



Proposal for the Implementation of a Portable Storage System
In the company ESCO SA

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GRATITUDE

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- **Lift truck:** forklift, crane forks, is a poised vehicle in its rear, using two forks used to raise and lower pallets or pallets.
- **Stock:** property owned by a company to either sale or for processing or incorporation into the production process.
- **Storage:**It consists of the systematic conservation and management of goods in warehouses. To optimize warehouse management,
- **layout:** often it used to name the scheme of distribution of elements within design.
- **Indicators:** What can not be measured can not be controlled
- **variables:** They represent a concept of vital importance in a project
- **Glossary:** Palatización system is mounted on a chassis or mobile bases guided through rails in the floor
- **offices:** They are based on each customer orders which are prepared from the office and then go to the cellar master and handle the load of the truck to complete the delivery stage and dispatch.

Esco SA at the time had very little knowledge for effective storage that was tailored to their activity, for that reason had difficulties in security, distribution and storage since it required too personal for enlistment, loading and unloading for the scheduled offices, this meant that operations were slower and expensive. It was here where we saw an opportunity to develop our project is focused on improving the shortcomings of the company through the implementation of a portable shelf. These teams have measures 1,65x65 meters and a weight of 40 kg and a capacity to store one tonne and in turn are designed to fulfill several functions: secure storage, distribution and transportation, for this reason the benefits are obvious for different areas, streamlines internal operations, increased storage capacity, minimizes the risks of accidents, cost reduction, plus free labor that is harnessed to meet the day-to-day. With this project the company expects to improve its processes thinking of offering customers better service.

The project development was based on research methodology involved delfi where participated in the process of the company, also a study of the factors that can affect the time the project was carried out.

The results of the investigation showed results that the best option for solving the delays of the operation is the implementation of a storage system that would allow improvements in the operation ESCO SA

3. INTRODUCTION

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In the preparation of this work was set as the objective to know the financial feasibility of implementing a storage system using metal pallets, optimizing storage costs and operating times. Supported in various business practices that help companies get more satisfaction to its customers.

This research is to approach the analysis and subsequent solution to the problems presented in the ESCO SA on issues of storage and distribution from various diagnostic and research possible solutions to implement new practices in the processes of the company . Moreover frames the purpose of implementing storage systems that allow the company to make better use of its facilities as well as staff.

Eventually companies in Colombia seeking to become more competitive in the market by implementing technology into their processes to facilitate streamline operations and reduce logistics costs, therefore Escoc SA seeks to include processes new logistics cultures to be at the forefront you help optimize the activities of their processes. Through the analysis and improvement of critical plant and distribution center distribution, to improve service outcomes and meet contractual commitments with customers and users processes.

In the project different problems and in turn causes that cause therefore opt for the implementation of a storage system to ensure greater control of inventories and better flow of processes were evident.

In the elaboration of the present work it was in September as the objective of financial viability Knowing of the Implementation of a storage system using the metal stowage, storage costs and optimizing operating times. Supported in different business practices help companies reach That Their Customers with greater satisfaction. The present research Focuses on the analysis and subsequent solution to the problems presented by the company ESCO SA in storage and distribution issues, based on investigations in various diagnoses and possible solutions for the Implementation of new practices in the company's processes. Also it frames the purpose of the Implementation of storage systems allow the company to That make better use of ITS facilities as well as personnel.

Over time, companies in Colombia seek to be more competitive in the market by Implementing technology to Their Processes That Facilitate Their operations and reduces Their logistics costs, Therefore Esco SA seeks to include in Its Processes new logistics cultures to be in the vanguard That Help you optimize the activities of your processes. By Means of the analysis and improvement of the operational critical Processes and plant distribution of the Distribution Center to Improve That allow the service results and to Satisfy the customers and contractual Commitments With users.

In the development of the project, different problems and in turn evidenced Were the causes That causes it, Therefore opting for the Implementation of a storage system to greater That Guarantees Control of the inventories and better flow of the processes.

5. PROBLEM STATEMENT

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Antioqueña ESCO SA is a company dedicated rental equipment for construction and civil works, we have equipment, materials and high quality tools to meet the needs of our customers. We are 5 companies we merge to provide higher quality service and efficiency. Currently the company ESCO SA has 5 people which are responsible for the operation of loading and unloading, maintenance and enlisting teams of civil engineering, also must clean and repair broken equipment, therefore the activities of employees are affected by the loading and unloading time, because you do not have an implemented system that allows them to transport and store the equipment in a flexible and standardized.

With this issue we show financial overruns, longer work time, increased staff. Little space available for storage of construction materials and equipment, indirect materials, rework loading and unloading of equipment, increased frequency of requests for delay in the process. For these reasons it is important to implement a storage system that allows employees to storage, handling and distribution more effectively.

From the Integrated Logistics as a tool for planning strategies to optimize operations, activities, internal and external processes to optimize storage space and therefore point out that the company is focused on customer satisfaction, therefore we show that in the logistics area does not have a storage system that allows the optimization of space, resources such a costly and delayed operation are made.

5.1 GENERAL PURPOSE

- Determine whether the proposed storage system with portable stowage is viable for the operation of the company, allowing cost reduction and optimization of staff.

5.2 SPECIFIC OBJECTIVES

- Identifying each operation times so that they can be standardized.
- Analyze costs pallets referenced to measure the cost / benefit
- Analyze the number of people required for the process.
- Validate if the proposed model is the most optimal storage to improve safety standards
- Know the financial feasibility of implementing a storage system using metal pallets storage costs and optimizing operating times.

8. INVESTIGATION QUESTIONS

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- Is it likely that the pallet storage system provide optimum financial performance for the company?
- ¿The proposed solution can standardize and optimize operating times?
- The return on investment of the storage system will yield results in the short, medium or long term?
- You can optimize staff implemented the proposed storage system?
- Is the implementation of a storage system proposed increases industrial safety in the Company?

Logistics has been developed some strategic tools to optimize operation in internal and external processes of companies such as the storage and handling of products. "In the first stores they were based almost entirely on the strength of personnel for storage and movement of products. The first major modification to the massive participation of labor, was the creation of unit loads based on the concept of pallet.¹ (Edwin, 2015, p. 1)

As indicated by the author in the decades of the 'fifties and sixties, with the rise in prices appeared several mechanical systems to further reduce the use of labor and improve circulation of products within the distribution centers . For most of the stores became the norm the increasing burden of lifting machines used to move pallets. other investments in mechanical equipment and methods for automatically secure loads to pallets were also produced. Each of these methods produced an increase in the efficiency of storage. Generally, the most efficient stores are those who manage to hold the largest amount of product per square meter of available space and reducing costs, maintenance and administration. " (Edwin, 2015, p. 1)

Storage and distribution are gaining ample space research and development, by positioning levels that get companies that are betting on improving logistics process while creating attractive financial benefits by reducing costs with returnable, environmental by using less packaging single-use systems. The competitiveness that gives it a logistics process with a strategic approach allows the company to achieve high levels of service, integrating and coordinating different activities of transportation, distribution, storage and supply aimed to improve and optimize at a reasonable cost each of these activities to proper compensation to interested parties.

Data collection can conclude that a process of efficient storage areas participates safety, productivity, handling products, which are the main basis for the good performance of the distribution center. After analyzing the environment of the storage process a clear opportunity to improve the process of storage and handling, by implementing a portable stowage, which is viable and adjusted for the company according to its economic activity, identifies therefore that will allow the company to reduce operating times, costs of labor and maximize the available staff by the

¹ pallet: A pallet is a load grouping structure, usually made of wood.

company and thus to release bottlenecks caused by high times are carried out to perform 18
certain activities within the company,

10. FEASIBILITY STUDY FEASIBILITY AND

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Current companies desatancan for efficiency in its operations as if some company manages its resources efficiently is greater profitability and sustainability in the market. Esco SA is a company dedicated to providing service equipment construction civil work therefore within its strategy to be a leading company in the market while maintaining an excellent level of service to its customers with a time of perfect delivery and very good quality .

10.1 ANTECEDENT

After some studies Esco SA ²identify the problem of delays in the process of distribution and storage. It based on historical information provided by the distribution department more is required of staff which should then that's where the problem lies, because it is about using labor and are running other tasks along the way. This generates a large number of overruns that when measuring the efficiency and effectiveness is not as clear operation for the company.

Later having analyzed and identified the bottleneck the company analyzed several options to give a solution to the problem of improving the system of storage and handling of products because if this system gave result as expected finally that we saw reflected in efficiency operational and improving customer service.

² Esco SA: Construction Equipment Rental

Table 1 identify the resources needed to implement and then start the project.

TABLE 1
BUDGET FOR THE IMPLEMENTATION OF STORAGE SYSTEM.

Budget (\$)		
Implementation portable storage systems		Pesos (\$)
1	Laptops shelves.	\$ 39,200,000
2	Workforce	\$ 24,840,000
3	Employee Training	\$ 5,600,000
4	mechanical equipment	\$ 13,500,000
5	Lift truck	\$ 48,000,000
7	Unbudgeted	\$ 10,000,000
8	Maintenance	\$ 8,000,000
Total		\$ 141,140,000

Source: Made by myself

TABLE 2
COMMENTS FOR THE IMPLEMENTATION OF STORAGE SYSTEM.

