologically.

In times of price instability, for example inflation, an update of the stocks is added, which are valued with the price of the last entry, but the consumption is out of phase, more, the further away the time is from the moment of purchase and consumption. Therefore, with rising prices, lower costs than real ones may appear, and therefore, profitability higher than the real ones, that is, the result is greater than the real one because the cost price that is applied is lower, as a result, in the internal scope, is equal to the difference between the net sales income completed during the period and the amounts corresponding to said income, upon removing it, at the income less amount, the result is greater.

This criterion can be applied Mixed with average purchase price of the period

2.b. LIFO -Last in First out- (last entry, first exit): Strict mode:

It consists in that the price of the last stocks to enter will be the one applied to the first ones that go out -until they are exhausted-, therefore, it is up to identify and value the consumptions according to the most recent entries.

With the application of this criterion, a more adjusted profitability analysis is obtained than with the FIFO, since the consumption is updated, although the inventories are outdated. Therefore, if there is inflation, the accounting result will be lower than the real one when being applied, to the consumptions, higher cost prices. Therefore, comparing it with the strict FIFO, we observe that the accounting result, in periods of inflation, is greater with the latter than with the strict LIFO.

This criteria can be also applied Mixed with average purchase price of the period and With pre-registration of purchases

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2.c. FIFO -High In First Out- (stock at the lowest Price):

The highest price shall be that applied to the first units to go. It is the same as the LIFO but substituting the price of the last entry for the highest one.

1.2.2.2. Political or agreed criteria:

Are those in which the **real value** of the stock can not be calculated through the information provided by them.

$$Stock_i + Purchases - Consumption \neq Stock_f$$

They are characterized by the depletion of stocks ($S_f = 0$) the balance of the account does not have to be zero, may be debtor, creditor or zero, depending on the criteria used and whether prices are rising or falling.

If the prices are up, by leaving the materials at a higher price, the account may have a credit balance ($H > D$). Otherwise the balance may be debtor since ($D > H$).

The fact applies any criterion such, not considered depleted stocks, as in the case of actual criteria, their value reflecting the balance of the account will not be real.

Of all of them, in class, only the continuous or current average price will be developed, based on the actual criteria, the FIFO and Strict LIFO, since the rest of the real criteria represent small variations of the previous ones, as well as the politicians or agreed.

We find an account in which different charging and payment criteria have been applied, that is, in the debit a criterion has been applied real - acquisition price - while in the case of a political or agreed one. Therefore, the account loses its financial record or what is the same, no longer representative of your balance and you have to return to regularize reflect the actual balance may arise differences in results reflect n.

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To know these differences, at the end of the period, it will be necessary to calculate the real stocks extracontractively and proceed to their adjustment and subsequent accrual. For its calculation could be used any real criteria, however it is advisable to apply both national degree of policy and the international is the average price. Once the actual balance is determined, it will be compared with that obtained by applying a political or agreed criterion and the differences will be seen and adjusted.

To this criterion belong:

1. Last purchase Price:

It consists of the valuation of each consumption according to the most recent purchase price, that is, the last purchase made before said consumption, regardless of the volumes of both.

It will coincide with the strict LIFO in the case that the consumptions do not exceed the purchases in quantity.

EXAMPLE:

The Purchases of the period were:

- 1st: 20 units x 2,00€/unit
- 2nd: 100 units x 2,50€/unit

* If we consume 90 units:

- In FIFO method the consumption is value:

90 units x 2,50€/unit

- In Last purchase method the consumption is value:

90 units x 2,50€/unit

* If we consume 110 units:

- In FIFO method the consumption is value:

100 units x 2,50€/unit and 10 units x 2,00€/unit

- In Last purchase method the consumption is value:

110 units x 2,50€/unit

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This criterion assumes a current valuation permanent consumption, performing the evaluation of them very similar to the real prices, which will result in a calculation result quite up to date, as sales revenues are the actual therefore will be updated as the price of cost is also, the result, as we have said will be quite updated or although it will be less than the real.

2. Price of present market, day price or current replacement cost:

It consists in valuing each consumption at the price that would correspond to its replacement or purchase at that moment (it will produce effects very similar to the LIFO and the price criterion of the last purchase).

3. Price of future market, price of replacement or NIFO, Next in first out:

It is applicable in periods of inflation, is to assess the consumption price which is expected to be effective in the market when you go to recover the element. Replenishment of stocks is achieved without affecting the purchasing power of the company, obtaining an adequate result figure.

The NIFO allows a direct update on inflation, softening the effects that fluctuations in prices cause on the cost of products.

