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Process management as a baseline for occupational safety

La gestión por procesos como línea base de la seguridad laboral

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Abstract

The purpose of this article is to inform employers and workers in general about the importance of documenting the management by processes for the benefit of occupational safety, which productive or service companies must have in order to have safe working environments. What is described in first order are the statistics of work accidents in a period of five years and the legal aspects and pertinent public organisms of control, with which the public and private companies manage their plan of prevention labor risks in our national territory and then it is to make known on the importance that has the use and application of the technical tools of control and analysis that make possible to evidence, to analyze and to improve the enterprise processes. Finally, having managed to balance the process management, making it possible for workers to adopt a

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culture of doing things right from the first moment and thus improve labor productivity, reducing or eliminating hazards and risks associated with work and that lead to occupational accidents, with a good control at the source and in the middle, it will reduce or eliminate risks. The result of this well-directed management will allow the company to focus on customer satisfaction, providing safe working environments.

Keywords: Employer, Worker, Occupational Safety, Occupational Accident, Hazard, Risk, Companies, Management by process, Diagramming.

Resumen

El presente articulo tiene como objetivo dar a conocer a empleadores y trabajadores en general sobre la importancia que tiene documentar la gestión por procesos en beneficio de la seguridad laboral, con la que deben contar las empresas productivas o de servicio para disponer de ambientes seguros de trabajo. Lo que se describe en primer orden son las estadísticas de accidentes de trabajo en un periodo de cinco años y los aspectos legales y organismos públicos de control pertinentes, con las cuales las empresas públicas y privadas gestionan su plan de prevención riesgos laborales en nuestro territorio nacional y luego es dar a conocer sobre la importancia que tiene el uso y aplicación de las herramientas técnicas de control y análisis que hacen posible evidenciar, analizar y mejorar los procesos empresariales. Finalmente habiendo logrado poner en equilibrio la gestión por procesos, haciendo posible que los trabajadores adopten una cultura de hacer las cosas bien desde el primer momento y con ello mejorar la productividad laboral, reduciendo o eliminando los peligros y riesgos asociados al trabajo y que dan lugar a accidentes laborales, con un buen control en la fuente y en el medio, se lograra reducir o eliminar los riesgos. El resultado

de esta gestión bien direccionada le permitirá a la empresa enfocarse en la satisfacción de sus clientes, proporcionando ambientes seguros de trabajo.

Plabras clave: Empleador, Trabajador, Seguridad Laboral, Accidente de trabajo, Peligro, Riesgo, Empresas, Gestión por proceso, Diagramación.

Introduction

In Ecuador it is a constitutional right that workers develop their activities in an adequate and conducive environment that guarantees their health, integrity, safety, hygiene and welfare established in Art. 326 Literal 5 of the Constitution of the Republic of Ecuador, 2008.(Constitution of the Republic of Ecuador, 2008).. Based on this mandate, on May 2, 2024, Executive Decree 255 - Regulation of Safety and Health at Work was signed and published on May 9 in the Official Gazette, Second Supplement No. 554, which aims to: Promote a culture of prevention and protection in occupational safety and health and strengthen its regulatory framework, through the development of public policies and actions to strengthen safety and health at work. (Regulation of Safety and Health at Work, 2024).

Article 4 of this new legal instrument on occupational safety and health states the following: The National Policy on Occupational Safety and Health will be in charge of the governing body of labor and the national health authority, who within the scope of their competencies will issue the national policies on occupational safety and health. (Reglamento de Seguridad y Salud en el Trabajo, 2024)..

The First General Provision states: For all matters not provided for in these Regulations, the provisions of the Constitution of the Republic of Ecuador, the International Agreements signed and ratified by Ecuador, the Organic Law of Public Enterprises, the Organic Law of Public Services, the Labor Code and other regulations in force shall be observed.

The Twelfth Transitory Provision of DE-255 states: The labor governing body, within five (5) months from the publication of this Regulation in the Official Gazette, shall issue the technical regulations on occupational safety and health. Until its issuance, the provisions contained in articles 21 to 184, with the exception of articles 64, 65 and 67 of the Worker's Safety and Health Regulations, published in Official Gazette No. 565 of November 17, 1986, last amendment February 21, 2003, shall remain in force and shall be of mandatory compliance in workplaces and/or work centers. (Occupational Safety and Health Regulations, 2024).