Observations
560 thousand stowage 70 units required by the system
Person in charge of directing and organizing the system for 3 years and leave optimized
2 annual training of 800 000
1 Electric longshoremen
1 freight of 6 meters and can accommodate 2 tons
sundries
Maintenance stowage and hoists

Source: Made by myself

After making a financial analysis owners perceive a significant improvement as technological conversion that optimizes internal company processes and besides that detect an opportunity to improve service to customers, for that reason give the guarantee for the implementation of project as this in time will bring economic benefits by reducing operating time.

The pilot test shows that the implementation of the project is set according to the operation, on average activities charge (regardless of the discharge) had an average duration of 1 hour and required 5 people to make a single office, now the system under test handling and enlistment with appropriate mechanical equipment reflects reduced operating times falling to 50% and only one forklift operator or failing electrical stevedore would minimize the labor costs would need work that for every \$ 14,580 and serious office are 7 offices to the bone day \$ 102,060 days in the week for a total of \$ 612,360 for the month a total of \$ 2.449.440.si we analyze the results for the year would total \$ 29,393,280.It is important to note that the same person in charge are responsible for the process of landing that would be on extra cost.

11. STORAGE SYSTEMS

The distribution centers make key part of the company, since each store has the function of custody or care of raw materials or finished products company, keeping them in optimal conditions as stated by the author of "The store is an enclosure where the functions of receiving, handling, storage and subsequent dispatch of products are made" (Gómez, 2013, p. 120)

by author (Gómez, 2013) stores are important for three reasons:

- A. Avoid imbalances of supply and production.
- B. Avoid imbalances between demand and supply of products.
- C. Derivative financial resources to optimize the cost of stored materials.

12. BASIC PRINCIPLES FOR WAREHOUSE MANAGEMENT

Good management of the storage process involves taking into account several basic principles that allows administrators or responsible for the warehouse make a good use of resources by helping the flow of materials, minimizing costs and improving service levels to customers, now after seeing the benefits mentioned going to the principles:

- A. Articles more movement should be located near the exit to shorten the travel time.
- B. Heavy and difficult to transport items should be located so as to minimize the work done to move them and store them.
- C. High spaces They are used for predominantly light and protected items.
- D. Flammable and hazardous or sensitive to water and sun materials can be stored in any annex, outside the warehouse building.
- E. They must be provided with special protections to all items that require it.
- F. All elements of fire and safety must be properly located in relation to materials stored.

When the organization chooses to exercise physical warehouse management, decide on the management model to be applied at the operational level, based on their physical organization. According to the physical organization is considered two types of models of operational management of warehouses, these are the Warehouse and Warehouse Organized Chaotic. (Del Olmo, 2016) 23

13. CLASSIFICATION OF STORES

In the field of logistics we identified several types of stores that are classified by activity:

- A. Depending on the nature of your articles
- B. According purpose logistical
- C. According manipulation
- D. According to its legal nature

13.1 According to The Nature Of Their Items

According to the classification they are composed of all the elements that will be used and then transformed in the production process, as are: raw materials, packaging, spare parts. Etc. It is therefore very important to keep good custody of these and all items stored in the distribution center, because they are allowing in their excellent response time to customers.

13.1.1 Warehouse Semi-Processed Product:

Enclosures are within companies for the care of semi-finished products to be processed into finished products.

13.1.2 Finished Products Warehouse

Wineries warehouses serve the function of conservation of finished products for the preparation of picking³ and then meet demand.

³ Picking: In the field of logistics, picking or order picking is the process of extracting material collection units or packaged sets a superior packaging unit which contains more units than lessons

13.1.3 Obsolete Products Warehouse

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In the cellar are obsolete products that for some reason the company have separate raw materials or finished products, for that reason determined classify them in a warehouse of obsolete since these they will not be sold as a finished product.

13.1.4 Plant Stores

They are produced in the company that is stored for distribution in the time required by customers, these are strategically located so that more efficient distribution and minimizing the costs of handling and transport.

13.1.5 Regional Stores

They are strategically positioned warehouses in order to quickly reach their Logar was spent or reach customers Just in time ⁴distribution center where these prepared for the redistribution of goods.

13.1.6 Temporary Stores

This type of stores specifically companies implement it in certain moments in which the conditions of the market or stocking up for certain seasons of the year where high flow of products or materials are presented, go out rent or disposal of alternate hold for storage .

13.2 According to Manipulation

Stores in operation day use various tactics storage that can be classified into:

- Almacenes block:
- conventional stores
- automated storage

13.3 According Its Legal Nature

- Own.
- Rented.
- Renting.

⁴ Just in time: The just in time manufacturing means producing the minimum number of units in the smallest possible quantities and at the last possible moment

- Leasing:

14. WAREHOUSE FUNCTIONS

Lstores will generally perform two basic functions of physical supply and distribution storage system has two primary functions: maintaining inventories (storage) and handling of goods. Handling of goods includes all activities of loading and unloading, and transfer the product to the different areas of the store and order picking area. Meanwhile, the storage is simply the accumulation of goods for a period of time. The choice of location in the warehouse and storage time depends on the objectives set for it. Inside the warehouse, activities transfer-storage are repetitive and similar to the transfer-storage activities that take place between the different levels of the distribution channel. Therefore, "the system Storage is in many ways a distribution system to lower level. The identification of the main activities of the system helps to have a comprehensive understanding of it, also providing a basis for generating alternative designs. " (Edwin, 2015, p. 3)

15. STORAGE METHODS

Methods of storage area distribution center according to the handling of products or materials which can be classified:

- According to the organization for product placement
- According to the flow inlet and outlet
- According to the equipment used for space optimization

15.2 BY THE ORGANIZATION FOR THE LOCATION OF THE PRODUCTS

15.2.1 orderly storage:

This method consists of assigning a fixed location of a particular product for the purpose of facilitating the flow and later their preparation for release, on the other hand brings difficulties for the optimization of space as this can not store other products in this place.

15.2.2 Chaotic storage:

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Consists of going storage materials or products randomly taking into account the available spaces and the proximity of its use, this tactic also known as "free egg", which for the company or the managers of the distribution center does not allow them to lead greater control of product locations on the other hand optimizing the storage spaces.

- **According to the flow of input and output:**

When strategies methods of input and output should have several criteria or can be classified into is implemented:

- a) **FIFO:** (First in, first out).

The FIFO method known as first in, first out

- b) **LIFO:** (Last In, First Out).

To the contrary of the previous last in, first out.

- c) **According to the equipment used for space optimization**

Storages according to the equipment used for the optimization of space must take into account the structures where you store

16. GOOD PRACTICES AND DISTRIBUTION STORAGE

Distribute the internal space of a warehouse is one of the most complex aspects of logistics storage requires several activities such as space management requested to maintain stocks, the need for temporary or permanent storage, management of the movement of goods and from stored points, the order of the products without damage, arrange the location of the goods according to the type of article and maintain the most current database possible. (Johanna & Guevara, 2015)

17. PLANT DESIGNS

Designs for a plant are properly planned in detail to achieve the expectations that are sought, a plant must entangle each step and process the best way to function as a clock at the same pace and performance.

That is achieved by reducing the internal times of plant, have accurate information, 27
identify bottlenecks and difficulties in each task.

17.1 Objectives of design and plant layout

The objective of a design and plant layout is to find an arrangement of work areas and equipment that is most cost efficient, while the safest and satisfactory for the employees of the organization. Specifically good distribution advantages result in reduced manufacturing costs as a result of the following benefits:

17.2 Risk reduction of occupational diseases and accidents at work

the safety from design factor is contemplated and is a vital perspective from distribution, so the tools are removed in the corridors; the dangerous passes, the likelihood of slips, unhealthy places, poor ventilation, poor lighting, etc. is reduced

17.3 Improving worker satisfaction

With engineering detail that is addressed in the design and layout small problems that affect workers, facing the sun, the shadows in the workplace are factors that solved increase morale contributor to feel contemplated that management is interested in them.

17.4 Increased productivity

Many factors are positively affected by an adequate job of design and distribution manage to increase overall productivity, some of them are minimizing movements, increased employee productivity, etc.

17.5 Reduce delays

By balancing operations it prevents materials, employees and machines have to wait. It should be sought as a fundamental principle, that the production units are off the ground.

17.6 Space optimization

By minimizing travel distances and optimally distribute halls, warehouses, equipment and employees, better use the space. As principle you should choose to use various levels, as the third dimension takes advantage achieving savings surfaces.

By reducing distances and logical sequences to generate production through distribution, 28
the material remains less time in the process.

17.7 Optimization of surveillance

In designing the field of view to be had for monitoring purposes is planned. " (Lopez, 2016)

18. ZONING OF STORES

When we talk about zoning stores or lay-out ⁵we refer to the warehouse layout design or plan, emphasizing its different working areas are designed in such ways that it is the same operation more efficient and effective.