Since I proposed Schmalenbach, following the 1st World War to combat the effects of inflation, it is picked unanimously by both the accounting doctrine as the P Accounting practice, as one of the most suitable logical systems, However, no one applies it (neither doctrines nor professionals), among other things, for the problems it poses, such as, for example, tax matters for fear of fraud. A solution would be to apply price indices -IPC-, inflation, statistics, etc.

From the NIFO they fit 2 interpretations, use the real price of the next purchase if it is known or use an estimated or predetermined price, but in both cases the future price will be used.

1.2.3. Contingencies in the manipulation of materials:

Next, we will refer to some contingencies that may arise due to the manipulation of the materials.

Once the materials are acquired and until the corresponding product is obtained, they go through two clearly differentiated stages²:

- a. Stay in the warehouse until consumption
- b. Its incorporation to the process until the product is obtained.

During these two stages arise a series of problems that affect the amount of these materials and therefore their cost, so it will be necessary to take them into account. In this section we will only take into account the treatment given to those contingencies that are common in the company since these are usually known approximately and not those that may occur sporadically:

a. During the stay in storage:

As a result of handling, atmospheric agents, measurement errors, etc. a series of losses, breaks, etc., can be produced, which will cause the number of units purchased not to coincide with the units available for the process, that is, with those that can be used in the development of their activity-they are called "differences" of inventories "-

These contingencies, being common, are usually known approximately (depletion coefficient, volatility index, etc.) and the solution applied to correct the problem is to apply a supplement to the value of the material at the time of consumption:

$$\text{TOTAL CONSUMPTION} = \text{Real Consumption} \times (1 + \text{Depletion Coefficient})$$

That is to say, it is a question of calculating the reduction coefficient and for it consumption will increase as a supplement.

² There is a third contingency that would be those that occur until it enters the warehouse but this is corrected, as we have already indicated, with the application of the purchase price, so we will ignore it.

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The shrinkage coefficient depends on each type of product, calculated in some cases based on experience and in others, on formulas in which we will not enter.

EXAMPLE: In a perfume factory there is a warehouse of materials where 100 liters of alcohol have been inventoried, as it appears in its warehouse file. For each batch of perfumes manufactured by the company, 10 liters of alcohol are incorporated into the production process. We know that evaporates or loses a part in each incorporation (coefficient of shrinkage = 0.11), which means that a total of 10 liters of the 100 liters that are currently in the warehouse will be lost.

This means that when you reach a consumption of 90 liters the warehouse card will indicate that there are still 10 liters in the warehouse when, really, nothing would be left.

The solution will be that every time that 10 liters are incorporated into the production process, for the purposes of the warehouse record, 11.1 liters will be discharged [$10 \times (1 + 0.11)$], and in the last (9th) 11,2 liters so that when the company reaches a consumption of 90 liters in the form appears as if they had consumed 100 liters ($8 \times 11,1 = 88,8 + 11,2 = 100$).

b. Its incorporation to the process until the product is obtained:

In most production processes in industrial companies and for various reasons such as low quality materials, inhomogeneous, waste (wooden planks knotty or skins with more waste than others ...), evaporations, negligence, etc. is obtained **fewer physical units of product materials used** (actually they incorporated with materials they could have more or affinities of product amount -uc- of finally obtained from).

When dealing with usual setbacks it will be enough to divide the total cost of the materials actually applied to the process between the production obtained in it, with which the unit cost will be adjusted and each uc p roduct obtained aliquot bear its share of the value of the difference of units used since it is not logical to

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blame the loss only cost to the place where an impact or a single order or production order.

If a production of x is planned and only x' is obtained as a consequence of shrinkage, being $x > x'$; The cost of material to be allocated per unit of product quantity will be:

$$\text{Cost per ufp.} = \frac{\text{Total cost of materials used}}{X'(\text{real production obtained})}$$

EXAMPLE: A ketchup factory has planned a production of 100 boats and have obtained only 96 cans. It is known that for each of the manufactured boats a total of 200 grams of tomato paste is needed and that the consumption price of each gram is 0,05€, therefore the total cost of the material applied to the production process for a total of 100 bites of ketchup is 1.000€ (100 pots x 200 gr. x 0,05€/gr). If finally, only 96 cans have been obtained, it may be due to waste that may have been produced during the productive process, therefore, the cost of the tomato paste for each bottle of k e tchup will be:

$$\text{Cost per ufp.} = \frac{1.000,00\text{€}}{96 \text{ cans}} = 10,42\text{€/can}$$

The proposed solutions are taken in unavoidable situations, otherwise, they should be avoided.

1.3. COST OF SUPPLIES

The supplies constitute, together with the materials, another type of supply. However, there are certain differences as can be inferred from its definition.