The labor governing body is currently responsible for: To monitor compliance with the legal regulations in force, related to Safety and Health of Workers. and for which it maintains at the disposal of public and private companies, the computer platform: Unique Work System (SUT), in which everything that has been executed of the safety management system of the company or workstation must be registered and declared, taking into account that there must be evidence of the management carried out.

On the other hand, social security is the responsibility of the State, which will regulate, regulate and control the activities related to this competence. For which the Art. 370 of the Constitution of the Republic of Ecuador, (2008) states: The Ecuadorian Institute of Social Security (IESS), an autonomous entity regulated by law, will be responsible for the provision of mandatory universal insurance contingencies to its affiliates.

E l (IESS, Seguro General de Riesgo del Trabajo, 2024)through the Seguro General de Riesgos del Trabajo (SGRT) is published annually through its web page: https://www.iess.gob.ec/es/web/guest/visor-riesgos With this information it is possible to face the real problem with the participation of those involved (public governing bodies, employers and workers), allowing foreseeing new dangers and risks, as well as identifying other economic sectors that become dangerous due to different factors. This allows the development of preventive measures, as well as the formulation of preventive policies and programs at the national level that contribute to the reduction of occupational hazards. The statistics provided below are the product

of the collection of information for the period 2019 - 2023 to provide results that can generate timely corrective actions. (IESS, General Insurance of Labor Risks, 2024)

Table:1 and Figure:1. Presents information on occupational accidents (OT) reported during the period 2019 - 2023 what stands out in it is the place where they occurred or in what circumstance they originated, highlighting that the OTs have taken place in the highest percentage in the workplace (LT) and secondly in the home-work commute and vice versa (IVT).

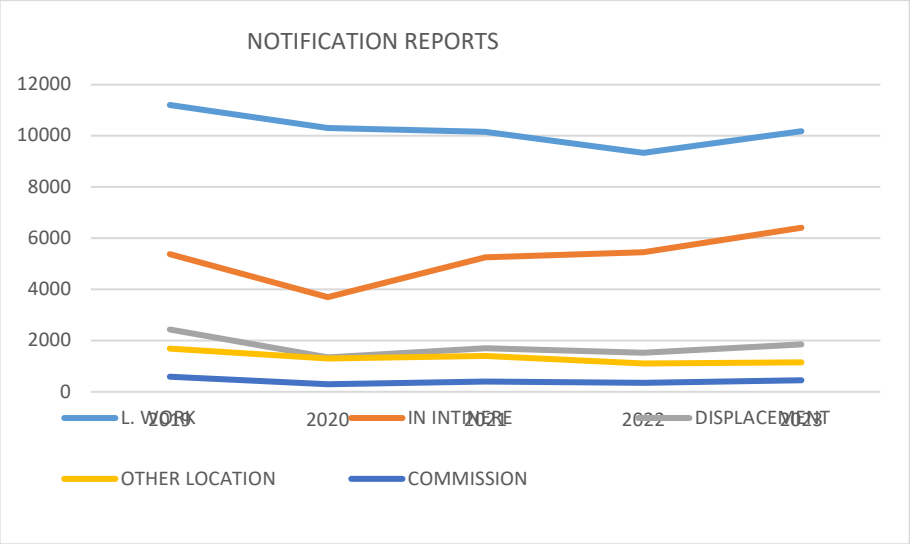
Table: 1 *REPORTED OCCUPATIONAL ACCIDENT NOTICES - SGRT-2019-2023*

YEAR	RA	LT	IVT	DJT	OLT	CS
2019	21293	11207	5373	2435	1688	590
2020	16947	10310	3699	1345	1297	296
2021	18915	10163	5258	1699	1398	397
2022	17785	9337	5466	1534	1107	341
2023	20056	10188	6411	1842	1156	459

SOURCE:SGRT (IESS, Seguro General de Riesgo del Trabajo, 2024)

RA. - NOTICES REPORTED ANNUALLY
LT. - IN THE WORKPLACE
IVT. - TO AND FROM WORK IN INTINERE
DJT. - TRAVEL DURING WORKING HOURS
OLT. - AT ANOTHER WORKPLACE
CS. - ON SECONDMENT

Figure 1. REPORTED OCCUPATIONAL ACCIDENT WARNINGS BY LOCATION (2019-2023)



SOURCE: SGRT (IESS, Seguro General de Riesgo del Trabajo, 2024)

Table 2 shows the statistics of reported TA for the 10 economic sectors with the highest incidence, with SECTOR D - MANUFACTURING standing out in this group in first place.

