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## Improvement of the industrial process costing system in fishing activities

### Perfeccionamiento del sistema de costos de los procesos industriales en actividades pesqueras

### Aprimoramento do sistema de custeio do processo industrial nas atividades de pesca



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**Received:** 4/11/2022

**Accepted:** 24/06/2023

## ABSTRACT

Cost accumulation systems are basic instruments to support the design of managerial decisions, the optimization of business processes and the definition of strategies that support the differentiation and competitiveness of the economic units that comprise the productive sector of a country. The study developed is oriented to the redesign of some of the basic work procedures of the cost system of the Industrial Base Business Unit La Coloma belonging to the Industrial Fishing Enterprise "La Coloma", from the reorganization of the main instruments and stages associated with the calculation and accumulation of industrial processing costs in fishing activities to their updated production flows. For this purpose, theoretical and empirical methods were applied, as well as a set of procedures and techniques, which allowed the study of the historical trends of management accounting and cost systems, as well as the characterization of their current state in the entity, which contributed as main

result to the redesign of the operation vouchers, calculation and distribution of indirect costs, joint costs, equivalent production and redesign of their cost sheets. This laid the foundations for the application of more specific financial instruments that would contribute to build relevant information for the operational management of costs and expenses of the industrial units of this sector of the economy.

**Keywords:** industrial activities; cost per process; accounting procedures; fishing industry.

## RESUMEN

Los sistemas de acumulación de los costos son instrumentos básicos en el apoyo al diseño de decisiones gerenciales, en la optimización de los procesos empresariales y la definición de las estrategias que soporten la diferenciación y la competitividad de las unidades económicas que engloban el sector productivo de un país. El estudio desarrollado está orientado al rediseño de algunos de los procedimientos de trabajo básico del sistema de costo de la Unidad Empresarial de Base Industria La Coloma perteneciente a la Empresa Pesquera Industrial "La Coloma", a partir de la reorganización de los principales instrumentos y etapas asociadas al cálculo y acumulación de los costos de procesamiento industrial en actividades pesqueras a sus flujos actualizados de producción. Para ello, se aplicaron métodos teóricos y empíricos, así como un conjunto de procedimientos y técnicas, que permitieron el estudio de las tendencias históricas de la contabilidad de gestión y los sistemas de costo, así como la caracterización de su estado actual en la entidad, lo que contribuyó como principal resultado al rediseño de los comprobantes de operación, cálculo y distribución de los costos indirectos, costos conjuntos, producción equivalente y rediseño de sus fichas de costo. Esto sentó las bases para la aplicación de instrumentos financieros más específicos que contribuirían a construir información relevante para la gestión operativa de los costos y gastos de las unidades industriales de este sector de la economía.

**Palabras clave:** actividades industriales; costo por proceso; procedimientos contables; industria pesquera.

## RESUMO

Os sistemas de acumulação de custos são instrumentos básicos para apoiar o desenho das decisões gerenciais, a otimização dos processos empresariais e a definição de estratégias que apoiem a diferenciação e a competitividade das unidades econômicas que compõem o setor produtivo de um país. O estudo desenvolvido está orientado para o redesenho de alguns dos procedimentos básicos de trabalho do sistema de custos da Unidade de Negócio de Base Industrial La Coloma pertencente à Empresa de Pesca Industrial "La Coloma", com base na reorganização dos principais instrumentos e etapas associados ao cálculo e acumulação dos custos de processamento industrial nas atividades pesqueiras aos seus fluxos de produção atualizados. Para tanto, foram aplicados métodos teóricos e empíricos, bem como um conjunto de procedimentos e técnicas, que permitiram o estudo das tendências históricas da contabilidade gerencial e dos sistemas de custos, bem como a caracterização de seu estado atual na entidade, o que contribuiu como principal resultado para o redesenho dos comprovantes operacionais, cálculo e distribuição dos custos indiretos, custos conjuntos, produção equivalente e redesenho de suas planilhas de custos. Isso lançou as bases para a aplicação de instrumentos financeiros mais específicos que contribuíssem para a construção de informações relevantes para a gestão operacional de custos e despesas das unidades industriais desse setor da economia.

**Palavras-chave:** atividades industriais; custo por processo; procedimentos contábeis; indústria pesqueira.

## INTRODUCTION

The term accounting comes from the Latin *computare*, which means to count, both in the aspect of comparing magnitudes with the unit of measurement and in the sense of telling or making history. An approach to the historical evolution of accounting reveals that it is as old as the need that people had to have information (Castaño de Armas et al., 2018).