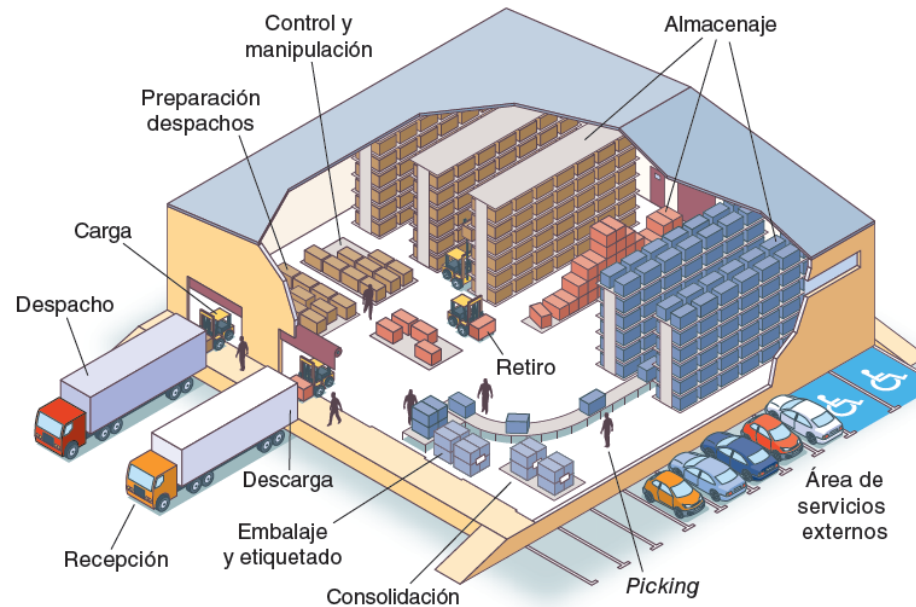
"When making the design store should seek the most efficient way to handle products that are in it. Thus, a warehouse with a continuous transfer of goods will have a lay-out (design) different from other store materials only for a company that works on request. " (Gómez, 2013, p. 131)

Similarly stores can be classified in several areas:

- Loading and unloading areas
- Storage areas
- Product handling areas
- Areas of internal services
- External service areas

⁵ lay-out: a sketch of where information should go each element of a web page.

KEY 1 1WAREHOUSE DESIGN



Source: (Gómez, 2013, p 131 Distribution Center.

19. DISTRIBUTION

Producers and intermediaries acting in hand for mutual benefits. Sometimes the channels are organized by agreements or controlled by initiative of one director who can be an agent, a manufacturer, a wholesaler or retailer. This manager can set policies for it and coordinate the creation of the marketing mix.

The methods can be combined in a channel horizontally and vertically under the administration of a leading channel. The combination can stabilize supplies, reduce costs and increase coordination of channel members.

19.1 Vertical integration channels:

two or more stages under an address channel are combined. This results in the purchase 30 of the operations of a link channel or performing operations this link to perform the functions. For example, a large mass merchant sales, and discount stores can store and transport the products you purchase the manufacturer, thus the need for the wholesaler is removed.

This integration includes control all functions from production to the final consumer.

19.2 Horizontal integration of channels:

It consists of combining institutions at the same level of operations under a single administration. An example will be the department stores. This integration provides significant savings in advertising specialists, market research, shopping, etc. And you can carry out an organization to merge with other organizations or increasing the number of units.

Horizontal integration is not the best management approach to improve the distribution and among its limitations include:

- A. Difficulty coordinating more units.
- B. less flexibility
- C. Increased planning and research to tackle larger-scale operations.
- D. more heterogeneous markets.

Selection Criteria for Distribution Channel

Allocation decisions should be made based on the objectives and overall marketing strategies of the company.

Most of these decisions are made goods producers, who are guided by three management criteria:

19.2.1 Market Coverage

In the channel selection it is important to consider the size and value of the potential market to be supplied. As mentioned intermediaries reduce the amount of transactions you need to do to get in touch with a market of a certain size, but it is necessary to take into account the consequences of this fact; for example, if a producer can make four direct contacts with end consumers, but makes contact with four retailers who see what their end consumers makes the total number of

contacts in the market will have grown to sixteen ,, indicating how they increased market coverage with the use of intermediaries. 31

19.2.2 Control

It is used to select the appropriate distribution channel, ie is the control of the product. When the product leaves the hands of the producer, it controls because it becomes the property of the buyer and it can do what it wants with the product is lost. This means that the product can leave a warehouse or supplied differently on their shelves. Therefore it is more convenient to use a short distribution channel because it provides greater control.

19.2.3 costs:

Most consumers think. When shorter channel, lower the cost of distribution and therefore lower the price to be paid. However, it has been shown that brokers are specialists who perform this function more effectively what way would a producer; therefore, distribution costs are generally lower when intermediates used in the distribution channel.

From the above it can be deduced that use a shorter channel distribution generally gives a result, very limited coverage market, a higher control products and higher costs; on the contrary, a longer channel results in a wider coverage, lower product control and low costs.

As seems a more economical distribution channel, least likely conflicts and stiffness. When making the assessment of alternatives has to start by considering its impact on sales, costs and profits. The two known alternative distribution channels: the sales force of the company and the producer sales agency. As the best known system is the one that produces the best relationship between sales and costs. analysis with an estimate of the sales made in each system start, as some costs depend on the level of the same.

Decisions on distribution channels give products the benefits of the place and time benefits the consumer.

20. THE BENEFIT OF PLACE

It refers to the fact of bringing a product closer to the consumer so that this does not have to travel long distances to obtain and satisfy a need. The benefit of place can be viewed from two perspectives: the first considers the products whose purchase is favored when they are very close

to the consumer, which is not willing to make a great effort to obtain them. The second view 32 considers the exclusive products, which must be found only in certain places not to lose its exclusive character; in this case, the consumer is willing to make some effort, greater or lesser degree, to get depending on the product concerned.

21. THE BENEFIT OF TIME

It is a consequence of the above because if there is no benefit of all, this can not be. It is to bring a product to the consumer at the right time. There are products that should be available to the consumer at a time after which the purchase is not made; others have to be sought for some time to seek greater consumer satisfaction. "(Vedia, 2011)

22. TYPES OF PACKAGING

From my point of view the packaging of a product is important because it is involved product integrity and can see reflected the life, not excluding the cost loss or shipments that can be generated

22.1 What is the packaging or packing?

The packaging is used to contain products temporarily, mainly to group product units thinking about how to make them easier to handle, transport and store. In addition to these, packaging perform other functions, protect the content, reporting on the content and how to move safely ... Inside a tent or a large surface packaging can be of great help to boost sales and attract customers. At this point we highlight structural and graphic design as key factors in achieving customer loyalty and satisfy customers.

22.2 Primary packaging (containers)

The primary packaging is the packaging that protects the product directly, ie, the one most in direct contact with the product and protects it. Within these glasses for coffee poured the contents directly. This packaging is to be exposed to end public, it is so important that it is striking and functional. When they are consuming the product if the packaging attractiveness will continue to use it. It is sometimes the product packaging which a customer falls and moves to acquire it. It can also be a secondary packaging which achieve surprise. In the bottle and the wine box we then What would you say is more beautiful?

22.3 Secondary packaging

33

The dispenser boxes containing several units of product can be an example, but also those designs that allow you to transport the customer one or more product units. These packages also help the transfer of product and often are also used to deliver the product to the public at large areas sometimes see boxes on the pallet with the product so that we can catch him.

22.4 tertiary packaging

It would be the first image that comes to mind when we speak of cardboard boxes. We imagine a large packaging containing large amounts of product that is stored in a warehouse until his transfer or sale.

Its main purpose is to protect and transport the goods to ensure that they arrive in good condition at their destination for all processes. They must be made of hard and resistant cartons because otherwise the content may be broken. (Kartox., 2014))

23. PACKING GOODS

ESCO.SA have an operation that requires a package between the cities, which was firmly established by the metal rammer which with its robust structure improves handling conditions the goods.

"Today, there is much talk of packaging as a coordinated system whereby products produced or harvested are accommodated within a set packaging for shipment from the production site to the site of consumption without suffering any damage. The aim is to achieve a permanent business relationship between a product and a consumer, which should be beneficial for both.

We can notice three obvious points between which the whole issue of trade in fruits, vegetables and products generally arises: Production, distribution and marketing

The purpose of the packaging system is to facilitate the collection, packing and sorting goods for shipment, protecting them from physical and environmental risks during storage and transportation. His last function is to motivate the consumer to purchase guaranteeing that it is in the same quality that had at the time of collection or production.

The functions of packaging are many and are divided into two: structural and modern. Which 34 have to do with the physical part of the product is called structural.

- Contain. The package must have a specific capacity for the product is well distributed
- Compatibility. The packaging must be compatible with the product to prevent flavors or microorganisms contaminating the product are transmitted
- To hold back. The packaging must retain all product attributes
- Practical. The packaging must be able to arm themselves, filled and closed easily
- Be comfortable for handling by the trader and the carrier.