Table 2 *TOP 10 - OCCUPATIONAL ACCIDENT WARNING REPORTS BY ECONOMIC SECTOR*

ECONOMIC SECTOR - IUCS	2019	2020	2021	2022	2023
A-AGRICULTURE, LIVESTOCK, HUNTING AND SILVICULTURE	1963	1658	2757	1596	1681
D-MANUFACTURING INDUSTRY	3465	2819	3146	3132	3455
F-CONSTRUCTION	781	359	549	472	516
G-TRADE WHOLESALE AND MAI. AND MEN. REP. OF VEHICLES, MOTORCYCLES, AND HOUSEHOLD GOODS ...	3265	2322	2610	2675	3062
H-HOTELS AND RESTAURANT	1036	354	499	478	577

I-TRANSPORTATION, STORAGE AND COMMUNICATION	1062	706	763	893	1050
K-BUSINESS AND RENTAL REAL ESTATE ACTIVITIES	1953	1328	1904	1826	2201
L-PUBLIC ADMINISTRATION AND DEFENSE, COMPULSORY SOCIAL SECURITY PLANS. SOCIAL SECURITY PLANS, COMPULSORY AFFILIATION	2157	1917	1876	1893	1991
N-HEALTH AND SOCIAL SERVICES ACTIVITY	2540	3338	2200	2009	2298
O-OTHER COMMUNITY SOCIAL AND PERSONAL SERVICE ACTIVITIES.	675	471	594	568	640

SOURCE: SGRT (IESS, Seguro General de Riesgo del Trabajo, 2024)

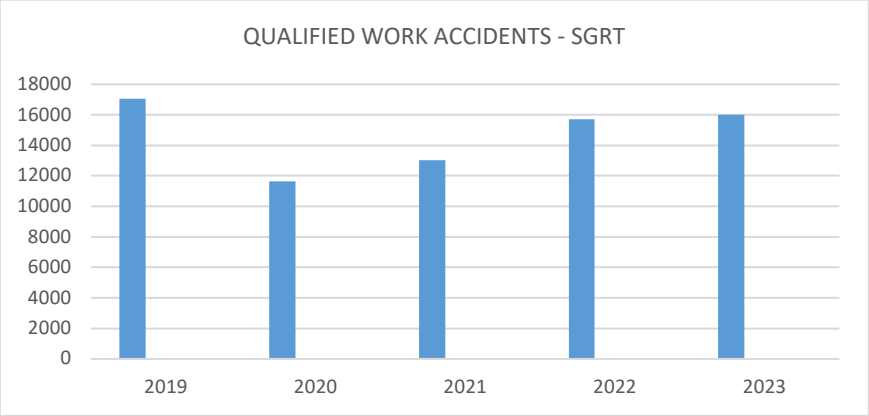
The reports of work accidents (TA) received by the IESS must be evaluated and qualified by the SGRT, as follows: Table 3 and Fig.2.

Table 3. *QUALIFIED WORK ACCIDENTS - IESS-SGRT*

LOCATION / PERIOD	2019	2020	2021	2022	2023
PLACE OF WORK	9449	6781	7049	8273	8374
IN INTINERE	4260	2734	3558	4781	4846
COMMUTING DURING WORKING HOURS	1659	968	1123	1361	1497
IN ANOTHER PLACE	1331	922	1027	1012	941
ON SECONDMENT	357	224	286	303	327
TOTAL NUMBER OF QUALIFIED ACCIDENTS	17056	11629	13043	15730	15985

SOURCE: SGRT (IESS, Seguro General de Riesgo del Trabajo, 2024)

Figure 2. QUALIFIED WORK ACCIDENTS IESS-SGRT



SOURCE: SGRT (IESS, Seguro General de Riesgo del Trabajo, 2024)

One of the striking statistics is described in Table 4, in which the variables are age and sex, indicating that both men and women between 21 and 30 years of age concentrate a high number of workers who have suffered a qualified work accident, followed by those between 31 and 40 years of age.

Table 4. *QUALIFIED BY AGE RANGE AND SEX - 2019-2023.*

AGE	WOMAN	MAN
1 - 20	233	2076
21 - 30	6006	20849
31 - 40	6209	16576
41 - 50	3828	9351
51 - 60	2473	4438
61 - 70	395	932
71 - 80	5	25

SOURCE: SGRT (IESS, Seguro General de Riesgo del Trabajo, 2024)

Table:5 gives the statistics of occupational accidents qualified by the SGRT during the period 2019-2023 by economic sector, in the same it is observed and in a very evident way that sector D: Manufacturing Industry, leads the statistics of qualified AT, continuing the sector: G.

