1

ISCTE ◇ IUL
Instituto Universitário de Lisboa

Accounting Department

THEORETICAL LESSON 9

Calculation of the Production Costs by Job and by Process

Management Accounting I

Management

2014/2015 – 2nd semester

Theoretical Lesson 9

2   ## Objectives of the Lesson

i. Production regimes and calculation of the manufacturing costs

ii. Characteristics of the production processes by job and by process

iii. Direct method of calculation of the products manufacturing costs

iv. Indirect method of calculation of the products manufacturing costs

v. Method of the equivalent units

Theoretical Lesson 9

> 3 **Objective 1**

i. Production regimes and calculation of the manufacturing costs

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Theoretical Lesson 9 | i. Production regimes and calculation of the manufacturing costs

> 4 **Production Regimes**

↘ The production regimes used in the companies influence the ascertainment of the products manufacturing costs

↘ As it was previously mentioned, the production regimes may be classified into:

Discontinuous...	Continuous...
... by order or by job	... by process or directed to stock
Example: building industries, ship building, etc.	*Example: cement, beer, paper, oil refining industries,etc.*

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| 5 | **Objective 2** |

ii. Characteristics of the production processes by job and by process

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Theoretical Lesson 9| ii. Charateristics of the production processes by job and by process

| 6 | **Production by Job vs. Process** |

Production by Job...	**Production by Process...**
... units production or batches of specific units	... permament production of product for stock
...the finished product is identifiable over the course of the production process	... the finished product is not identifiable over the course of the process in progress
... the production process can last for a period of time shorter or longer than a year	... the time of the production process is generally shorter ithan a year
... at the end of the month the product is in progress or finished and, without any necessary calculations, the value of the production in progress is known	... at the end of the month, the product is in progress or finished, and it is necessary to ascertain the value of the production in progress
...the manufacturing cost is ascertained by the **direct method**	...the manufacturing cost is ascertained by the **indirect method**

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| 7 | **Objective 3** |

iii. Direct method to calculate the products manufacturing costs

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Theoretical Lesson 9| iii. Direct method to calculate the products manufacturing costs

| 8 | **Table of Conversion Costs** |

↘ The drawing of the Table of Conversion Costs, even when the manufacturing costs are ascertained by the **direct method,** has not any significant peculiarity regarding what was mentioned in previous lessons

⇩

Difference:
The Cost Centres (Sections) render services to works and not to products, therefore the costs of the cost centres (sections) are included in the Table of Job Costs

Theoretical Lesson 9| iii. Direct method to calculate the products manufacturing costs

10 - 5

9 **Table of Job Cost**

↘ The drawing of Table of Job Costs, where the manufacturing costs are ascertained by the **direct method**, has not any significant peculiarities regarding what was mentioned in previous lessons as for the Table of the Production Costs

↘ The costs accumulation is made by order in the job cards during all the production period

↘ The monthly value of the production (work) …

Finished…	In Progress…
Raw Materials Costs + Conversion Costs	Raw Materials Costs + Conversion Costs
… considering the opening stocks and the by-products, if the works are finished	… considering the opening stocks and the by-products, if the works are not finished

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10 **Table of Production Costs**

DESCRIPTION	MU	Unit Cost	Job...		Job...	
			Q	€	Q	€
1. Materials used						
2. Subcontracting						
3. Conversion costs						
...						
Total 3.						
4. MCMP = (1) + (2) + (3)						
5. By-product						
6. MCMP						
7. Job cost at the beginning of the month						
8. Cost of the finished job						
9. Cost of the work (job) in progress at the end of the month						

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| 11 | **Objective 4** |

iv. Indirect method to calculate the products manufacturing costs

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Theoretical Lesson 9| iv. Indirect method to calculate the products manufacturing costs

| 12 | **Table of Conversion Costs and of Production Costs** |

↘ Both the drawing of the Table of Conversion Costs, and the one of Table of Production Cost, when the manufacturing cost is ascertained by the **indirect method,** have not any significant peculiarity regarding what was mentioned in previous lessons.

↘ The costs accumulation (usually monthly) happens according to the product type and, at the end of each period, the unit average cost is calculated:

Unit MCFP = Costs Accumulated / Quantities Produced

13 Indirect Method with Production by Stages

Table of Production costs

Description	Unit C	Intermediate product		P1		P2		Total
		Q	€	Q	€	Q	€	

1 Direct Materials (DM)
  M1
  M2
  …
  Intermediate product
Subtotal DM
	€							

2 Conversion costs								
S1								
S2								
… Total Conversion costs (2)								
3.MCMP								
4. Opening stocks PiP – Closing stocks PiP								
5. (By-products)								
6. Global MCFP Unit MCFP								

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14 Table of Production Costs

↘ Consulting the tablesheet, the value of the finished work(s) is knpwn and/or the work(s) in progress. This happens in the direct method, but it does not happen in the indirect method.