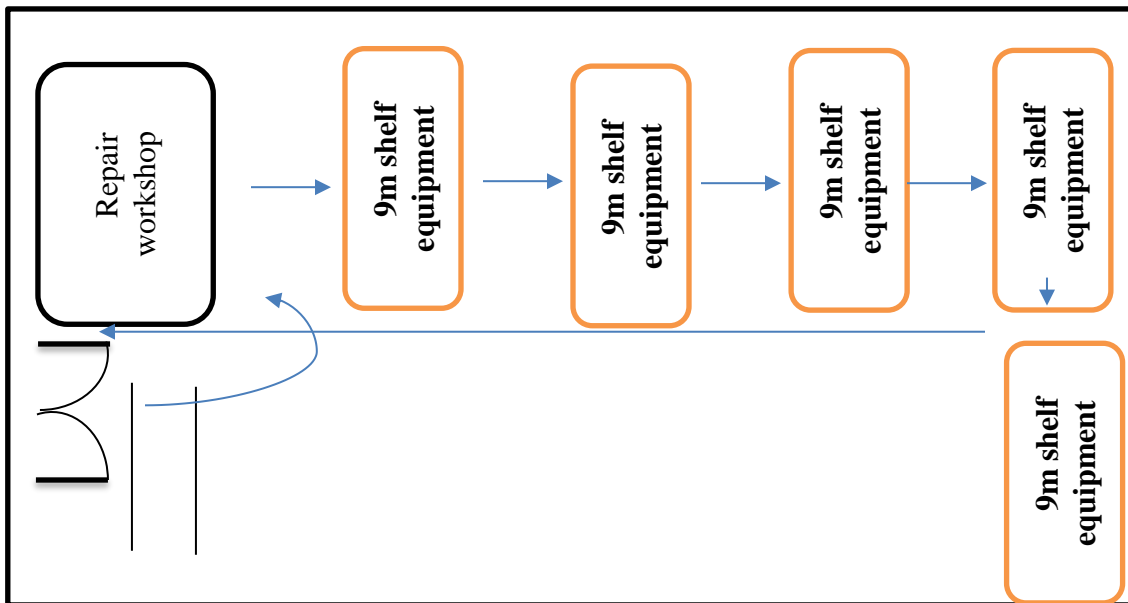
For the conservation of some perishable products or delicate type, take into account additional features when packing them: Separate, isolate, cushion, fix, seal, among others.

Modern functions are more related to intrinsic aspects of the product, ie, presentation and exhibition. This means that the product should be able to sell itself. " (Gómez, 2013)

24. OFFICE

Shipments are based on each customer orders which are prepared from the office and then go to the cellar master and handle the load of the truck to complete the delivery stage and dispatch.

"The order preparation involves the collection of specified goods orders warehouse areas where they are located. This activity can take place directly in the storage areas or special areas (called picking areas) designed to improve the flow of goods. Frequently, is picking critical activity within the handling of goods, since the treatment of smaller volume orders involves intensive and relatively more expensive than the other working activities. " (Edwin, 2015), As we can see in Figure 2



Source: Made by myself

In the above flowchart see the physical map of the winery which has a single entrance and exit for revenue and shipments, the flow chart shows that all income must go through a review of the workshop which makes a physical and structural study of each machine to ensure your car again in this step is divided into two if you are in good condition to send to storage or requires repair to be functional and sent to storage. After doing these tasks the machine is sent to the corresponding rack which is loaded into the system to know when addressing the customer that the company has available for service.

"Between the loading and unloading, the goods may be several shipments. The first occurs from the discharge point to the storage area. Then there may be a movement to spring out or shipment preparation area. The use of a preparation area shipments in cargo handling operation, generates a node and additional binding within the network storage system. Transfer activity within the store can be carried out by any of the different types of equipment available for handling goods. This equipment ranges from trucks and vans manual steering, storage systems and fully automated recovery. " (Edwin, 2015)

25. TYPES OF DISPATCH

36

The conditions of release have three options subject to free choice of the declarant in order to expedite the procedure of legalization to the goods, which will allow become more competitive thanks to foreign trade following measures:

25.2 Advance office

The advance clearance allows the necessary information from the declaration before the arrival of the goods, which is why this step is not performed when the means of transport has come to the place of entry. The fundamental reason to condition this type of office is based on required advance customs formalities for the import the goods can be transferred to the store owner, before their release, payment or issuance of the guarantee by the customs tax debt, countervailing duties and perception of the General Sales Tax where applicable.

25.3 Urgent Dispatch:

For this type has the characteristic element determining the type of merchandise you can enjoy these facilities are considered as urgent dispatches shipments of emergency and relief shipments which should be presented in the final site as quickly as possible, doing so less merchandise procedures and faster.

25.4 Exceptional office:

It allows you to request the customs destination to the maximum term of thirty (30) days after the date of completion of the download calendars. Warns customs law after this period the goods may be submitted only to the import arrangements for consumption.

26. UPGRADING AND PROCESS REDESIGN

Improvement and redesign processes It aims to meet the needs of customers, through an efficient and effective process that ensures the transformation of input into output easily, quickly and at a low cost manner.

For processing there are a number of methodologies that are based on the 37 improvement cycle PDCA, created by Walter Stewart (1924) and understanding of the organization in terms of the value chain Michael Porter (1985), which gave rise to process improvement methodologies.

27. METHODS OF COLLECTING ORDERS

"Order picking motion, order after order:

- A trainer on request

For each order is the same coach who will collect the items and returns them to the preparation area to pack them

- Several trainer on request

For each order are different preparers prototypes picking area who collect the items and return them to be packed

Preparation for orders by waves or more orders

- For a given wave is the coach who collects items and returns them to the preparation area where classified by order before packing
- several preparers wave

For a given wave are different preparers who collect the items and return them to the preparation area where classified by order before packing

Preparation requested permanent position

- Preparer fixed position with selection of article

The coach just take the items taken from a trance LIFTER, the packed in new packaging and forwards using the trance-LIFTER.

- Preparer fixed position without article selection

The coach does not like the other displacement, or making article. An escort ship the product brings to his position to classify, regroup, recondition and makes it in motion image of a chain of car assembly, the package is ready again.

28. IMPROVE YOUR PERFORMANCE ORDER PREPARATION OR PICKING.

- Behaving of a warehouse management system SGAWMS having a picking order and adapted function in real time. 38
- Ensuring quality: put heavy items at the bottom of the packaging, do not mix nature of products.
- Preparers optimize routes and wheelbarrows: optimized picking paths.

29. SIMPLE EXTRACTION AND EXTRACTION AGRUPADA

To retrieve the goods ordered by the customer in the order from its storage location on the shelves there are two methods:

- individual selection: A trip order:

Productivity is achieved by the measures:

- correctly identify the location of the product.
- Draw the shortest route.

In cases of complex movements in the pallet truck speed and height positioning it is important. To reduce the distance is important to place the ordered merchandise sales according to ABC.

Case:

Each reference has many pallets in stock.

The stock covers sales of 1 to 3 months.

All same reference pallets are placed together in the same hall, ordering the ABC store sales. " (Kartox., 2014))

30. INDICATORS OF OFFICE

"" What can not be measured can not be controlled, which can not be controlled can not manage. " The metric is very important for the functioning of an organization, as this directly impacts the attitude and behavior of its members, placing them at a point evaluation regarding the objectives and achieved.

Today, required evaluation methods that allow the capture of both quantitative and qualitative information are made, since the metric purely financial systems do not allow to determine with certainty the magnitude and therefore do not entitle enhance the skills and abilities

required of the current organizations, skills and competencies such as logistics, continuous improvement and innovation and development. 39

When trying to initiate a process of evaluation of logistics management of an organization, it is imperative to extract a set of indicators known as KPI (Key Performance Indicators), these vary according to the process or activity into consideration and provide performance measurement logistics management and supply chain. " (Kartox., 2014))

31. INVENTORIES

inventories constitute the amount of stock in physical goods or products used in an organization, which can be tangible goods sold by service companies or assets that contribute to the product that the company or factory serviced.

The inventory for production is generally divided into:

Commodities: Resource that requires the activity of production or service company.

Components: Articles that have not yet been completed in the process

Production or service

Work in progress: Inventories in the system waiting to be processed or arranged.

Inventories of work in process include components, and may also include some raw materials. Often the level of work in process inventory is used as a measure of efficiency in a system programming offices.

- Real ended: They finished the process of maintenance and repair products and can also be classified according to their function
- Inventory cycle: Portion of the total inventory varies proportionally to the size of the lot.
- Inventory security or safety stock: protection against the uncertainty of demand, delivery time and supply.
- Inventory in transit: One who moves from one place to another.

31.2 INVENTORY MANAGEMENT SYSTEMS

40

ESCO.SA as any service company with a good amount of goods, a lot of items that do not have the same feature requires proper management that largely determine the allocation of costs in the production process and the level of efficiency and management effectiveness.

The model mobile shelf along with ABC is a costing system based on the classification of the articles and their flow.

32. INVENTORY CONTROL METHODS

"Inventory control is performed in order to develop sales forecasts or budget, to determine inventory costs, purchasing or procurement, receipt, storage, production, shipping and accounting.

The inventory which usually means a significant investment by the company must be carefully examined. The general trend in what regards the inventory level is to keep it low, thus curbing the amount of money that must engage in inventories. It should ensure a close relationship between all areas taxed in one way or another to inventory management.

Organizational methods to achieve these goals vary pendency of the activities carried out in the different entities and according to the complexity and volume of operations of the entity.

Among the most common techniques for management and inventory control are:

- The ABC System.
- The basic model of Economic Order Quantity (CEP).
- Re-order point.
- Reserve or safety stock inventory.
- Inventory control just in time.
- simple financial reasons.

33. METHODS OF EVALUATION OF INVENTORY

The valuation methods or inventory valuation methods are techniques used in order to select and apply a specific basis for assessing inventories and productivity in monetary terms when responding to the client. Inventory valuation is a vital process when purchasing unit prices have been different.

There are numerous techniques inventory valuation, however commonly used by organizations today (given its usefulness) are:

- Specific identification
- Log in first in first out - PEPS
- Last in first out Log - LIFO
- constant average cost or weighted average.