Table 5. *TOP 10 - AT. RATED BY ECONOMIC ACT. ECONOMIC*

ECONOMIC SECTOR - IUCS	2019	2020	2021	2022	2023
A-AGRICULTURE, LIVESTOCK, HUNTING AND FORESTRY	1756	1026	1217	1249	1464
D-MANUFACTURING INDUSTRY	3001	2191	2495	2906	2931
F-CONSTRUCTION	605	280	000	436	420
G-WHOLESALE AND RETAIL TRADE AND REPAIR OF VEHICLES, MOTORCYCLES, HOUSEHOLD GOODS AND EFFECTS	2482	1575	1826	2331	2437
H-HOTELS AND RESTAURANT	381	000	375	420	000
I-TRANSPORTATION, WAREHOUSING AND COMMUNICATIONS	974	565	627	831	820
K-BUSINESS AND RENTAL REAL ESTATE ACTIVITIES	1475	980	1324	1545	1622
L-PUBLIC ADMINISTRATION AND DEFENSE, COMPULSORY SOCIAL SECURITY PLANS	1695	1269	1358	1649	1586
N-HEALTH AND SOCIAL SERVICES ACTIVITY	1888	1715	1421	1648	1714
O-OTHER COMMUNITY, SOCIAL AND PERSONAL SERVICE ACTIVITIES	629	391	368	559	515

SOURCE: SGRT (IESS, Seguro General de Riesgo del Trabajo, 2024)

In this scenario, it is important that both the employer and the employee know about the legal aspects related to labor safety. In this regard: When the affiliate suffers an accident at work or is diagnosed with an occupational disease, the employer is obliged to notify the IESS within 10 working days from the date of the accident or presumed disease. The employer would generate employer's liability for not complying with this term.(IESS Resolution 513, 2016)

According to the International Labor Organization (ILO) for the Americas, there are significant challenges related to occupational safety and health. Available figures show 11.1 fatal accidents per 100,000 workers in industry, 10.7 in agriculture, and 6.9 in the services sector. Other sectors of the region's productive and service economy,

such as mining, construction, agriculture and fishing, are also among those with the highest incidence of occupational accidents. The human cost of occupational diseases and occupational accidents is also considered, highlighting the fact that they affect production and economic performance, and generate significant investments in the medical field. (International Labor Organization, 2024)

The Constitution of the Republic of Ecuador, (2008)in its article 326, paragraph 6 states: Any person rehabilitated after a work accident or illness, shall have the right to be reintegrated to work and to maintain the labor relationship. The Social Security Law, (2001)Article 155 of the Social Security Law (2001) states that: POLICY GUIDELINES. - The General Insurance of Labor Risks protects the affiliate and the employer through programs for the prevention of risks derived from work, and actions for the reparation of damages derived from work accidents and occupational diseases, including physical and mental rehabilitation and labor reinsertion.

Ecuador according to statistical records of the National Institute of Statistics and Census (INEC) in 2021 its population was 17.8 million inhabitants and by 2023 there will be approximately 18.3 million, of which 51% are women and 49% are men, of this population 64% live in urban areas and 36% in rural areas. According to the same source, as of 2023 the Directory of Companies and Establishments (DIEE) will be called Statistical Registry of Companies (REEM), which reports that in 2022 there will be a total of 863,681 companies, generating 2,815,050 jobs. (National Institute of Statistics and Census, 2024)..

The Andean Community of Nations (CAN) establishes two criteria for the size of companies: The first criterion to determine the size of a company is sales and the second criterion is the number of people employed. It is important to note that to determine the size of a company, priority is given to the use of sales available to the company; if not available, it will be based on registered employment. Only for Public Institutions, the number of registered employment positions will be considered first and the volume of sales second (Table 6). INEC - Statistical Registry of Companies - April 2023.