We can define the supplies as **those elements acquired by the company abroad, not storable, tangible or intangible.**

For their consideration of non-storages -although some may be – the purchases will be equal to consumption. Therefore, the problem in this type of costs is not in

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the calculation of the cost of its consumption, but in its distribution that we will see later in other topics.

As examples, we will distinguish 2 groups:

1.3.1. Electricity, water and natural gas:

In this first group, although the first two could be stored, it is not usually done. That's why all of them are considered non-storable.

They are characterized because they reach the company through an external distribution network (cables or pipes) and are distributed through another internal network with meters for their measurement. Due to their non-storable condition, the coincidence of the magnitudes of purchase and consumption, making it much easier to calculate the total consumption corresponding to the period, which is usually done through meters.

1.3.2. Fuels:

They can distinguish between **gaseous, liquid and solid**. The first two are not storable because of the risk it involved.

The gaseous, besides natural gas, it included in the first group would be **liquefied gases** (butane and propane obtained from petroleum distillation), **oxygen and acetylene** gaseous fuel.

The liquefied gases -butane, propane-, although they are distributed in liquid form, in cylinders or in bulk trucks, are also considered not storable, due to the risk that this implies, and therefore they are considered as supply and not of material.

The Oxygen -Chemical element- is distributed in liquid or gaseous form, and due to its dangerousness, it is also considered not storable.

The Acetylene -gaseous fuel- is distributed in steel cylinders for welding equipment and chemical products. Like the previous ones, because it is highly flammable, it is clearly considered not storable.

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The Liquids, like gasoline, diesel, etc., they are not considered storable for security reasons.

And finally, the solids, of **vegetal** origin (firewood) or **mineral** (coal, peat, anthracite ...). These supplies, if they would be storable, so that their treatment could be equal to the materials.

2

COST OF LABOR AND EXTERIOR SERVICES

2.1. COST OF LABOR

The cost of labor it is defined as "*the consumption valued in money of human labor applied to production*".

The cost of labor may be considered direct or indirect, depending on whether a direct and clear relationship exists with the product, or that the relationship does not exist or is difficult to calculate. In the latter case, it will be necessary to resort to the application of different distribution criteria.

However, although the cost of the labor factor is clearly direct with respect to the product, in the company, sometimes, it is important that said information be shown by centers or sections, as in the case of organic cost systems, in which case said cost is treated as Indirect, distributing as an indirect cost class more within the cost statistics, concept that we will deal with in later issues.

Regarding the problems posed by the valuation of labor, the main problem will be the calculation of its real cost to the company, given that there is a mismatch between the accrual of the expense, the payment of that expense (neither in the amount nor at the time of its realization) and the incidence of the cost. Therefore we must specify these concepts:

- **SPENDING:** The remuneration to company personnel are known to the expenditure for the external environment, this is more perception gross employer 's share of social security and other concepts.

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- **PAYMENT:** On the other hand, the company pays the worker a net salary which shall be the gross salary less what he withheld from income tax, which is to submit to the Treasury, and the workers ' share of the SS which has b ra also retain this gross and pay, with the employer 's contribution to security Social.

- **COST:** The above figures will not coincide with consumption (cost, in monetary terms), and will fluctuate from one period to another due to circumstances unrelated to production (such as vacations, illnesses, strikes, etc.), so that in periods with equal production there may be different personnel expenses, or else, in periods with equal labor expenditure, obtain a different quantity of production.

Thus, for example, at the end of January, the total labor force in January will be accrued (salary + social security + corresponding extra pay, etc.), although, afterwards, the payment of some of these concepts will be made in different months and the amount is not yet known. For example, in January, we will have to pay the payroll in that month, social security will be done in February and extra payments in December and July. In February, the same will happen and so on, the payment not coinciding with the expense. Regarding consumption, it will depend on what is applied in each period to the production process. Then:

$$\text{Expense} \neq \text{Payment} \neq \text{Consumption}$$

Therefore, in calculating the cost of labor (m.o.) for the company, three problems must be distinguished:

1.- The timelessness of payments. There is no uniformity when the different payments are made (in January I pay the payroll for that month, the social security of the month in February, the extra pay in July and December, etc.).

2.- The nor uniformity in the quantity. There are months that the payroll is paid + extra pay, others, only the payroll, etc. If we did not consider this circumstance, the cost of the products that are manufactured in the months that there is extra pay would be more expensive.

3.- Non-uniformity in the time magnitude. Not all months have the same working days. The parties are irregularly distributed throughout the year next to the

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vacation period, the labor calendar foresees certain "non-recoverable" holidays of irregular temporality as regards their distribution during the year.