Since the "Specific ID" is the individual identification of each of the articles, which increases the degree of certainty in equal proportion to the degree of complexity of your application, we will study the other three methods.

33.2 TYPES OF INVENTORY

"Inventories according to the period in which they perform can be classified as follows:

33.2.1 Initial inventory

It is the inventory made at the beginning of a period of production, where all company assets is recorded. This is done at the beginning of the fiscal year -on 1 January-. The initial inventory reflects the balance of the business before you start shopping, production or before the existing inventory is sold.

This is calculated with information from the accounting records of the company. With its completion, you can then determine which were the final inventory gains or losses of the company.

33.2.2 Periodic inventory

It is the one that takes place every so often taking a physical count, to know clearly the amount of inventory that the company has in a given period. With this physical count the company knows the cost of sales, and possessing accurate inventory. It takes place at the end of each period, either monthly, semi-annual or annual.

The cost of sales that was generated in a period is calculated by performing a set of 42 inventory, where purchases are added to the initial inventory, and then the final inventory and returns on purchases is subtracted. One disadvantage of this inventory is inventory loss due to lack of constant control.

33.2.3 Final inventory:

It is the inventory made at the end or close the fiscal year, usually it takes place the last day of the fiscal year; and it serves to determine the new situation of the capital. With this a physical inventory of the goods or products with a corresponding assessment it is made.

33.2.4 Perpetual inventory

It is the way updated inventory shows the number of existing items in the store in detail. This keeps track of goods in existence and have been sold to their respective value, therefore keeps track of exits and entry of goods.

This inventory is used when making provisional monthly or quarterly balances.

- **Flashing Inventory:**

It is the inventory conducted several times a year.

- **Physical inventory:**

It is the actual inventory, consisting of the count, weight and measure each and every one of the items available in the store. This count can be transported raw materials for processing, or products for sale.

33.3 TYPES OF PHYSICAL INVENTORIES:

33.3.1 Raw materials:

Sen inventories that are made to matters that have not had any changes before the product manufacturing process, they are used in production.

33.3.2 Materials in process:

Inventories where the counting of the materials used in the manufacture of the product is made.

33.3.3 Finished products:

Inventory made only to products that have already gone through a manufacturing process, and are ready for storage.

It is done as a very detailed list of stocks; and it aims to inform the auditors who conducted the inventory is the main asset value showing the number of goods or products that are in store. It should take at least once a year. 43

33.3.4 Inventory in Transit:

It is the inventory used in order to keep production operations linking the company with suppliers and customers. These show the materials that have been requested by the company and which have not yet been received. These are used when moving material from one place to another.

33.3.5 Maximum inventory:

It is used to forecast inventory demand in production. In some articles this inventory can be very high because of crowd control approach used. This is calculated relative to the months of demand and its variation over.

33.3.6 Minimum inventory:

It is inventory used to determine the minimum amount required to hold the stock.

33.3.7 Online inventory:

It is the inventory is in the process of being processed in the production line.

33.3.8 Inventory Added:

It is applied inventory when production of a single product is administered. Here items must be grouped by family or economic importance.

33.3.9 Merchandise inventory:

It is the inventory that contains all the assets belonging to the company, who buy them to sell without making modifications.

In this type of inventory an account with the goods ready for sales, and in another separate account goods tend certain conditions or peculiar characteristics specified is created, such as the goods are in transmit, goods on consignment, etc.

By function inventories can be classified into:

33.3.10 Reserve inventory

Also called safety stock, it is carried out to compensate for the unexpected by purchasing increases, and the risk of unexpected production stoppages.

33.4 Decoupling 15.3 INVENTORY:

44

In this type of inventory or adjacent two operations where synchronization processes in production rates is not sincronizarle, leading to perform each operation are carried out as planned.

33.4.1 Cycle Inventory:

It is shown when the goods or products are purchased or produced outweigh the needs of the company. This is taken into account when the person shelves the purchase, production, or transportation of one unit at a time; and chooses to work in batches, therefore they tend to accumulate inventories.

33.4.2 Seasonal inventory:

Also called inventory forecasting, happens when the company offseason increases production to meet high demand, creating some accumulation of products or goods.

Inventories by shape can be classified into:

33.4.3 Commodity inventory:

Fall those materials used in the manufacture of products but have not undergone processing. It represents all the materials that are used directly in the manufacture of the product.

33.4.4 Product Inventory in Manufacturing Process:

It is the inventory that labor is counted, materials, gross raw materials, indirect production costs, etc. Refers to goods in the manufacturing process belonging to industrial or manufacturing companies.

This inventory is carried out by counting the total of materials, manufacturing costs, and labor before the closing date. products that have not yet finished making shows, and they lack some processes or steps to become a finished product.

33.4.5 Finished Goods Inventory:

It is accounting for assets to be sold are transformed into finished products, and belong to industrial or manufacturing companies.

This inventory are all products or merchandise, as well as articles that have occurred that are available for sale.

33.4.6 Factory Supply Inventory:

Details the materials used in the manufacture of products and can not be counted accurately, such as nails, paint, lubricants, etc.

Systems or basic methods used for accounting for inventories are the periodic 45 inventory system where the company at the end of the period does count existence without a continuous record of their stock; and the perpetual or permanent inventory which takes a continuous record of inventory and cost of goods sold.

Inventories should be active current, as the organization or company can not buy goods to hold them for many years in his establishment, as it can generate an increase in financial costs due to resources that will not mobilize, which do not give way any profitability.

All inventory consists of items of current assets which are suitable for sale. They consist of all the goods found in the warehouse of a company that is valued as acquisition cost for both productive activities and for sale.

The inventory shows an overview of how the company will develop its production activities, as well as the set of products or goods has, so is said to be the most important asset of the company.

33.5 INVENTORY MANAGEMENT SYSTEMS

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36. STORAGE EQUIPMENT

36.2 forklifts and stackers

mechanical handling equipment loaded into distribution centers allows system operators perform activities in a more agile way, optimizing the time of handling and distribution of materials.

We can classify the most important equipment in warehouses (see Figure 2)

TABLE 3
CLASSIFICATION OF CARGO HANDLING EQUIPMENT

TIPOS DE MEDIOS MECÁNICOS EN LOS ALMACENES	
MEDIOS FIJOS	<ul style="list-style-type: none">-Transportadores de gravedad, de rodillos, de cadenas, de banda, etc.-Mesas elevadoras giratorias y de rodillos/cadenas.-Transportadores aéreos.
MEDIOS MÓVILES	<ul style="list-style-type: none">-Transpaletas manuales.-Apiladores:<ul style="list-style-type: none">• Con tracción y elevación manual.• Con tracción manual y elevación motorizada.-Transpaletas y apiladoras autopropulsadas o eléctricas.-Carretillas:<ul style="list-style-type: none">• Contrapesadas.• Retráctiles.• Multilaterales.-Transelevadores.-Estanterías móviles.

Source: (Rodriguez, 2015, p. 109)

37. LOAD HANDLING EQUIPMENT.

Suitable handling equipment or cargo movement designed to go the need for distribution centers, as seen in the figure below



Source: (Rodriguez, 2015, p. 110)

38. METAL SHELVES

Shelves are a fundamental piece in warehouses in the logistics process, which helps the flow of materials that are part of the operating process in companies. According to the above stores are usually classified according to the handling of products or equipment. As we can see in Figure 4.

TABLE 4
CLASIFICACION OF THE SHELVES

CLASIFICACIÓN DE LOS ALMACENAMIENTOS	
FORMA DE ALMACENAJE	MODALIDADES Y SISTEMA
ALMACENAJE EN ESTANTERÍAS PARA CARGA PALETIZADA	<ul style="list-style-type: none"> –Estantería convencional –Estantería compacta –Estantería suministrada por transelevador
ALMACENAJE EN ESTANTERÍAS PARA CARGA MANUAL	<ul style="list-style-type: none"> –Estantería para carga manual y pasillos elevados
ALMACENAJE EN ESTANTERÍA “CANTILEVER”	<ul style="list-style-type: none"> –Para aparatos de manutención
ALMACENAJE MÓVIL Y DINÁMICO	<ul style="list-style-type: none"> –Estantería de base móvil –Estantería por gravedad –Estantería para carro satélite
ALMACENAJE EN ENTREPLANTAS	<ul style="list-style-type: none"> –Sobre pilares –Sobre estanterías

Source: (Rodriguez, 2015, p. 57)