TABLE 6. *TYPES OF COMPANIES*

COMPANY SIZE	ANNUAL SALES (dollars)	EMPLOYED PERSONNEL
Microenterprise	Less than 100,000	1 - 9
Small business	From 100,001 - 1000,000	10 - 49
Medium "A" company	From 1000,001 - 2000,000	50 - 99
Medium "B" company	From 2000,001 - 5000,000	100 - 199
Large company	From 5000.001 - and up	200 - and upwards

Ecuador's Gross Domestic Product (GDP) grew 3.3% in the second quarter of 2023 versus the same period of 2022, reported the Central Bank (BCE) on September 29, 2023. (Tutivén Desintonio & Quintero Montaño, 2024; Fernandez Pereira, 2024).. The same source highlights that of the 18 sectors of the country's economy, 15 reported a positive performance during this period. Among the activities that showed the highest year-on-year growth are: Electricity and water supply by 10.8%. Aquaculture and shrimp fishing by 10.5%. Education and health and social services by 8.5%. Mail and communications by 7.5%. Public administration by 4.3%. (Firsts, 2024)

Firsts, (2024) points out that, in October 2023, the country has increased by 23% the number of companies, type: Sociedad por Acciones Simplificadas (SAS). A total of 13,179 companies were incorporated in the period from January to August 2022 according to information provided by the Superintendence of Companies. Compared to the same period of 2021 in which a total of 10,722 companies were created. If analyzed by type of economic companies, the only one that registers growth are the Simplified Joint Stock Companies, which were created more than two years ago with the purpose of promoting the formalization of the enterprises generated in the country in times of pandemic. Figures show that during 2022 SAS type companies doubled compared to 2021. On the other hand, Limited Liability Companies (Sociedad Anónima) and Limited Liability Companies (Sociedad de Responsabilidad Limitada) registered a contraction.

As is public knowledge, it is the responsibility of the Ecuadorian state to ensure the safety and promote the welfare of workers involved in all processes developed in both public and private companies. To this end, with the publication of DE 255 and providing that the governing body of labor and the national health authority will have a period of five months according to the twelfth and thirteenth transitory provision, to issue the new labor safety regulations, respecting in the meantime what is in force and permitted.(Occupational Safety and Health Regulation, 2024).

Methodology

The scientific research generated represents a dynamic process according to the research approach, using historical and descriptive techniques during the period (2019 - 2023). The correlation with other tools interrelates the variables, it should be noted that this does not lead to the analysis of the cause-effect relationship, but allows to identify the sectors in which their processes should be improved and the tools with which they should operate to identify waste and risks. Monje Álvarez, (2011).

According to ISO 9000-2000, (2000) defines process: Set of mutually related or interacting activities, which transform input elements into results. Two basic characteristics must have the processes to be able to apply the requirements of ISO 9001: 2000

That they interact.

Manageable

Figure 3. PROCESS DESCRIPTION

Source: Author

Input = Input

All input elements of the process must be considered, i.e., materials and inputs to be processed, human resources to be processed, information to be processed. Customer requirements

Transformation = transform

During the transformation process, the "magic M's" Materials, Labor, Machines, Work Methods, Environment and Measurements are involved. This is where added value is generated.

Output = Output

The result of a process must be a product or service that satisfies the customer's needs.

For organizations to operate effectively, they have to identify and manage numerous interrelated and interacting processes. Often the output of one process directly constitutes the input to the next process. The systematic identification and management of the processes used in the organization and in particular the interactions between such processes is known as the "process-based approach". ISO 9000-2000, (2000)

For Acosta, (2018)there are many authors who have shown that the processes defined by managers and middle management of production or service companies are responsible for most of the errors that are generated in any process, leading to complaints and dissatisfaction of customers, but not the workers who are those who are limited to perform the tasks of this.

For Abbas, (2020); Shafiq et al., (2019); Mizuno, (2020); Zaratiegui, (1999)processes are tools widely used in the different models of organizational management, especially in those organizations that maintain a Total Quality policy as the basis of their management strategies.

For many years the organizational structure of the companies were maintained in relation to the requirements of the organizational approach, now they are defined as a new concept of organizational structure that considers that every organization can be conceived as

a network of interrelated processes to which a management model called: Process Based Management can be applied. With this approach begins to decay the vertical type organizational structure at the level of functions, orienting to horizontal type structures, allowing to address to customer satisfaction. (Rodriguez, 2018; Mallar, 2010)..

The process-based approach has its advantages:

Orients the company towards the customer and towards the company's objectives.

To the extent that you know and know what you have to do. Resources are optimized and rationalized.

Contribute to a broader vision of the organization (Value Chain).