All these problems make the costing in year of work to be performed conveniently and practical to use one adequate periodification of it. For example, you have to treat all units produced have a cost of homogeneous production (*eg. if I apply 100 € a day for labor it is intended that every month are € 100 and not 100 other 300, 200, etc.*).

Therefore, it was necessary to make a proper analysis of labor for it desirable to make a distinction between the magnitudes spending, payment and cost and carry out the calculation of the real impact of this cost on the product.

To compute the cost really attributable to production, calculation that is done individually for each worker, either per day (Cd) or per hour (Ch) -what will depend on each company (those € 200 of which we spoke in the example previous) -, in principle, the estimated annual disbursement that the company makes for each of them will be calculated, including only those concepts that are known beforehand. Those who do not know each other, bonuses, bonuses, overtime, etc. they will go by a different route. Subsequently, the estimated time of actual provision will be obtained and, after that, the daily or hourly cost can be obtained. Finally, all these data will allow us to calculate the cost of labor to be allocated in each period. So that:

1. It is estimated the **cost of labor annual estimated** that the company must support per worker (K) , are considered for this purpose, the base salary, bonuses in June and December, fee employer social security, volunteers accruals , other add-ons salaries - provided that the amount is known in advance , for example the seniority bonus³, not the extra hours

³ In the total calculation of the annual disbursement should be included everything that is regular and periodic, then the bonuses for seniority could be included because they are regular and periodic because from one year to another it is known how many years a worker has worked in the company and it will be the same all year round. However, this plus, although it is known a priori, at the time of the computation, for reasons of regular distribution of the cost - a place is not the fault of having more workers with more seniority - it is not convenient to include it in the annual calculation taking to an auxiliary place called "exploitation of buildings" and from there it is distributed where appropriate.

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because they are unknown until the moment they occur -, etc. arriving at the estimated annual cost .

2. On the other hand, will have to obtain the **time estimated actual delivery (T_{prs})** whose number will be conditioned by the current labor legislation, that is, let's calculate how much, it is estimated, will work each employee during that year or what the time of presence is the same. For it to **time calendar (T_{cal})**, for example in days, 365 -, we must subtract it the **time estimated not tra down ($T_{n/prs}$)** : Sundays, holidays not recoverable, holidays paid , permits and licenses, sick leave, etc.

The ratio between the **cost estimate of annual labor (K)** and the **time estimated actual delivery (T_{prs})** is obtained , as it is taken as a reference for calculations, **the cost per day or per hour :**

$$Cd = \frac{K}{T_{prs}/d} \quad \text{ó} \quad Ch = \frac{K}{T_{prs}/h}$$

From all this, the cost of labor, for each worker and each period, is determined by the product of this cost by days / time and time worked in each period:

$$\text{LABOR COST} = \text{Days/Hours} \times \frac{K}{T_{prs} \text{ d/h}}$$

When all these calculations are made for each worker, everyone will have a file that will include: all his personal data, the place of cost where he works, the daily or hourly cost, etc., so that when calculating the cost to be charged by MO simply look at the record of it and remove the data.

EXAMPLE: Be an employee who provides services to a company receiving the following remuneration:

- A base salary of 1,300 euros per month with 14 payments throughout the year,

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- A monthly seniority bonus of 400 euros and a distance bonus, also monthly, of 32 euros.
- During the previous year he received 1,200 euros for travel expenses, due to extraordinary circumstances, not due to the habitual performance of his work.
- For overtime received in the past year 990 euros.
- The contribution to Social Security for this employee amounts to 6,818 euros for the entire year.
- In addition, it is known that this year there will be 11 days between national holidays, the autonomous community and local, in addition to the 30 days of mandatory holidays. It does not work Saturdays or Sundays and the weekly workday is 40 hours. In the month of July he worked 21 days.

It asks: Calculate the projected cost of the day and the actual time for this worker as well as the labor to apply in July.

(Result labor cost to apply to the month of July: **Cost of Labor = 2,882.88 €**)

In addition to the work provided by the staff on the company's staff, the company needs other services consisting of human work that will hire other companies. These are called "**external services**" Ra n is studied at the end of the question.

2.2. COST OF EXTERNAL SERVICES

About external services, defined as consumption worth money, what s services or work performed by individuals or legal entities with which there is a commercial legal bond and therefore is carried out by personnel and means that do not belong to the company (with a link subject to the Labor / Labor Law). In turn, they can:

- **Be part of the process or productive activity of the company** and for economic or technical reasons decide to "outsource" (outsourcing, vertical disintegration or outsourcing) named in P.G.C. (607) "Work done by other companies" (Subgroup 60 "Purchases", account 607). In these cases, the "COMPANY" is the contractor or organizer and instructs another

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subcontractor to carry out a service, which will then be incorporated into a product / service that will sell / lend and that constitutes its main activity. It will therefore be a direct cost.