38.2 CONVENTIONAL ESTANTERIA.

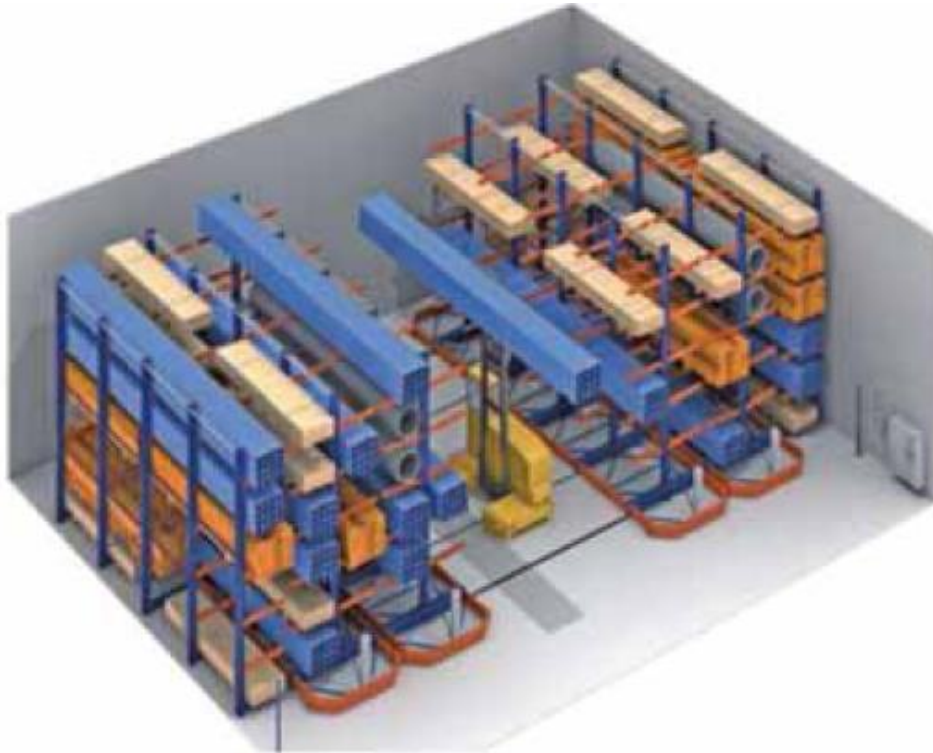
It is designed to store products mechanically through handling equipment such as forklifts, these systems have adequate strength for heavy loads, its structure is simple, consisting of racks to indicate the height of the shelf; crossbar, which define the length of the module and other elements for the safety of the same. (See Figure 4) (Rodriguez, 2015, p. 59)



Source: (Rodriguez, 2015, p. 57)

38.2 THE SHELVES MOBILE

Palatización system is mounted on a chassis or mobile bases guided through rails in the floor. It is a high-density due to maximum use of space to operate only with a single aisle, removed the individual from a shelf conventional palletizing, opening the hall where the charging unit to which you want to access is located, is performed automatically located and through the base chassis electric motors. (See Figure 5)(Rodriguez, 2015)



Source: (Rodriguez, 2015)

38.2 Automated warehouses

Pallet handling is done by levadores transe. These facilities must have good resistance pavement storage capacity is at values around 90% of the volume of the store. (See Figure 5) (Rodriguez, 2015, p. 58)



Source: (Rodriguez, 2015, p. 58)

38.2 METALLIC ESTIBA REFUNDABLE

For the feasibility of returnable packaging will be reduced to only one way to stow, as a benefit of versatility of the processes involved (transport and distribution, filling, storage ...)

various consultations with suppliers of packaging were made through electronic frontloading of the dimensions contributions; to which the provider adapted to obtain the desired result, and chose a design that meets the needs and requirements of the company.

Continuing, and to maintain impartiality follows the same scheme, in order to maintain balance between the two alternatives.

38.3 MAINTENANCE OF METAL ESTIBAS

It is clear that the process of maquiladora throughout the production phase, transport and subsequent return to the company to dispatch the customer, is controlled and supervised by the

company, which is why it is guaranteed that both materials and packaging not They will be 53
subjected to any material or abuse that may affect the product.

In contrast to present a situation in which the returnable packaging present any signs of damage, it shall be repaired for proper use and subsequent return to the line. Returnable before being loaded with the product packaging should be inspected as a routine preventive measure.

39. CHARGING TIME ESTIBAS RETURNABLE METAL

In this case, the time decreases while having fewer personnel to operate thanks to the ease of design and fittings for the team.

40. CONSTRUCTION EQUIPMENT

The construction equipment that handles the company are lightweight and medium which are the basis of the company as all are for rent, each of these devices can be manipulated manually or with mechanical instruments some of these teams are: pumps, concrete vibrators, formwork, scaffolding, mills,

41. ELEMENTS OF DISTRIBUTION OF MATERIALS

Physical distribution and storage, provisioning and control is the part that manages the flow of tangible products for productive purposes and includes all product management processes from obtaining raw materials to final product delivery.

42. STORAGE PROSPECTIVE

the usefulness of the facilities progressively from 25% who had up to a 75% profit rise and increasing the amount of stored without neglecting the efficiency and effectiveness of the entire operation will increase

This material is very rigid and very good resistance to heavy material such that its shape is handled makes an easy grip without risk or weakness throughout the entire structure as a shelf.

This design makes it easy to stow handle the product not only for movement within the company but also the loading and unloading of transport used winery

The distribution process is carried out with company vehicles stake body type and weight main problem is not volume. (See Figure 7)

Figure 7

ILLUSTRATION 7 PORTABLE ESTIBA

Source: Own

43. METHODOLOGICAL FRAMEWORK**44. METHODOLOGY**

Collection of primary information: take related information with the Project of the various 55 databases provided by the Institution electronically (internet) in order to determine whether there is information related to this project and consultations library references to guide to argue this project.

Make contacts with large companies that have standardized to determine the characteristics of the new storage process to use.

Fieldwork: consisting interact with different spaces available to the storage process since the product enters cellar floor is packed accounted for and goes to a work, led to the CEDI for enlistment and subsequent maintenance and the different phases of transportation and handling which will be submitted new packing and storage.

Address the different concerns or comments generated by the different actors in the chain, and their documentation of each process to determine a more optimal process either storage, packaging, transport or distribution.

44.2.1 ETHNOGRAPHIC INTERVIEW.

These interviews can be distinguished:

- The narrative interview.
- Episodic interview.
- Directed.
- Undirected.

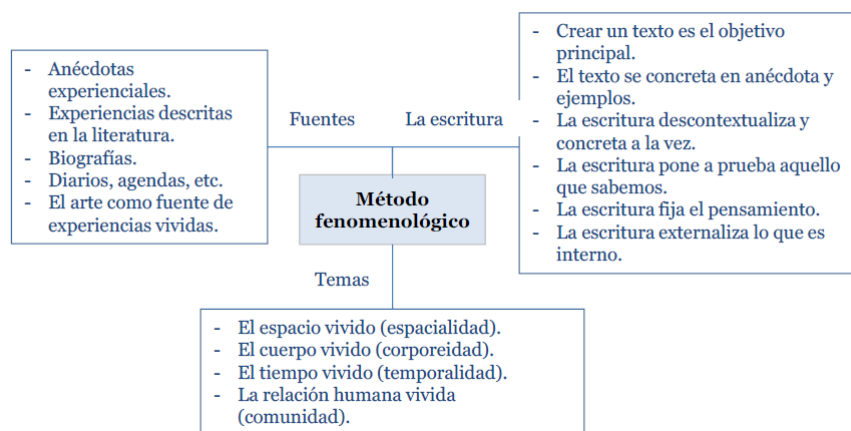
44.3 METHOD ETNOGRAFICO

Represents, together with the study of cases, the entire set of characteristics that define the qualitative methodology. The ethnographic method aims a product while Ethnography is a peculiar process to study the social, consisting reconstruct such contexts. As a result, recreates "shared beliefs, practices, artifacts, folk knowledge and behaviors of a group of people"(Goetz, JP and LeCompte, MD)

These authors point out the following principles for cultural reconstruction supposed (ibid: 28-29)

The phenomenological method is a method basically philosophical aspect that deals with phenomena, understood as 'what appears' (Greek *phainómenon*). Despite this original sense, the phenomenon has come to mean not mere appearance, but manifestation of what things are in themselves. Thus, although the phenomenal has been understood by some as merely apparent (and in this sense as not real, like something 'false') finally turns out that the phenomena become a way to know what lies beyond of mere appearances. Will this go beyond what is apparent which would justify applying a methodology strictly qualitative, to interpret reality. (Van Manen, M., 2003)

ILLUSTRATION 8 phenomenological method



Source: (Van Manen, M., 2003)

44.5 CASE STUDY METHODOLOGY

This methodology could be located within the more general observation, although applied when the elements or subject to observe complex are considered, so can not be understood as single components of a sample. Cases are selected based on their previous peculiarity and precisely intended to allow study explain this peculiarity (Stake, RE, 1998, p. 11). Therefore, the case study in perspective of qualitative methodology is not a study with a sample $n = 1$ or more because you do not have a wider or simple convenience sample, but interested precisely study the uniqueness of the case or cases in question. An example would be the study of an educational center being

located in a private area socially obtain a high school results; Another example could be the study of a company that quickly overcame a crisis situation, etc. 57

The case studies and qualitative research has a number of features that most authors share. (Serrano Perez, G., 1994) Relates the following characteristics:

- Particularist.
- Descriptive.
- Heuristic.
- Inductive.

44.6 RESEARCH INTERVIEW

The interview technique to collect data in qualitative research is based on the principle of conversation. It is a relationship between two interacting partners in the process, although one of them (the interviewer) leads to another (interviewee) to the subject to be treated. The interviews have already consolidated in the field of social sciences, with some very notable historical examples tradition, as is the case with Freud in psychoanalysis, Piaget in evolutionary psychology or M. Mead in the field of anthropology. This does not exclude that poses serious demands in their planning, execution and, especially, in their interpretation, so that there is a simple technique.

The interview is in the context of qualitative research, where knowledge is constructed through the interaction between interviewer and interviewee, which influence each other to the point that the result may be different depending on who the interviewer (Kvale, S., 2011)Interviews are, therefore, a data collection technique applied in a variety of qualitative methods; of course in the aforementioned case study, but also ethnographic methodology and action research, mainly.