Helps reduce operating and management costs

It is a great help for effective decision making.

Contributes to reducing development times

Allows self-evaluation of the outcome of your process.

Contributes to the development of own and lasting competitive advantages

Process management provides the structure for cooperation across functional boundaries. It encourages teamwork.

For an organization to be competitive it is necessary to generate value for its customers, internal and external, increasing the effectiveness of its management. This becomes a reality if the management model based on processes is applied, which is based on the fulfillment of the mission of the organizations, directing the necessary activities towards the satisfaction of the client, suppliers, personnel, shareholders and society in general. Putting this management model into practice requires a new future strategy that stimulates the generation of added value throughout the production chain, focusing on all its variables. These new trends are what allows many productive and service

companies that use this methodology to be different due to process management. (Hernández Palma et al., 2016).

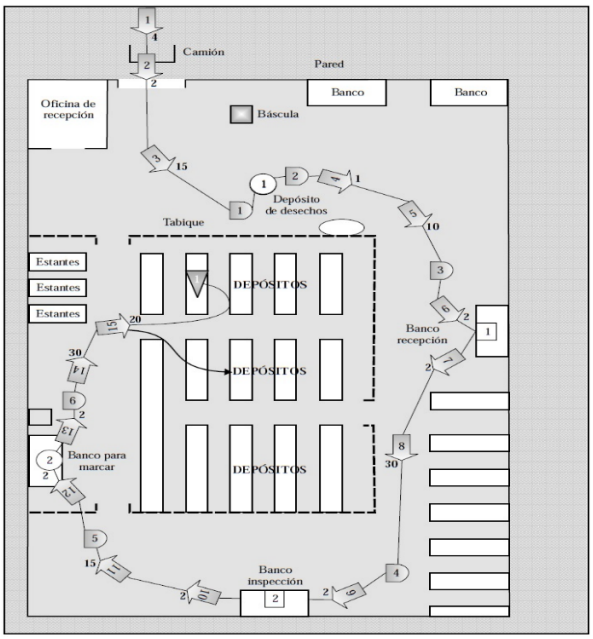
Results

Figure 4. Plant layout

Source: Designed from Richard Muther, (1970)

The plant layout involves the physical arrangement of the industrial elements. This arrangement, whether already practiced or planned, includes the spaces necessary for material movement, storage, indirect workers and all other activities or services, as well as work equipment and shop floor personnel. When we use the term floor layout, we sometimes refer to the existing physical layout, sometimes to a projected new layout, and often we refer to the study area or the work of making a floor layout. Hence, a plant layout can be an existing facility, a plan or a job. However, the term is used so frequently that we can rarely mistake its meaning. The work of designing a floor layout covers a wide field. It may comprise only an individual workplace or the complete arrangement of many acres of industrial property. But in all cases, we must plan for an efficient layout. In 1968 Muther designed the Systematic Layout Planning methodology. To solve the problems of plant layouts. (Richard Muther, 1970).

Figure 5. Path diagram



Source: (Yepes Piqueras, 2022)

It is a graphic representation of the surface of the link in which the production or service activity takes place, it contains specific locations of all the work stations and the layout of the movements of men and/or materials. The route diagrams are a function of the movements of the operator, machine, materials or process. It takes into account operations, inspections, delays, transport and storage. The same symbology is used as that of a process diagram. This diagram makes it possible to identify possible congested areas, to determine the progress and setbacks of the process and to facilitate the development of a better plant layout. The objective, therefore, is the improvement of methods, eliminating or reducing routes by means of the appropriate plant layout. The route diagram can be two-dimensional or even three-dimensional. Material handling increases the cost of production without adding value to the product. Therefore, the following is recommended to reduce it:

Arrange the materials at the height at which they are to be worked with.

Reduce as much as possible the distances traveled by the material handled.

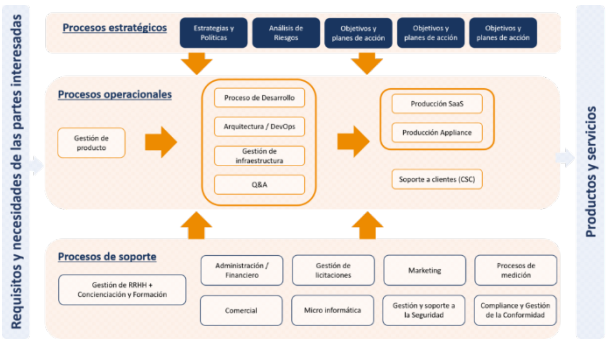
- Take advantage of gravity when possible.
- Transport as much as possible.
- Keep passageways clear.
- A good workplace layout depends, among others, on the following factors:
- Product weight, size and mobility.
- Product complexity.
- Duration of the process.