- **The services of diverse nature acquired by the company**, not included in the previous group, are not part of the process or productive activity of the company. The cost of the same is CONFIRMED as INDIRECT COST to the production since it deals with services related to auxiliary, support or accessory services to the main activity of the company (repairs, conservation, tax advice, accounting, legal, coverage of risks, procedures, management, transport, etc.) all collected in subgroup 62 "External services" of the PGC

We are going to focus on those that do not represent direct costs for the company. They can be: occasional, habitual or mixed.

The computation of consumption, with some exceptions, does not imply complexity since usually coincides purchase or acquisition with the consumer.

- **Occasional - punctual, concrete or non-repetitive:** The contracted service on an occasional basis and for specific reasons-eg intermediations a repair determined, work masonry, commission, courier, transportation, etc., the price is agreed and therefore the value of the purchase and your affiliation no problem, because your application is known.

- **Habitual - periodical and continued in time:** It is pluriperiodicas benefits I to hire company to use them continuously and permanently. Its price is usually agreeing for the entire period of validity, para Cal ass of consumption will require accrue -since that is not known until finally. For example: leases, Safety dad, taxes, banking services, cleaning services, etc.

- **Mixed services:** They respond to the characteristics of the function of semivariable or mixed costs , integrated by a fixed component - *to be supported by the mere contracting of the service, even when it is not used* - and another variable -according to its use- , for example , the telephone service , for which a fixed periodic fee is paid - basic line , which gives the right to use the service -

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which is independent of the major, minor or no use that is made of it, and another variable derived from the use or consumption made during the period. Another example could be the medical assistance service, etc.

Inasmuch as it deals with agreed prices whose global periodic amount - fixed price and consumption - is specified in the invoice, for the valuation of purchases and consumption, there is no problem, except that of having to estimate, the amount to be allocated to a given time interval and the need to adjust, subsequently the possible differences.

There are two special services, taxes, which are difficult to consider (this is the consideration for receiving a public service, although sometimes we do not receive it). Services of a financial nature are services but due to their special characteristics they will be seen separately.

3

COST OF AMORTIZATION AND OTHER COSTS OF THE PRODUCTIVE TEAM

3.1. AMORTIZATION COST

The **cost of the productive team** is defined as the consumption valued in money of the capital goods applied to the productive process.

The problem that may arise from this cost is not the valuation of the inputs or purchases, which is the only thing that we know objectively and that as we know is at the acquisition price, but that of the valuation of the consumptions and the stocks whose measurement is not can be done directly having to resort to indirect measurement procedures. Specifically, this measurement is linked to the depreciation suffered by these teams and quantified through the calculation of the **depreciation** that if we remember was defined as "*the accounting expression of depreciation or loss of value of character i r reversible that experience the economic elements of fixed assets , fixed or non-current assets of the company*".

As already studied in its day, this depreciation can be of three types:

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- **Physical depreciation or as a function of time:** Due to the simple passing of time.

- **Functional or use depreciation:** It is the wear suffered by the use made of the elements, by its operation. This is the fundamental reason why wear and tear of the elements of real fixed assets normally occurs.

Both are calculated through the **ordinary depreciation**. When there is no functioning, physical depreciation or as a function of time is the only one that exists, when there is functioning, the functional subsumes the first.

- **Economic or obsolescence depreciation:** Loss of fitness of the elements for technical progress, changes in demand or exceptional circumstances, that is, by the appearance of new or more modern techniques in the market, change in the tastes of consumers, etc. that cause the equipment to lose value, meaning an important shortening in some cases in the foreseen period of use . This depreciation gives rise to the **extraordinary amortization** that s and inferred results.

There are, then, three depreciations and two types of amortizations. We will focus only on the ordinary, because it is usually the one that really affects the product.

Regarding ordinary depreciation, it can be calculated in two ways: depending on time and depending on usage. In this topic we will study the **amortization according to the use**, since the first one was already studied in previous subjects.

This type of depreciation aims to calculate the incorporation of the depreciation cost to the product in the way that is as close as possible to reality, therefore, it will be necessary to consider the actual use of the good and not just the elapsed time.