Generally, the interview can be:

- Structured.
- focused interview.
- Semi-standardized interview.
- Interview focused on the problem.
- Interview with experts.

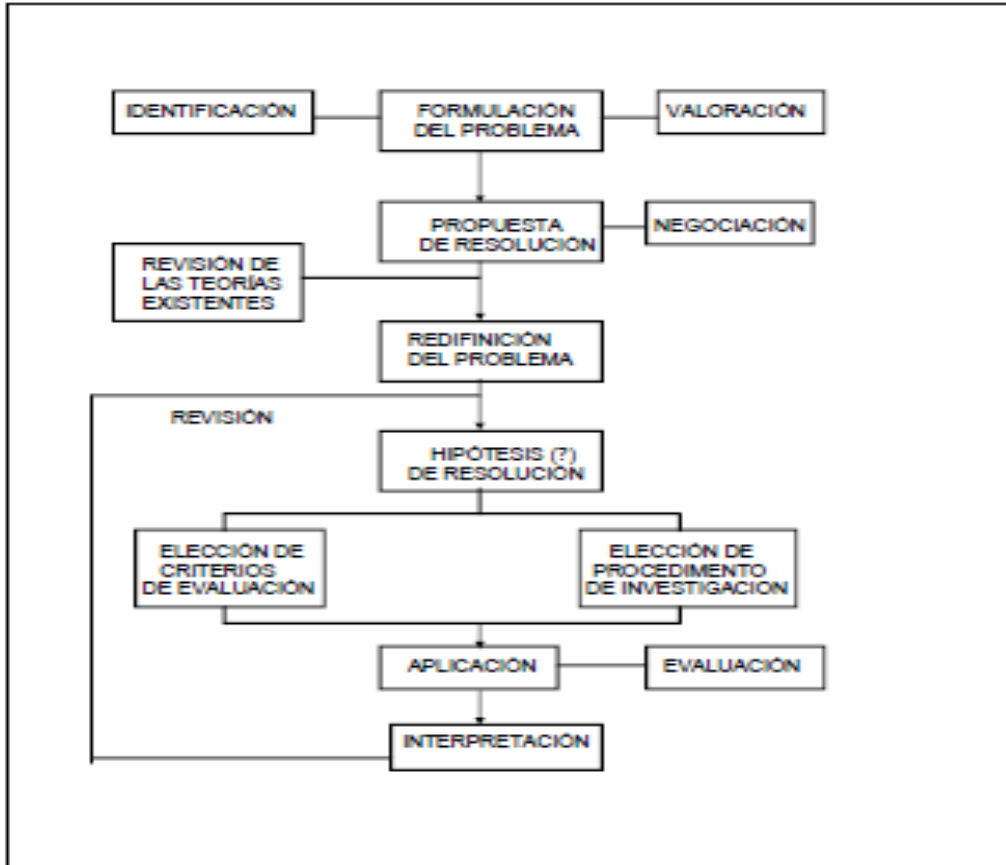
45. DIMENSIONS OF ACTION RESEARCH

According to the above, action research is included in the most generic form of 58 cooperative research, although more emphasis is put on the kind of people who are research teams in this denomination in the strict methodology to follow . So define Amoros et al (1993: 61) when applied to education: "The cooperative research highlights the fact that researchers and educators work together in planning, implementation and analysis of the research carried out for solve immediate and practical problems of educators, sharing responsibility in decision-making and carrying out research tasks. "

It should be noted, however, that linking researchers from outside the practice itself is not seen as a necessity for all, especially if the emphasis is placed on the figure of 'teacher-researcher'. Action research puts into question the usual hierarchical status between the researcher and the practical, seeking mutual involvement(Delorme, Ch. 1985)In addition to cooperative action research methodology it is defined as:

- **situational.**
- **Auto-evaluator.**
- **training.**
- **participative.**

GRAPHIC REPRESENTATION OF GENERAL PROCESS RESEARCH-ACTION



Source: (Delorme, Ch. 1985)

46. OBSERVATION AS SCIENTIFIC METHOD

Observe has been a constant of the human being restless and even more of the researcher. 60
The constant and close observation stands as the main source of knowledge, not in vain imitation is the first source of human learning. And when we talk about research, quantitative perspective observation stands in scientific method, with the aim of capturing reality 'as is'.

46.2 TYPES OF SAMPLING

The sample selection is presented as a very important quantitative observational design, as security for its external validity activity, as seen in the previous topic. There are a variety of forms of sampling, although quantitative methodology are preferred which allow statistical inference to the whole population. Cohen and Manion (1990) indicate the following types of sampling:

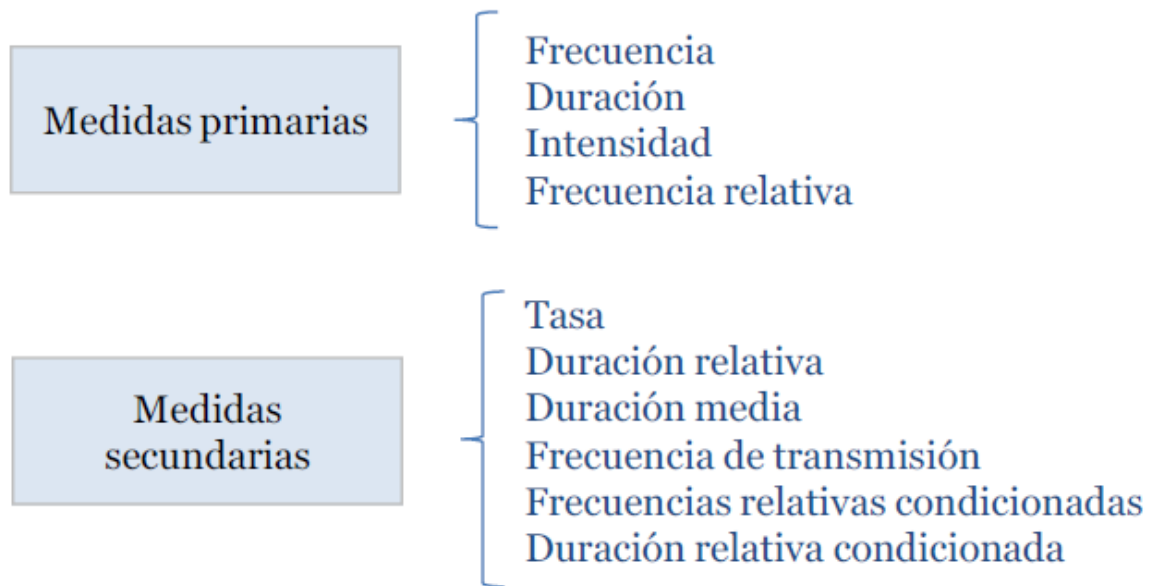
46.3 PROBABILITY SAMPLING.

ensuring that the sample represents the entire population on the basis that it is distributed according to the principles of the normal curve, which the laws of statistical probability are applicable sought.

The options are:

- **Random sampling.**
- **Stratified sampling.**
- **Sampling sets.**
- **Non-probability sampling.**
- **Convenience sampling.**
- **Snowball sampling.**
- **Quota sampling.**
- **purposive sampling.**

the variables that are observed but another fundamental question is to decide when and how to make observations, particularly its frequency and duration are categorized. The possibilities are endless about it, depending on the nature of the variables to observe the conditions of observation, of the possibilities of the observer, etc. (Carreras, Ma. V., 1993) It presents a classification scheme of possible observations of behavioral measures shown below:



Source (Carreras, Ma. V., 1993)

The categorial system requires data collection instruments, such as structured interviews, questionnaires and checklists. Since interviews are a technique of data collection more common in qualitative methodology they will be treated at the time to study it. In quantitative research the most common instruments are the checklists and questionnaires.

47. DELFI METHOD

The Delphi method, whose name is inspired by the ancient oracle of Delphos, it seems that it was originally conceived in the early 50s within the US Center for Research RAND Corporation by Olaf Helmer and Theodore J. Gordon, as an instrument for predictions about a case of nuclear catastrophe. Since then, it has been frequently used as a system for information about the future.

Linston and uroff define the Delphi technique as a method of structuring a group communication process is effective in allowing a group of individuals, as a whole, deal with a complex problem.

