



Image. Ivan Samkov in Pexels, 2021.

A Clean Cost Optimization

SP90-06-210

This problem situation was written by Mariana Pacheco Langner (marian@tec.mx) y Luis Antonio Camacho Galindo (luisacamacho@tec.mx), with the purpose of serving as support material for instructors of the "Natural Soaps Cost Optimization" document. The problem situation is based on different people's experiences; some data has been modified at the request of the people and institutions involved.

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The company and Joseph

Joseph walks the corridor of his small soap factory. He is currently supervising the production of a very important order that must be filled for the Macy's store before the end of the month. As he walks, he focuses on every detail because he is aware that this is what has led him to success.

Some years ago, Joseph was diagnosed with a skin condition: an allergic reaction to the soap's components, which he used daily. He was forced to look for alternatives and realized that the natural soaps he used to buy did not meet his needs and that was how Joseph undertook the task of making his own soaps.

Joseph was encouraged when he read about one of the [mega trends](#) in recent years: the ecological consumer, the conscious and sensitive buyer who considers the repercussions of his/her habits on the sustainable development where he/she lives.

After several attempts with different formulas, he was able to prepare soaps with a pleasant appearance, smell, and even different colors, all with 100% natural ingredients.

The company began receiving orders from his family members and little by little he was known for the quality of his soaps, and the orders began to pour in.

As a Mexican company, Natural Soaps is characterized by innovating and capturing opportunities that the market offers, being concerned about health, skin care and the environment.

Natural Soaps is dedicated to the manufacturing of natural body soaps for daily hygiene.

Production Process

It is based on a chemical reaction: *cold saponification*.

By mixing a strong base (sodium hydroxide lye) with a fat (natural oils), a chemical reaction is provoked creating two elements: soap and glycerin. The soaps are ready when all the lye is transformed and there is nothing left. The oils are used in the process to help lye to be chemically transformed.

“At Natural Soaps, we use natural oils because the excess on every soap will help to nourish, soften and protect the skin. With the production process we follow, we conserve the natural properties of the oil as we do not add heat; *cold saponification* is a long process. Once the mixture is ready, we pour it into molds and let them cure for a minimum of four weeks to allow the process to complete, and the soap to dry” -Joseph explains-.

Natural Soaps is dedicated to the manufacturing of natural body soaps for daily hygiene.



Image. Soap raw materials.

Fuente. Anthony Shkraba en Pexels, 2021.



Image. Soap suggested use.

Source. Tara Winstead en Pexels, 2021.

He needs to know the precise unit cost, to calculate profits.

Unit cost

Natural Soaps use a job costing system for its production costs, and a predetermined factory overhead rate based on direct labor costs to apply factory overhead to all jobs. Since the beginning, the soap with the highest demand, because of its natural properties, was Olive oil.

During the first semester of 2023, the company processed three batches:

1. NS-Olive-001 with 1,300 pieces
2. NS-Olive-002 with 1,400 pieces
3. NS-Olive-003 with 1,500 pieces

In order to manufacture a single unit the following are needed:

- ▶ Olive Oil: 200 ml. at \$100 pesos*/liter
- ▶ Lye: 40 gr. at \$70 pesos/Kg
- ▶ Direct labor: 0.5 hours at \$31.25 pesos/hr

The estimated semester overhead for 2023 includes:

- ▶ Indirect labor: 1,100 hours
- ▶ Rent: \$50,000.00 pesos
- ▶ Profit : \$35,000.00 pesos
- ▶ Maintenance and repairs: \$1,000.00 pesos
- ▶ Equipment depreciation: \$5,000.00 pesos
- ▶ Others: \$12,000.00 pesos

Joseph is wondering the following information:

- ▶ 1. How many Direct Labor hours have been used?
- ▶ 2. How much is the Overhead application rate?
- ▶ 3. He also needs to know the precise unit cost, to calculate profits.

*1 MXN= \$0.055096 USD (X-rates.com, 2023).

Job Costing

Joseph wants to know everything about the costs. He wants to be clear: costs are not one of his strengths , so he asks you to prepare:

- ▶ 4. The total manufacturing cost for each job
- ▶ 5. A Statement of Cost of Goods Manufactured
- ▶ 6. An Income Statement for the semester ended June 30, 2023.

Normal Cost

The cost to be calculated is per job order.

Revenues are calculated adding a profit margin of 35% to the Cost of Goods Sold.

Sales and Administrative Expenses as a percent of revenues are 15%.

Inventories are not considered since the production of the semester is scheduled: it begins and ends within the period without accumulating inventories, except for a Beginning materials inventory, made up of :

Olive oil: (260 lt * \$100 pesos) \$26,000.00 pesos

Lye: (52 kg * \$70 pesos) \$3,640.00 pesos

The jobs were completed in the production area, with 80% being delivered to the Macy's store and the rest remaining in the finished goods inventory.

From jobs to a process

Joseph considers that the ecofriendly trend has gained market share little by little and it's here to stay, as new generations prefer these natural products over industrialized ones.

Due to this increase in consumption, sales increased favorably. With the profits generated, Joseph invested in the purchase of machinery that allowed him to standardize the process and increase production capacity. This is how Natural Soaps migrated from a job costing system to a process costing system. The production process involves two steps: Mixing and Cooling.

After this migration, Joseph wants to know:

- ▶ 7. The new Cost of Goods Manufactured
- ▶ 8. The new Income Statement for the semester ended December 31, 2023.

During the first semester of having implemented this change in the company, the accountant decided to use the Weighted Average Method. Following data was obtained:

Revenues are calculated adding a profit margin of 35% to the Cost of Goods Sold.

Data related to the Process Costing System

PROCESS 1 MIXING			
Concept	Units	Completion Percentage	Costs
Beginning Work in process inventory	0		
Direct materials		0%	\$ -
Conversion		0%	\$ -
Units started during July	12,000		
Units completed during the period	¿?		
Final Work-in-process inventory:	0		
Direct materials		100%	
Conversion		100%	
Costs added during the period:			
Direct materials			\$ 273,600.00
Conversion			\$ 162,437.50
Total costs incurred			\$ 436,037.50

PROCESS 2 COOLING			
Concept	Units	Completion Percentage	Costs
Beginning Work in process inventory	0		
Direct materials		0%	\$ -
Conversion		0%	\$ -
Transferred-in	¿?		¿?
Units to account for			
Work-in-process inventory, June 30:	4000		
Direct materials:		100%	
Conversion		70%	
Costs added during the period:			
Materials			\$ -
Conversion			\$ 162,437.50
Total costs incurred			\$ 162,437.50

Joseph is asking some additional information to the Natural Soaps accountant:

- ▶ 9. What is the difference between using job costing and process costing?
- ▶ 10. Was it appropriate to switch to process costing? Why?
- ▶ 11. What are the equivalent units?
- ▶ 12. What are the transferred costs?

Natural Soaps future depends on a good management of costs and profits, so your answers are crucial.