During the 15th century, events occurred that laid the foundations of what is known today as Accounting. The "paternity" of accounting was attributed to the monk Friar Lucas Paccioli (1445-1517), a historical period that the doctrine has called "genesis and emergence of the double entry accounting" (Cano Morales et al., 2017).

It was not until 1880 that it was concluded that the accounting criteria prevailing up to that time were not compatible with the information requirements of industrial activities. According to Henry Metcalfe (1885), in his book "Industrial Costs", it was not until this date that a significant interest in the problems presented by the indirect costs of products began to develop, and it is here where the development of what would later become cost accounting began, based on the information requirements that would strengthen the decision-making processes for business operations.

The emergence of cost accounting is therefore located in an era before the Industrial Revolution. This, because of the information it is handled, tended to be very simple, since the production processes of the time were not so complex, developing in an environment characterized by an increase in mechanization and standardization; these particularities help to understand the fundamental basis of the classification of manufacturing costs (Isaac Sanchez et al., 2019).

The first companies to use a method similar to the cost system were the vineyard production industries, book printing industries and steel mills, which used it to keep track of the resources used to manufacture the good, they kept books to manage the costs of the manufactured products, which are similar to the cost manuals used today (González Jiménez & Tamez Martínez, 2017).

During the Industrial Revolution, companies invested in their own workshops and hired their own stable workforce. Thus, they replaced the artisan workshops with their own workshops. This change in the development of the company's production process required an information system with new solutions to management problems that were different from those that had occurred up to that time. Over the years, the evolution that this discipline has undergone is mainly due to the demand by companies for accounting systems capable of providing information that will allow them to adopt management strategies in an increasingly competitive and global environment (Plana, 2014).

Cost has been an economic term addressed by several authors, who have defined it in different ways, and there are different criteria regarding its essential elements, some of their definitions being: economic expense represented by the manufacture of a product or the provision of a service (Dotres Zúñiga et al., 2020), or value sacrificed to obtain a good or a service (Creagh Hernández & O'Farril Rodríguez, 2020). The Ministry of Finance and Prices defines cost as: "The economic expense that represents the manufacture of a product or the provision of a service, the monetary value of consumption of all kinds, which involves the exercise of an economic activity aimed at the production of a good, service or activity", this concept refers to the magnitude of the material, labor and

monetary resources necessary to achieve a certain volume of production or provision of service with a certain quality (Ministry of Finance and Prices, 2019).

For his part, González Delgado (2018) assumes that: "the cost is an economic indicator that reflects the efficiency achieved in the use and exploitation of resources, hence its importance in the business environment as it constitutes a working instrument of administrative management. Its calculation will depend entirely on the recording of expenses and this, at the same time, will obey the care taken in the accumulation process. It is possible to affirm, then, that the accumulation and recording of expenses and the calculation of the cost constitute essential moments for an efficient business management".

On the other hand, Latorre Aizaga (2016) states in his definition that: "cost is any consumption or expense caused in the operations or production area that adds value to the service or final product and that can be activated as inventory".

These authors agree that costs are associated with the sacrifice or consumption of resources to obtain goods and services, which are expressed in monetary terms, based on the decrease in assets and the increase in liabilities at the time the goods and services produced are obtained.

It can be established that the cost is the value of material resources (raw materials and basic materials), human resources (salaries, vacations and others) and indirect costs associated with production (indirect materials, indirect labor, water, electricity, depreciation, amortization, wear and tear, maintenance, among others) incurred in the production of a product or in the presentation of a service. It is a basic indicator of productive economic efficiency, so its behavior and control facilitate the evaluation of the results of a given economic period and, on this basis, rational decisions for the management of enterprises. The cost is composed of elements that further facilitate a better understanding of its calculation (Horngren et al., 2012):

- Raw materials and materials
- Fuel and lubricants
- Energy
- Salary
- Other salary expenses
- Depreciation and amortization
- Maintenance expenses

- Other monetary expenses
- Transfers

Enterprises are central organizations for the functioning of economic systems; they are important because people can satisfy their needs through the exchange of goods and services, better known as products (Guamialamag Montenegro & Muñoz López, 2020), where the determination of the costs associated with the generation of products, services and activities are fundamental elements within an organization for the development of its management processes. Therefore, in a cost system there are several elements that interrelate with each other to achieve a common objective. They are characterized by providing feedback to the system itself and by having a certain structure.