There are two application criteria of depreciation based on usage:

- The simple criterion
- The technical criterion

3.1.1. Amortization Simple Criterion

The simple criterion is to consider the use that is made of the element. For this, the useful life of the property is expressed in units of employment or service, eg. if, it is about a machine running hours or u.c. of product obtained, if it is a vehicle, in km traveled, etc., computing the amortization that in each case proceeds according to the use that has actually been made of it.

For it:

1. **The amortization or estimated cost of the generic unit of employment or service (u^p) is calculated** "by quotient between the depreciable value and the estimated useful life expressed in units of employment or service (Hours (H), km traveled, etc.).)". It would calculate, for example, the price of Km., Hours, etc.

$$u^p = \frac{\text{Amortizable value}}{\text{Estimated useful life}}$$

Where: **Amortizable value** = ($V_0 - V_r$)

V_0 = initial value

V_r = residual value

2. **Depreciation is calculated to be charged in a certain period, of an asset, depending on the use made of the element** (Eq If a vehicle has traveled in a specific period 2000 kilometers, the amortization to apply for the use of said vehicle will be given by the product of the 2000 kilometers traveled and the price of the kilometer).

If, for example, the time is taken as reference, the amortization to be applied according to this criterion would be calculated in the following way:

$$h^p(u^p) = \frac{V_0 - V_r}{T^p(U^p)} \Rightarrow a^r = T^r \cdot h^p$$

Where:

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h^p = estimated hourly cost or estimated cost of the generic unit of employment

T^p = estimated useful life of the property expressed in hours

a^r = depreciation cost to be charged for a good, in a certain period, according to the use made of the item

EXAMPLE: The company "ER" acquired machinery amounting to 150.000 euros whose residual value was 15.000 euros, which is considered a life until 1500 operating hours. During the exercise the machine has been working 60 hours. Determine what is the amortization cost of the machinery to be charged in this period.

$$\text{Estimated hourly cost} = \frac{V_0 - V_r}{\text{useful life}} = \frac{150.000 - 15.000}{1.500} = 90 \text{ €/operating hour.}$$

By Therefore, this machine will cost 90 euros per hour of operation. If, in a certain period, 60 hours have worked, the amortization cost attributable to this period will be:

$$a^r = 60h \times 90\text{€} / h = 5.400 \text{ euros}$$

3.1.2. Amortization Technical Criterion

The technical criterion aims to adjust as much as possible to the effective depreciation of the equipment. It is applicable, fundamentally, when dealing with fixed assets whose acquisition price is very high.

In its development we will consider 2 variables:

- **THE VARIABLE "PERFORMANCE"**: It must be considered because a car or a machine does not always work with the same performance, it is not constant throughout its life, it is usually decreasing. Something low at the beginning, to rise, and then decrease until it is useless. This technical performance is established by the engineers who create the element. Thus, if we intend to collect the real depreciation, this performance will have to be considered in the calculation of the amortization quotas.

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Throughout the useful life of a good, it is not the same, neither in yield nor in cost, one hour at the beginning of it, at the end. So, for the cost to be homogeneous it will be necessary to homogenize the useful life of the different elements - we will have to make all hours equal.

- **THE VARIABLE “CAPACITY OF UTILIZATION”**: or occupation coefficient, is the rate of use of the machinery or capacity to use the good.

In addition to the performance variable, another variable that is also decisive in the calculation of depreciation based on usage is the capacity utilization variable that is calculated by seeing the effect caused by the lower production rate, in the greater or lesser wear that occurs. It is important because you also have to take into account the way in which the good is used in particular since it is not the same to use it at full capacity (100%) than at a lower capacity (70%, 80%, etc.) , that is not always the teams work at the same rit mo, for example, in a car, is not the same always go to 90 km / h , which is 150 km / h , wear will be greater in the second case .

Those elements on which are provided the yield coefficients, these are calculated to full capacity (100%) but after the various elements, can be n use a different capacity, having to adjust the performance to that capacity. For this, we will also have to consider the pace of operation, that is, the **capacity utilization of the elements**.

Due to these circumstances, the wear suffered by the element will not be equal throughout their lives depend on the **utilization ratio or coefficient useability** applied at any time, and the **coefficient of technical performance**, which depends on the time in which it is in respect of its useful life. For all this, it will be necessary to homogenize the useful life of the good.

So, first, we will transform the actual operating time (T) into homogeneous time:

$$T_{homogeneous} = T_{real} \times \underbrace{\text{capacity coef.} \times \text{performance coef.}}_{T_{effective}} \times \text{performance coef.}$$
$$T_{homogeneous} = T_{effective} \times \text{performance coef.}$$

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For the amortization calculation according to this procedure we will have to calculate:

1. **The Homogeneous hourly cost to apply:** Which will be the same for all hours of activity, regardless of the Result or capacity that it should be applied in each moment and period.