Problem: in the indirect method the cost of the finished production is only known **after** being valued the production in progress

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The **value of the production in progress** at the end of the month is ascertained by calculating an **equivalent value to the percentage of finishing**

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Method of the Equivalent Units

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15 **Objective 5**

v. Method of the Equivalent Units

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16 **Method of the Equivalent Units (MEU)**

↘ In processes of continuous production (indirect method) …

… the <u>quantity of production which is not finished can only be recognized and measured by</u> direct inventory

…there can be production in progress at <u>different stages of finishing</u>, corresponding to an ascertained percentage in relation to the finished product

Problem: direct calculation of practical inventory is difficult (it can make the factory/production stop) and sometimes it implicates estimates ⇩

Therefore, the value of the production in progress can be ascertained using the **method of the equivalent units**

17 **Method of the Equivalent Units (MEU)**

In a certain month, in equivalent measure units:

Production of the month, finished and not finished (MCMP)

=

Finished production in the month (MCFP)

+

Production in progress at the end of the month

-

Production in progress at the beginning of the month

↘ Therefore, it is necessary to convert the units of production in progress into equivalent units of the Finished Product, using finishing percentages (%)

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18 **Method of the Equivalent Units (MEU)**

Concisely, the stages to ascertain the MCFP using the indirect method and valueing the production in progress using MEU are:

1. Accumulate the manufacturing costs of the month (MCMP)

2. Calculate the production of the month in equivalent units (E.U.)

3. Calculate the unit cost of the E.U. produced in the month

4. Measure the closing stocks, using the cost of the E.U. of the month and taking into account the valuation criterion

5. Ascertain the **MCFP (MCMP + Opening Stock PiP – Closing Stock PiP)**

| 19 | **Method of the Equivalent Units (MEU)** |

Example:

Data of the month:

E company produces the product P.
Opening Stock PiP: 300 un. – Finishing level: 40%
Finished production: 2 000 un.
Closing Stock PiP: 500 un. – Finishing level60%
Manufacturing costs of the month (RM+CC): 47 960 €
Opening Stock PiP valued in the previous month by <u>MEU</u>:
2 400 €
Ascertain the **MCFP of the month**.

| 20 | **Method of the Equivalent Units (MEU)** |

↘ Ascertainment of the production of the month and the production cost of the month in EU of finished product:

Monthly Production (EU) = 2 000+(500x60%)–(300x40%) = 2 000 + 300 – 120 = 2 180 EU of finished product

Monthly Cost (EU) = 47 960 €/2 180 EU = 22 €/EU

↘ Valuation of the Closing Stocks PiP for the calculation of the MCFP, assuming that the valuation criterion is **FIFO**:

The Opening Stocks PiP were the first to be finished, therefore the **Closing Stocks PiP** are valued at the production cost of the monthly EU:

300 EU x 22 € = 6 600 €

MCFP = MCMP + Opening Stocks PiP – Closing Stocks PiP$_{(FIFO)}$
MCFP = 47 960 + 2 400 – 6 600 = 43 760 €

21 · **Method of the Equivalent Units (MEU)**

↘ Valuation of the Closing Stocks PiP for the calculation of the MCFP, assuming that the valuation criterion is **LIFO**:

The **Opening Stocks PiP** were the last to be finished, therefore, of the 300 units of Closing Stocks PiP (500 x 60%), 180 are valued at the production cost of the EU of the month, and 120 (40% x 300) at the cost of the Opening Stocks PiP:

(180 x 22 €) + (120 x 20 €) = 6 360 €

MCFP = 47 960 + 2 400 − 6 360 = 44 000 €

↘ Valuation of the Closing Stocks PiP for the calculation of the MCFP, assuming that the valuation criterion in the **WAC (Weighted Average Cost)**:

[(2 180 x 22 €) + (120 x 20 €)]/2 300 = 21.8957 €

Closing Stocks PiP = 300 x 21.8957 = 6 569 €

MCFP = 47 960 + 2 400 − 6 569 = 43 791 €

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22 · **Method of the Equivalent Units (MEU)**

See how very simple the example is. In this example it was assumed:

- Only one finishing level for all the production which is not finished;

- That that finishing level was the same regarding the different resources incorporated into the production.

   However, reality is not always like that!

↘ Let us imagime that PiP was divided into its three components - RM, DL and MO – and that each component had a % of different finishing!!! It is possible to exist PiP at different stages of finishing and the finishing level may be different in the different rescurces.

Example: The Materials and the CC of one Cost Centre (Section) are already incorporated, but another Cost Centre (Section) is missing (or other Cost Centres)

Method of the Equivalent Units (MEU)

23

In a word, to ascertain the MCFP in continuous production processes (Indirect Method), valueing PiP using the Method of the Equivalent Units, we have to:

1. Accumulate the Manufacturing Costs of the month (MCMP)

2. Measure PiP at the end of the month

3. Identify its finishing level

4. Calculate the Production of the Month Equiv. Units

5. Calculate the Unit Cost of the Equiv. Units produced in the month

6. Value the Closing Stocks PiP, using the cost of the Equiv. Unit of the month, taking into account the valuation vriterion

7. Ascertain the MCFP (MCMP + Stocks PiP– Closing Stocks PiP)

Theoretical lesson 9

24

End of Lesson 9