(Yepes Piqueras, 2022)

Only by achieving the maximum productivity of the investments and resources used by a company to manufacture its products will it be possible to obtain them at a minimum cost.(Velasco Sánchez, 2014).

Process Map

Figure 6. Process map



Source: Designed from Alonso, (2020).

The process map is a graphic representation that describes the sequence and interaction of processes; it is an approach that defines the organization as a system of interrelated processes that drives the organization to have a vision beyond its geographical and functional boundaries; it shows how its activities are related to external customers, suppliers and stakeholders; it gives the opportunity to improve coordination between the key elements of the organization;

a method to visualize the activities of a company, at all levels, through the processes ordered by their hierarchies and relationships. The organizational structure shows or represents the way in which the company should be organized, the processes the way in which the inputs are transformed into output; both respond to the strategy outlined. Therefore, showing on the map the main relationships between the processes in response to the strategy set is very useful for the improvement of the organizational structure.(Medina León et al., 2019)..

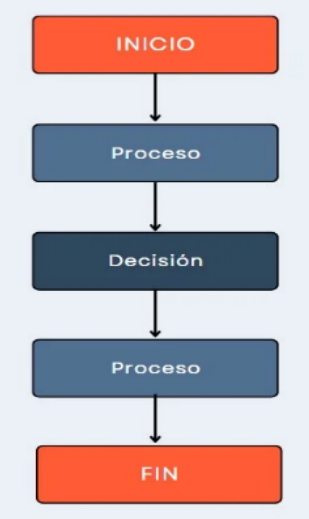
Before starting to graphically represent the processes, it is important to identify and know the types of processes that are related to each other and are:

- Strategic Processes
- Operational Processes
- Support Processes

The process flow diagram represents a very important tool to describe graphically any type of process either productive or service, the diagrams convey information logically the sequence that has the process, use symbols the same that have a different meaning which allows a clear analysis, the symbols have a universal interpretation, in this context among those that stand out are: American Society of Mechanical Enginners (ASME), American National Standard Institute (ANSI), International Organization for Standardization (ISO), Dautches Institut fur Normung (DIN). The husband and wife team, Frank Gilbreth and Lillian Moller, (1921) Industrial Engineers presented the process flow diagram to the American Society of Mechanical Engineers (ASME) in addition to other studies in different fields of engineering.

Block diagram of the process:

Figure 7. Block diagram

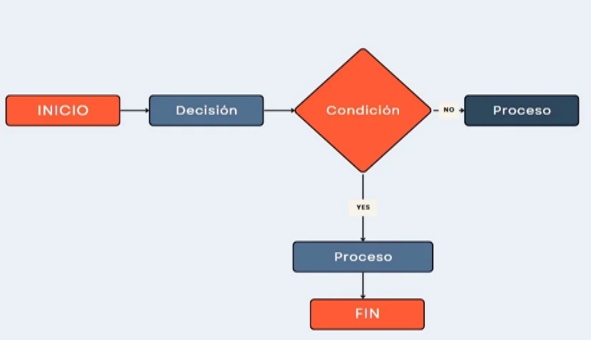


Source: AUTHORS.

This type of diagram is considered the simplest, since it describes the sequence of the process in general, reflecting the order of the sub-processes.

Decision flow diagram:

Figure 8. Decision flow diagram



Source: AUTHORS.

These diagrams are of vertical and horizontal type, what they represent are the activities of the process, it is necessary to emphasize are the decisions to be taken in relation to the analysis to be carried out. These diagrams can be used to represent the activities in which some departments or areas interact.

Analytical Cursogram of the process.

Figure 9. Analytical Cursogram

Source: Designed from Calderon, (2020).

Diagram that represents all the actions (operation, transport, inspection, waiting and storage) that take place in the development of a job, thus showing the trajectory of a product and including the times required for each action and the distances traveled. This diagram presents a higher level of detail than the synoptic one, since it records more information, which can then be used to improve the process. The existing types of analytical flowcharts are:

1) From the operator, it follows the trajectory of a person, i.e. it records all the movement flows of a person.