This will be calculated at the beginning of the useful life of the asset, before calculating any amortization fee to be applied. Since at that moment we do not know yet what capacity to use (I can not invent it) it is always calculated assuming 100% of the capacity - if it is homogeneous, it must be calculated for all equally:

$$\text{Homogeneous Hourly Cost} = \frac{\text{AMORTIZABLE VALUE}}{\text{HOMOGENEOUS TIME (TH)}}$$

$$\text{TH} = \underbrace{[\text{Hours of activity} \times 100\% \text{ Capacity of use}] \times \text{Performance coef.}}_{\text{EFFECTIVE TIME}}$$

EFFECTIVE TIME

Once this information is known, for the calculation of the amortization cost of an element (eg, a machine) to be applied in a specific period, the previous concepts must be calculated [T ew time (TE) , Homogeneous Time (T H) and Amortization rate (a)] but already with the coefficients of Performance and utilization capacities that correspond in each moment or stretch of calculation, so that:

$$\text{AMORT. QUOTA} = \underbrace{\text{HOMOGENEOUS TIME}}_{\text{EFFECTIVE TIME}} \times \text{COST HOMOGENEOUS HOURS}$$

$$\text{HOMOGENEOUS TIME} = \underbrace{\text{EFFECTIVE TIME}}_{\text{ACTIVITY HOURS} \times \text{UTILIZATION CAPACITY}} \times \text{PERFORMANCE COEF.}$$

$$\text{EFFECTIVE TIME} = \text{ACTIVITY HOURS} \times \text{UTILIZATION CAPACITY}$$

In the form of a box it would be:

REAL ACTIVITY HOURS	CAPACITY OF UTILIZATION	EFFECTIVE TIME	COEFFICIENT OF PERFORMANCE	HOMOGENEOUS TIME	COST OF THE HOMOGENEOUS HOUR	AMORTIZ. QUOTA

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In this way, the calculation of the amortization fee responds, not only to the technical characteristics of the element -performance-, but also to the real circumstances of production -capacity of use-.

EXAMPLE: Suppose a machine that cost 18.000 euros, with value residual of 2.000 euros.

Said machine has a service life estimated of 2.400 hours with if lowering coefficients yield: 90% during the first 400 hours of 100% in the following 1000 hours and 80% in the last 1,000 hours.

$$T_{\text{homogeneous}} = (400 \times 100\% \times 90\%) + (1000 \times 100\% \times 100\%) + (1000 \times 100\% \times 80\%) = 360 + 1000 + 800 = 2.160 \text{ h/homogeneous}$$

If we calculate the cost of the homogeneous hour:

$$\text{Hourly homogeneous cost} = \frac{18.000\text{€} - 2.000\text{€}}{2.160 \text{ hh}} = 7,4 \text{ €/h. homogeneous}$$

Suppose now that the period for which we want to calculate the amortization rate corresponds to the first 300 natural hours of operation of the machine of the example, during which period it has been running half the time (150h) to 100 % capacity and the rest 50%.

REAL ACTIVITY HOURS	CAPACITY OF UTILIZATION	EFFECTIVE TIME	COEFFICIENT OF PERFORMANCE	HOMOGENEOUS TIME	COST OF THE HOMOGENEOUS HOUR	AMORTIZ. QUOTA
150	1	150	0'9	135	7'41	1.000,35
150	0'5	75	0'9	67'5	7'41	500,18

The amortization quote for the period will be **1.500,53 euros**.

In this way, we see how the computation of the amortization fee responds, not only to the technical characteristics of the element -performance-, but also to the real circumstances of production -capacity of use-.

3.2. OTHER COST OF THE PRODUCTIVE EQUIPMENT

In the event that a company has to perform an analysis to carry out, for example, the replacement of some equipment, in addition to the amortization thereof, it is interesting to know that other costs are associated with said equipment in order to know what are the true costs that will originate. Therefore, the use of productive equipment, generated by its operation or other costs related to it, which would be the following:

- **Operation cost:** are the costs of the energy consumed to keep the asset in service (gas, liquid fuels, electric power, etc.).
- **Preventive maintenance costs or conservation:** correspond to the care to prevent future breakdowns and to keep it " ready" for operation. At higher costs of this type, the foreseeable life of the element will be longer. EJ: painting, cleaning, parts.
- **Repair cost:** arise because of possible damage to the equipment and materialize in work arrangements, etc., so that the computer regain its normal operation. The older the team is, the higher these costs are.
- **Risk coverage cost:** insurance contracted with third parties to cover risks that may affect the equipment, eg.: Vehicle insurance.
- **Financing costs:** external and internal (will be n in the next question).