Many have been the authors who have contributed their criteria about cost systems; Hurtado García (2020) considers that cost systems are the factors that have the greatest relationship with the successful implementation of reverse logistics in enterprises. The main importance of a cost system is to give adequate, truthful and reliable information for internal users in order to make an attractive decision (Towati Altawati et al., 2018), recognizing its incidence in managers intuitively understanding the financial impact of daily decisions without waiting for month-end financial reports (Turcanu, 2018).

Historically, management accounting has been one of the most widely used instruments as an information system for decision-making by management, since it provides information on the results of an enterprise and each of its areas, which contributes decisively to the control process through the preparation of the budget and the calculation and analysis of deviations, allowing a quantitative evaluation of the fulfillment of operational and strategic objectives.

In this sense, the use and continuous improvement of the work instruments within this discipline constitute a way to promote growth in the levels of efficiency of the Cuban economy, based on the reduction of costs. This is only possible with the achievement of an adequate use of material, labor and financial resources and the efficient exploitation of the means of production, guaranteeing an adequate control by areas of responsibility and production service activities, through the implementation of cost systems appropriate to the organizations.

The research presented here was carried out at Industrial Base Business Unit "La Coloma" (Epicol in Spanish), specifically in one of its Basic Business Units (UEB), where there are limitations in the

information system, since it does not allow compliance with the requirements of the stages of accumulation, calculation, analysis and management decision making.

The proposal is aimed at redesigning some of the basic work procedures of the cost system of the Industrial Base Business Unit, based on the reorganization of the main instruments and stages associated with the calculation and accumulation of industrial processing costs in fishing activities to their updated production flows.

## **MATERIALS AND METHODS**

The research had its general methodological foundation in the materialistic dialectics, taking into account its postulates and the fundamental laws of thinking in dialectical logic, general methods of the theoretical and empirical level were used, with the objective of characterizing, developing and deepening the essential particularities of the identified object of research.

The theoretical methods applied were:

- The historical-logical, which allowed the study of historical trends in management accounting, as well as the analysis of the evolution of cost systems.
- Modeling, which made it possible to make the necessary abstractions to improve the cost system of the UEB Industry of the Industrial Fishing Enterprise "La Coloma".

The following logical procedures were developed: analysis-synthesis, oriented to conveniently define the stages that characterize the cost system of UEB Industry; abstraction, used with the objective of isolating the non-essential elements of the object of research; induction, which allowed defining provisional explanations of the insufficiencies defined within the cost system of UEB in the diagnostic stage; and deduction, which in the form of logical reasoning allowed going from general statements to particular facts in the process of improving its cost system.

The empirical methods applied were essentially:

- The documentary review, which includes the study of the accounting procedures manual of the cost system to be modified of the enterprise and the UEB Industry, Resolutions No. 235 and 294, and Standard No. 12 Management Cost of the Ministry of Finance and Prices.

- Participatory observation, which made it possible to verify through direct and systematic perception the current status and the main activities and requirements associated with the functions of cost and statistics specialists and technicians in the entity.
- The surveys were addressed to the accounting professionals of the enterprise and, in particular, of the UEB Industry and Head Office to characterize the current state of the object of study.
- Non-structured interviews with managers of UEB Industry and Head Office and a group interview with its accounting and financial science professionals to determine the current status of the costing system, as well as to define shortcomings and main expectations associated with the study and the process of improvement of this accounting information system.

## RESULTS AND DISCUSSION

Industrial Base Enterprise Unit "La Coloma" (Epicol) is located in the south of the municipality of Pinar del Río, in the La Coloma Popular Council. Epicol's functions include fulfilling the production plan for lobster, state and non-state flake, tuna and other species such as conch, in addition to receiving and transferring products sent to the UEB Industry at the Collection Center.

In an initial exploratory study aimed at identifying the weaknesses of the cost systems in Epicol and in its Base Business Units, it became evident that there are limitations and inadequacies in the cost accumulation information system. The analysis was deepened in the UEB Industry, since it is the field of action of this proposal; in this sense, the following insufficiencies associated to this information system were detected:

1. There are not all the components that should be included in the cost system accounting procedures manual (operating vouchers, calculation of equivalent production, distribution of joint costs and by-products).
2. Planning is not systematically carried out by each of the areas or cost centers that make up the UEB, which makes it difficult to analyze and evaluate the performance of the people working in each production process.
3. Variable or fixed costs are not defined in any of the planned models, which generates information that makes analysis and decision making difficult in the face of significant changes in activity levels.