2) Of material, movement and sequence of material handling.

3) Of equipment, movement of the use of the equipment while it is being used to develop some activity. Sanchis Gisbert, Raquel (rsanchis@cigip.upv.es)

Process sheet.

Figure 10. Process Sheet

Source: Designed from Ilzarbe, (2023).

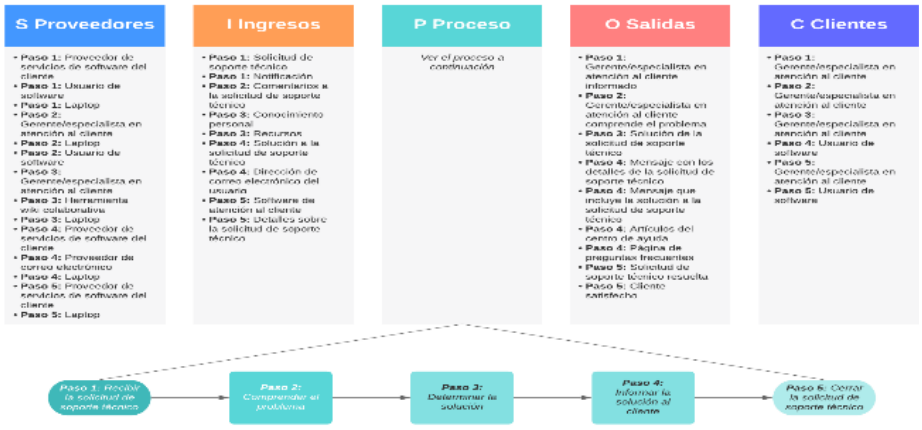
It is a tool that contains a wide range of information related to the process, this technical sheet identifies the person responsible for the process, input and output elements, resources, activities and indicators, among others. The information to be included in the

process sheets is diverse and must be defined by the company or organization that uses it.(Medina León et al., 2019).

A process sheet is considered an information support that describes the relevant characteristics of the process. The information it contains can be diverse, it will be in charge of the same organization and, as can be seen in the illustration, it contains terms such as mission, responsible, the interrelations of the inputs and outputs of the process, the indicators and control variables, among others that have been considered special for its management (Jaime Beltrán et al., Guide for a process-based management. pag.29-30).

SIPOC diagram.

Figure 11. SIPOC diagram



Source: Designed from. Gehisy, (2017)..

The SIPOC Diagram, for its acronym in English: Supplier - Inputs- Process- Outputs - Customers, This graphic tool allows to visualize the process in a simple way, the way in which all the activities and tasks of the process are described contributes in a successful way in the line of value generation. It should be noted that it is used for the development of process improvement strategies. Schmal & Olave, (2014)

- Supplier: person or department that provides resources.

- Resources (inputs): Resources are considered to be information, materials and even people.
- Process: set of activities and tasks that transform inputs into outputs, giving them added value.
- Output: Results obtained from the process, products, services, data, reports and indicators.
- Customers: the person or department that receives the result of the process.

Conclusions

During the Industrial Revolution, Taylorism is present in the period (1856-1915) its contribution was oriented to work improvements and increased productivity, finally established some principles and standards, obtaining a higher performance of labor and optimization of resources, among its main contributions is the study of times and movements, as well as working methods. In 1919, after the signing of the Treaty of Versailles, which put an end to the First World War, the International Labor Organization (ILO) was created, focused on social justice, which allowed in its first conference the adoption of 6 agreements: working hours in industries, unemployment, maternity protection, night work of women and minors in industries, minimum age. At the end of World War II, countries created the United Nations (UN) to avoid future conflicts. As a result of the war, Japan had lost much of its national wealth and industrial capacity. In 1946, Japan's rapid post-war economic growth began and it soon became one of the top 10 economies in the world. The origin of ISO standards dates back to 1976, leveraging the standardization of processes; The Toyota Production System (TPS) is the seed of the Japanese model, focusing on efficiency, elimination of waste and continuous improvement, permanently thinking about customer satisfaction, thanks to its various methodologies produces and provides high quality services, also allows to have safe and highly organized workplaces, thereby reducing the high rates of accidents at work. The TPS model represents today, the clearest evidence of sustainable growth focused on the continuous improvement of processes and thus meet customer needs. Process management has a great impact in the field of

occupational safety as it provides a structured and technical framework to identify, analyze and improve procedures related to occupational hazards, by adopting a process management approach.

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