All these costs are not included in the cost of the equipment and therefore not in the amortization of the item in question, being treated independently as an indirect cost more.

In addition to the costs mentioned above, with respect to a productive team, the so-called costs in improvements that represent new investments to increase the capacity of the element or its useful life can also be originated, as it was seen in the first course. It is not a cost generated by the productive team, but an increase in the value of the asset, which will result in an increase in the value of the amortizations. Therefore, since these increase the value of the good, they are considered within the amortization cost.

4

FINANCIAL COSTS

In addition to the cost of all the above factors, materials, etc., it will be necessary to consider as a factor of cost the financial burdens of the company, which will include, in an unequivocal way, the Costs of Own Capital + Costs of the Capital of Others.

Of both, it will only pose a problem, its inclusion as a cost factor together with the rest of the factors studied previously, **the costs of own financing**. There are reasons, regarding whether it should be included as a cost factor, in both directions.

The costs of external financing are costs agreed between parties (interest, commission plus formalization expenses) and, as we have already pointed out, they do not pose any problem since they are known in advance at the time of requesting the loan or credit. There is unanimity among the different authors in considering them as a cost factor.

Regarding the **cost of own financing or own capital** as a cost factor, as we have indicated in previous paragraphs, there is no unanimity.

Those who do not agree on its inclusion as a cost factor, among the arguments that are exposed is that not having the consideration of expenditure in the external does not have to be cost in the internal. This argument does not have much reason to be because, there may be costs that are not expenses and vice versa.

However, the great majority of authors are inclined to include it as a cost factor since this way it reflects better what is really happening. The arguments that establish, in this sense, are several, among some of them we have the following:

- Its inclusion implies obtaining a more rational figure of results, that is, more correct or logical. **(Scovell)**
- In the cost structure must include not only the raw material, labor, etc. but also the cost of the capital used in the productive process, regardless

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of the legal form of the financing - either owned or by others (**Fernández Pirla**)

- There must be a criterion of homogeneity between companies with the same Economic Structure (EE), so that two companies with the same EE must have the same cost structure, regardless of their Financial Structure (foreign capital and own capital), which does not have to be the same, since the EE is the one that can generate benefits. (**Calafell**)
- Pero the argument usually taken as reference, is claiming that the cost of equity, should include as cost factor by the fact that otherwise they would be ignoring the renunciation of the potential benefits they could have been obtained in other investments in the financial market, raising the problem in terms of opportunity cost (**Horngren**). Argument to which we also add,

Thus, in general, it can be said that most authors opt for inclusion as a cost factor, since, as we have already said, the application of the company's own resources for the acquisition of the economic structure of the same one, supposes the resignation to an alternative investment, is being renounced to a profitability of the financial market, reason why its cost will be, precisely that profit that has stopped to gain - cost of opportunity- .

Admitted self financing as a financial cost, the problems posed by its calculation are two:

- * The determination of the base capital, that is, the capital that will be taken as a basis for its calculation.
- * The determination of the interest rate to apply

1. Determination of the base capital

With regard to the first point, it would be easy to consider all of the company's own resources as a base capital - Net: CAPITAL + RESERVES - however, it could be the case that the financing itself was excessive, idle, and the calculation of its total amount would lead us to take into account costs that have nothing to do with production - costs not necessary. To avoid this, the amount of the productive economic structure of the company, that is to say, the EE, should be taken as the base capital, but without the excesses of financing and this will be

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subtracted from the amount of external financing, so that we will have the part of the own financing that is financing productive elements.

2. Determination of the interest rate to be applied

Regarding the determination of the interest to be applied, it is common for the authors to omit express criteria in this regard. Anyway, there are several positions:

- Use the **market interest rate of the environment where the activity of the company normally operates** - fixed or variable income offers - that is, reasonably safe long-term investments. If there are several, one option could be to take the one with the highest interest (**Schmalenbach**) .
- Some authors choose to take the **average interest rate of the capital market**.
- Another position is that which says that it must be given based on the threshold of resignation on the part of the employer, to the investment in his own company, that is to say, **the real profitability to which it is waived in each case**. However, this criterion results from great subjectivity and difficult concretion since it could lead to the fixing of a capricious interest rate and sometimes away from reality.
- Another position is the one that advocates the calculation according to the internal returns of the investments in own and foreign capital (IRR), that is, in terms of the flows of financial resources obtained and the returns generated by them -Internal performance- . This position is one that is considered more logical but has the disadvantage that the calculations are made within the company itself so it will not be a true opportunity cost since it should be calculated in third-party companies.

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