4. Direct and indirect production costs are not detailed, thus preventing the identification of the relevance of prime or conversion costs in the elaboration of the different industrial productions.
5. Raw materials and fundamental materials are not separated from auxiliary materials.
6. Budgets are not prepared correctly because they do not express information by cost centers for the levels of activities projected in the annual production programs.
7. The cost sheets are outdated and the methodology and basis for the distribution of indirect production costs are not adequately defined.

These weaknesses allow identifying the existence of a general contradiction between the current state and the desired state of the cost system of this UEB and of Epicol in general, which has its essence in the limitations of the information system, since it does not allow the fulfillment of basic requirements in the stages of accumulation, calculation, analysis and managerial decision making. This fact leads to consider the improvement of the UEB Industry costing system.

### **Main aspects to be taken into account for the improvement of the cost system of the UEB Industry of Industrial fishing Enterprise "La Coloma"**

The cost system of the UEB Industry of Industrial fishing Enterprise "La Coloma" has as its main objective to define the production costs of the different lobster, tuna and flake assortments, after the capture process has concluded and they have been transferred and delivered to the industrial processing plant of the Fishing Port "La Coloma". The plant has three basic production lines and different cost centers depending on the characteristics of its production processes, as well as a global storage center.

These features have a significant influence on the aspects that will characterize the cost system designed to group the costs and expenses generated, and the following are some of its fundamental elements:

1. For cost planning in UEB Industry, cost norms, analysis of historical series, capacity utilization and quantification of cost reduction measures and analysis of other technical-economic factors that may affect production are used.
2. The recording and accrual of costs are defined based on the use of specific primary documents, bases for the classification and distribution of costs and standard operating vouchers.

3. The calculation of costs takes into account annually defined projections, accounting policies for the development of this business sector, certified documentation based on technological standards, production statistics and flows associated with organizational requirements.
4. The main regulations in which UEB's cost system is included are: Accounting Standard No. 12 Management Accounting, Accounting Procedures Manual for Cost Systems defined by the Higher Organization of Business Management, Resolutions 54/2005, 235/2005 and 1038/2018 of the Ministry of Finance and Prices and Agreement No. 8301 of the Council of Ministers.
5. The main elements that make up the Accounting Procedures Manual of the entity's cost system and the UEB Industry are based on the aggregation of the elements of expenses, indispensable expenses to obtain certain production volumes, economic plans and operational budgets, design of efficiency indicators, as well as the evaluation of the behavior of expenses.
6. Other elements that are part of the cost system accounting procedures manual are a definition of branch and national regulations in correspondence with the organization of production processes, cost centers and activities, areas of responsibility, distribution bases and inventory valuation methods, as well as a definition of templates and primary documents.

Based on the study of the main elements that make up the cost system of the UEB Industry, its productive flows and the weaknesses identified in the accounting procedures manual of this subsystem, some of the improved processes and tools will be presented, approached from a coherent redesign of the planning, accumulation, calculation and interpretation of the results generated within the technological structure of this economic unit.

### **Improvement of the cost planning process of the UEB Industry of Industrial Fishing Enterprise "La Coloma"**

The planning process combines people, processes and technologies. This process provides a new perception of past, present and future operating performance, making it possible to identify trends and recognize opportunities that influence results. At UEB Industry, planning is carried out in different models which, as a whole, are considered by the person responsible for planning as part of the entity's Annual Plan. Among the most relevant models in the redesign of the UEB Industry cost planning process are the following:

- **Balance of revenues and expenses**

Generally, in the UEB it is planned for the next year, starting in the second half of the base year. Its main purpose is to form the basis for calculating the unit's indicators and projected results. It presents proposed revenue and expense data for the planned year based on a predefined level of activity. The body of the model designed for the preparation of UEB's plans is composed of 15 columns organized as follows:

1. Column 1 defines the indicators, accounts and subaccounts
2. In column 2, the consecutive number corresponding to each row is shown
3. Column 3 shows the proposal for the planned year by indicator and columns 4 to 15 show the proposed amounts for the 12 months of the year.

Some of the items considered as critical variables of UEB's predetermined projections would be total revenues which include the sum of sales and their amounts for deliveries to customers of finished products and, to a lesser extent, work performed, services rendered, goods purchased for trading, financial income and income from sales of raw materials and recovered materials not deductible from the cost of production and income from leasing fixed assets.

- **Cost of production and goods sold**

The cost of production and goods sold is also planned from the second half of the base year, and is defined from the projected level of capture for the coming year, according to the characteristics of the technological and organizational flows, the entity's goal and the projected evolution of prices in the economy and expected to affect the UEB, which allows planning expenses per unit and serves to obtain the cost of sales from the expected variations of the final inventory. The body of the model is also composed of 15 columns:

1. In column 1, the elements to be planned are defined
2. Column 2 defines the different units of measurement associated with the expense items, as well as the consecutive number corresponding to each row
3. Column 3 defines the proposed activity level for the planned year
4. From column 4 to column 15, the proposed expenditures by element for the 12 months of the year are shown

For the projections of the indicators, accounts and sub-accounts as fundamental expense elements within the characteristics of the technological flow of UEB Industry, raw materials and materials associated with the sum of those species that are destined as raw material for the industrial process and those materials that are used in the different technological processes such as: industrial inputs, boxes, chemical products, etc., were initially defined.

Projected fuel from calculating the amount of fuel used by equipment per consumption standards for planned activity levels and projected energy from calculating the amount of electrical energy used by equipment per consumption standards, as well as steam and gas used in specific industrial processes.

The salary fund planned by UEB takes as a reference within the accounting procedure designed the salary fund foreseen from the HR functional management, according to staff and approved salary, as well as other taxes, fees and contributions associated with direct personnel expenses (12.5% for Work Force Utilization, 5% Social Security Contribution).

- **Employment and income**

These elements are associated with the definition of guidelines for the establishment of employment projections and performance measurement indicators. Its objective is to take as a reference the productivity of labor, obtaining as a base the added value and, in addition, from other elements that allow measuring the efficiency of the unit as a whole. The body of the model designed for the preparation of the Plan is composed of 16 columns, organized as follows:

1. In column 1, the code of accounts and indicators are defined
2. In column 2, indicators and accounts are listed
3. In column 3, the units of measurement in which the content of the model is expressed are established
4. In column 4, the proposal for the planned year is defined and from column 5 to column 16 the data by months of the year are shown

The base indicators are used for income and salary projections, the analysis of the historical series of value added throughout the manufacturing or production process of the UEB Industry, discounting material consumption and services received. A breakdown of the basic elements that make up this indicator are also used for the development of its planning: gross production, material expenses (raw

materials and materials, fuels, energy), purchased services (including telephone, gas, water, mail, freight, maintenance, etc.).

These projections allow, in the procedure developed, to establish a level of labor productivity to be achieved, calculated as the quotient between the value added and the average number of workers, estimating the total average number of workers from the number of workers that the entity has in its registry, which is composed of all the people who have an employment contract for an indefinite period, determined and at home, and the planned salary fund from the income in national currency received by the workers, which would include the accumulated paid rest.

Concluding, the budgeting of UEB direct labor with the establishment of projections associated with the average wage-productivity correlation indicator, calculated by dividing the percent increase in the average wage of the year to be analyzed in relation to the year taken as a base and the percent increase in labor productivity calculated in the same way.

Finally, the planning of indirect production costs in the planning process of UEB Industry, based on the characteristics of its operations, starts by determining the amounts of the main elements that make up production costs (indirect salaries, auxiliary materials, fuels and lubricants, energy, other monetary expenses, maintenance expenses, clothing and footwear, depreciation, amortization and wear and tear, and other monetary expenses), maintenance expenses, clothing and footwear, depreciation, amortization and wear and tear and other monetary expenses), taking into account the valuation of the efficiency levels generated from the global rate resulting from the division of their accumulated amounts between the direct salary generated in different periods and the associated level of activity. General and administrative expenses, distribution and selling expenses, financial expenses, other expenses and other taxes, fees and contributions are estimated separately.

The calculation of expenditures for depreciation and amortization uses Resolution 33/95 for amortization expense, prior authorization of a plan approved by the Provincial Directorate of Planning and Finance, defines a rate to be applied that is intended for capital repair of assets and the amount of amortization of intangible assets that generate current profits within the basic industrial processes of UEB.

Finally, the accounting procedure developed defines correlation elements associated with the services rendered to other entities classified as productive, the amount incurred by the enterprise's personnel in the performance of their duties, as well as telephone, water, security and protection,

communications and internet, maintenance programs, clothing and footwear, as well as the amount of other monetary expenses not included in the above items. It is a basic element in the process of improving UEB's cost planning the incorporation into the models designed of the variation account between actual and predetermined cost and the distribution of these variations among the fundamental elements, defining their relative importance and deviation with respect to efficiency, price, volume and planned profit or loss for the period.

### **Improvement of the process of accumulation of costs in the UEB Industry of Industrial Fishing Enterprise "La Coloma"**

Cost accumulation in the UEB is oriented to the organized collection and classification of cost data through accounting procedures for this subsystem, based on the adequate definition of accounts, cost centers, elements and sub-elements. The manual establishes guidelines for using a standard process costing system, which is adjusted to the characteristics of the unit's production flows, which generate products with similar characteristics and require a planned updating process of the cost sheets to generate variations that strengthen its decision-making processes. This section presents some of the elements improved in the accounting procedures manual of UEB's cost system.

The operations associated with the UEB cost system, in general, begin with the transfer of the extractive production in process account to the raw materials account, being the inventory account associated with the reception at the port. The transfer is made from each cost center associated with the vessels, then the transfer is made from the Raw materials account to the Industrial fishing production in process account for each of its cost centers (each of the products), according to the consumption standard established for each production. Subsequently, a transfer is made from the Industrial fish production in process account to Finished production. This balance is shown in the Statement of Financial Position as Finished Production and in the Statement of Income as Sales of productions. Finally, the analysis of the variation in actual and predetermined costs is carried out.

As part of the redesign of the cost accrual process of UEB Industry, the accounts and cost centers by accounts should be refined as follows:

- **Accounts and cost centers by accounts**

A fundamental element of the process of improvement of the UEB's cost accumulation system is associated with the incorporation into the manual of the use and content of the cost accounts used

by the unit, of the operations that debit and credit and main sub-accounts of the accounts that assume the expenses generated in its productive process, being these accounts: Industrial fishing production in process, Indirect production expenses, Other production and/or services in process, Own production for inputs, Capital repairs with own means, Cost of production sold, Variation in actual and predetermined cost, Other taxes, fees and contributions, Other expenses, as well as the accounts that serve as counterparts to these.

The accounting procedures manual of the subsystem also incorporates the cost centers of the UEB derived from the transformations associated with the technological flow of several of its fundamental productions: 31111 Precooked whole lobster; 31112 Tail lobster with shell; 31113 Tail lobster without shell; 31114 Lobster dough, head, leg; 31115 Tail lobster without shell precooked; 31118 Raw whole lobster; 31211 Frozen whole fish, group I; 31216 Frozen whole fish, group II; 31217 Whole fish, gutted and scaled; 31219 Fresh whole fish; 31446 Fish fillet; 31447 Frozen whole tuna; 31731 Fish sticks.

The main predefined indirect production cost centers for UEB are 51724 Industrial maintenance brigade workshop, 51810 Quality control, 51831 UEB Management expenses UEB Lobster, 51832 UEB Management expenses UEB Flake and UEB Bonito and 51834 UEB Management expenses UEB Industry, 52410 Handling and 52480 Freight transportation.

Likewise, the expense sub-elements used in the UEB were updated based on the technological characteristics of the production flows and processes distributed in the components of raw materials and materials, fuel, energy, salaries, other labor force expenses, depreciation, amortization and wear and tear, maintenance expenses, clothing and footwear, and other monetary expenses. The UEB's main operating vouchers are incorporated into the UEB's cost system procedure manual:

1. Standard reception of catches
2. Accumulation of raw materials
3. Direct salary Accumulation
4. Accumulation of indirect production costs by elements (auxiliary materials, fuel and lubricants, energy, indirect salary, other indirect personnel expenses, depreciation, amortization, wear and tear, maintenance expenses, clothing and footwear and other monetary expenses)
5. Secondary distribution of indirect production costs
6. Transfer to production in process accounts of the different production cost centers

7. Transfer between departments and productions, using joint cost and equivalent production models
8. Sales with standard cost utilization
9. Determination and distribution of variations

With the improvement of the accumulation of costs in the UEB Industry, a correspondence will be established between all the items and elements that make up the information system, based on the adequate calculation of costs in the UEB.

### **Improvement of the cost calculation process in the UEB Industry of Industrial Fishing Enterprise "La Coloma"**

The cost calculation in UEB Industry is oriented to facilitate the adequate determination of the expenses incurred in its different productions. The redesign of this stage in the process of improving the system is aimed at improving the work of the accounting specialists and an adequate determination of the variations in the costs generated for the different periods under analysis.

The system uses as basic primary documents for the calculation of its costs the tide receipts, document elaborated when a ship arrives with the catch and is unloaded at the port, where a breakdown associated to the characteristics of the catch is developed and work orders, where the brigade chief reports the amount of hours worked in the different production lines, where the information is basic for the distribution of the real indirect costs and to develop several of its basic operation vouchers, output vouchers, reception reports, internal transfers, invoices, bank transfers, bank cards, request for materials, etc.

The system processes the information and generates as output a trial balance by balance, with information by elements and sub-elements for each product. This real cost is obtained from monthly periods, being a critical variable for the distribution process of indirect costs from the improvement process developed, using the direct salary cost as a fundamental distribution base that allows the determination of global rates.

Raw materials, wages and production indirect expenses are added together and the total cost is obtained; this total cost is divided by the units of production generated to obtain the unit cost of industrial production as a base indicator to evaluate the fundamental causes of the variations identified with respect to the expected production standards.

Salary is calculated using two different payment systems, the first is the special labor contract for workers who work in the industrial plant and the second is for workers indirectly involved in production. The main elements perfected in the UEB Industry cost calculation process are as follows:

1. The redesign of the equivalent production at the end of the month, using the method of weighted averages from a scheme that allows to establish the basic information to build reports of unit movements, equivalent production, total cost, unit costs and a proper allocation of costs.
2. Design of a model for the calculation of joint costs and by-products based on the use of the market value method, which allows reallocating costs based on the production volume and the relative importance of each assortment for the entity (production, sales price, quantity, amount, relative importance and distribution).
3. Incorporation into the manual of the distribution bases for the different direct and indirect cost centers of the UEB (salary, samples, number of maintenance orders, hours, etc.).
4. Definition of a work scheme associated with the process of updating the cost sheets and global indirect production cost rates based on the direct salary for key productions.
5. Design of a model for the periodic analysis of the variation in raw material costs, direct salary and indirect production costs in price, efficiency and volume, as well as their distribution in the accounts of production in process, finished production and cost of sales as product and period costs.

The incorporation of a group of accounting procedures to the UEB's manual of standards and instructions of the cost system, which will allow perfecting the process of calculation, recording and distribution of the different cost and expense elements generated from the technological flow and the current productive structure of this unit, based on the different theoretical considerations and resolutions that regulate the management of this accounting subsystem, is essential to strengthen the principle of association and the criteria that guide the practical application of accrual accounting.

The above elements were reinforced from the definition of guidelines for the design of budgets and annual plans, the recognition of the main primary documents that support its basic transactions, the definition of the operating vouchers generated by the standard cost system used in the unit, the updating of elements and sub-elements used in its essential production processes, the establishment within the manual of the distribution bases of the service and production departments, as well as orderly work schemes that favor the periodic updating of their cost sheets, the calculation of

secondary distribution, equivalent production, joint costs and the analysis of variations in price, efficiency and volume.

Assuming the relevance of management accounting to measure, analyze and report financial information in support of decision-making processes allows UEB Industry to be oriented to the achievement of the organization's objectives, the coordination of new product design, production and marketing decisions and performance evaluation in general.

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## Conflict of interest

Authors declare that they have no conflicts of interest.

## Authors' contribution

*Yonimiler Palacio Duarte* participated in the study design, data collection, statistical analysis, interpretation of the result, and preparation of the manuscript.

*Eduardo Rubén Espinosa Rodríguez* participated in the design of the study, analysis and interpretation of the results and preparation of the manuscript.

*Reinaldo Castaño de Armas* participated in the design of the study, interpretation of results, and preparation of the manuscript.

*Yordanka Díaz Pita* participated in the design of the study, data collection and interpretation of results.

*Dainel Falcón Corrales* participated in data collection, analysis and interpretation of results.

All the authors reviewed the writing of the manuscript and approve the version finally submitted.



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