A Delphi is the selection of a group of experts who are asked their opinions on issues related to future events. Estimates of the experts are carried out in successive rounds, anonymous, in order to try to achieve consensus, but with maximum autonomy for participants. Therefore, the

predictive power of Delphi is based on the systematic use of intuitive judgment given by a 62 panel of experts. That is, the Delphi method proceeds by polling experts with the help of successive questionnaires in order to highlight convergences of views and deduct any consensus. The survey was carried out anonymously (currently performed by using usual email or through web questionnaires established to this effect) to avoid the effects of "leaders". The aim of successive questionnaires is to "reduce the interquartile space specifying the median". The questions relate, for example, the odds of making assumptions or events related to the subject of study (which in our case would be the development future of the sector we are analyzing). the quality of the results depends, above all, the care taken in preparing the questionnaire and in the choice of the experts consulted. therefore, as a whole provide the Delphi method will allow the most important changes that may occur in the phenomenon analyzed in the course of the next few years. In the family of forecasting methods usually it is classified at Delphi method within the qualitative or subjective methods. Although the theoretical formulation of the Delphi method itself comprises several successive stages of shipments of questionnaires, emptying and exploitation, in most of the cases may be limited to two stages, which however does not affect the quality of results such and as shown by the experience in similar studies. As is known, the aim of successive questionnaires is to "reduce the interquartile space, this is how the opinion of expert opinion others and his own deviates. (Eneko Astigarraga)

Summarizes the steps to be carried out to ensure the quality of the results, to launch and analyze the Delphi should be the following:

47.2 Phase 1: formulation of the problem

This is a fundamental step in the realization of a Delphi. In a method of experts, the importance of defining precisely the field of research is very large because it must be very confident that the experts recruited and consulted have all the very notion of this field. (Eneko Astigarraga)

The development of the questionnaire should be carried out according to certain rules: questions must be precise, quantifiable (dealing for example on odds of making hypotheses and / or events, most of the time on data performing events) and independent (the alleged conduct of one of the issues on a particular date does not affect the performance of some other issue).

47.3 Phase 2: choice of experts

63

The stage is important since the term "expert" is ambiguous. Regardless of their titles, their function or hierarchical level, the expert will be chosen for their ability to face the future and having knowledge of the subject consulted. The lack of independence of the experts can be a drawback; for this reason the experts are isolated and their views are collected by mail or electronically and anonymously via; so the real opinion of each expert is obtained and not the opinion more or less distorted by a group process (this is to eliminate the effect of the leaders).

47.4 Phase 3: Development and launch of the questionnaires (in parallel with Phase 2)

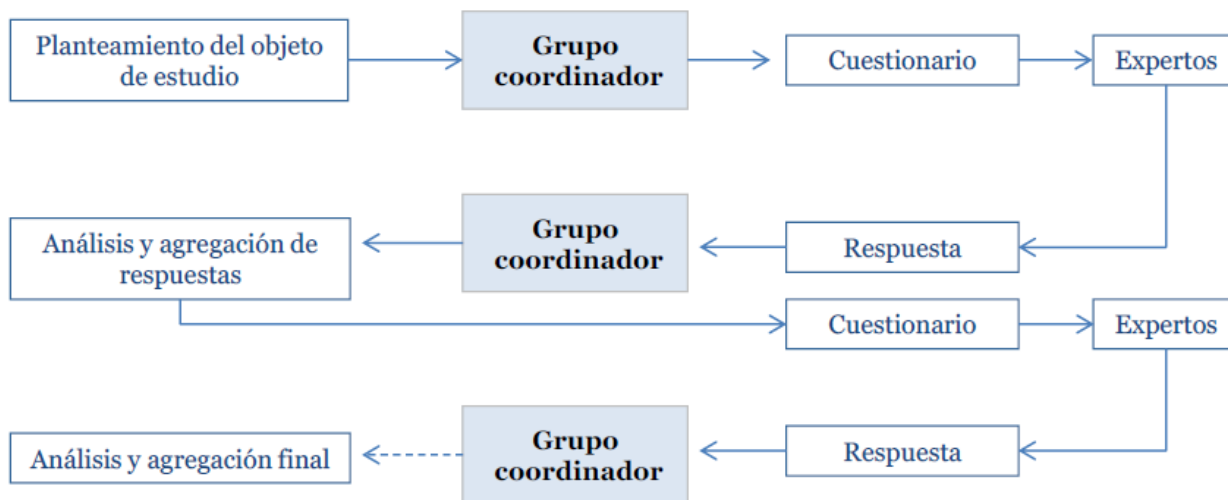
The questionnaires will be developed so as to facilitate, to the extent that an investigation of this nature allows, the response from respondents. Preferably the answers fluids to be quantified and weighted (year of completion of an event, probability of making a hypothesis, value will reach in the future a variable or event ... issues will be formulated degree of occurrence (probability) and importance (priority), the date of completion of certain events related to the object of study: information needs of the environment, information management environment, systems evolution, evolution in costs, changes in tasks need Long / Medium / Little, training, sometimes a categorized answers (Yes / No is used;

47.5 Phase 4: practical development and exploitation of results

The questionnaire is sent to a number of experts (keep in mind the non-response and dropouts. It is recommended that the final group is not less than 25). Naturally the questionnaire is accompanied by a cover note which specifies the purpose, the spirit of Delphi, and the practical conditions of development of the survey (response time, warranty anonymity). In addition, each question may arise that the expert should assess their own level of competence.

The aim of successive questionnaires is to reduce the dispersion of opinions and clarify the average consensus view. In the course of the 2nd consultation, experts are informed of the results of the first consultation questions and should give a new response and above all must justify it in case it is strongly divergent with respect to the group. If it is necessary, in the course of the 3rd consultation of each expert is asked to comment on the arguments of those who disagree with the majority. A fourth question time, allows the definitive answer: consensus opinion mean and spread of opinions (interquartile ranges).

ILLUSTRATION 10 METHOD DELFI SCHEME



Source: (Eneko Astigarraga)

48. HYPOTHESIS

A hypothesis is an expression by way of conjecture, that is, an attempt affirmative proposition about general or specific relationship between two or more variables. In formulating any hypothesis it is advisable to observe the following two criteria: they must express relationships between variables; and also be inferences which could prove the relationships. This indicates that any hypothetical expression shall be composed of two or more measurable variables and have an explicit form of the type of relationship that is presumed to exist between them. (PEPPER LASTRA *, 2014)

48.2 22.1 TYPES OF ASSUMPTIONS

48.2.1 22.1.1 null hypotheses:

They are propositions about the relationship between variables raised so that deny or refute the assertions of the research hypotheses. Thus, there are many null hypothesis and research hypothesis. The null hypotheses are symbolized as H_0 . We are told that there are no significant

differences between variables or groups, ie whether this difference is significant, and if not 65 due to chance. It is a hypothesis for statistical inference and is formulated for the purpose of being rejected.(Grajales Guerra, sf)

48.2.2 22.2.2 HIPOTESIS ALTERNATIVES:

They are made when there are other possible explanations, in addition to the proposed research hypotheses and void phenomenon. He is trying to explain the phenomenon when we reject the working hypothesis (research) and when for some reason can not accept the null. These are symbolized by Ha. (Grajales Guerra, sf)

- It favors the financial viability of implementing a storage system using metal pallets optimizing storage costs and operating times
- Financial viability does not favor the implementation of a storage system using metal pallets because it increases storage costs and operating times

Affirmative:

The implementation of a storage system allows the company to reduce operating costs because it improves material flow control inventories and leverages the resources, so as to increase productivity and improve customer satisfaction.

Negative:

The implementation of a storage system is not feasible for the company because it increases investment.

49. VARIABLES

The variables in the research, represent a vitally important concept within a project. The variables are the concepts that are statements of a particular type called hypothesis. (Wigodski, 2010)

48.1 OBJECT OF STUDY

In ESCO SA at its plant in Itagui have a distribution center which is not appropriate for operation, as it has clear material flow and indicated inventory control because it does not have a

system appropriate information for their activity. Moreover your storage system that slows 66
their everyday activities.

49.2 CONCEPTUALIZATION

ESCO SA is a company dedicated Antioqueña equipment rental for construction civil works, we have equipment, systems, materials and varied tools in this area. We are 5 companies we merge to provide higher quality service and efficiency.

49.3 CHARACTERIZATION

ESCO SA began in the 90s as a family business founded by Luis Alfredo Marquez with its large impact on the market expanded in strategic areas (Envigado, paragraph) and incorporated as a company in 2003 decided to merge with other 5 companies to give more force and expand its portfolio of services.

49.4 CONFLICT

We show that in the logistics area does not have a storage system that allows the optimization of space and resources so more expensive and delayed operation are made. In addition Conflict displaces at which employees perform enlistment and load transport vehicles and to meet the needs of customers.

49.5 CONTEXT

ESCO SA The company currently has 7 people who are responsible for installing and removing the equipment on trucks. Which not only used for this function but also to clean and repair the damaged equipment, usually this equipment is operated in arrumes and not have any kind of packaging that makes a delayed process and ineffective, the team is extremely difficult to manipulate because it is heavy and has risks that must have a good amount of person

a problem of space, security and time are identified, indicators that constitute them are several, one of them is the additional cost for external spaces to hold another relevant indicator accident rates and compensation for work injuries, the aforementioned variables found in symptoms and causes requirements specified in diagnosis.

49.6 MISSION

67

ESCO SA is a company that works with efficiency, effectiveness and service quality by providing rental equipment for the construction industry and civil works seeking to fill expectations and meet all the needs of its customers at the right time and with optimum quality.

49.7 VIEW

Our vision is to be a leading company in the sector, continuously improving in all its activities, offering product diversity and high quality services, to increase increasing its market share.

49.8 QUALITY POLITICS:

Our policy is to provide products and services with excellent quality in terms of compliance and technical specifications expected by users of our equipment and the general public

50. SYSTEM THAT BELONGS

ESCO SA belongs to the service system and contains three business lines of which two have the marketing of products, because it is dedicated to renting of light and heavy construction equipment, seal pavement and repair of cracks, finally industrial floors polished concrete with trowels belonging to the manufacturing system.

51. RETROSPECTIVE.

With this exercise we analyze the evolution of the factors that may impact the implementation of a project, just as visualize the starting point of each of these variables over time.

table 5

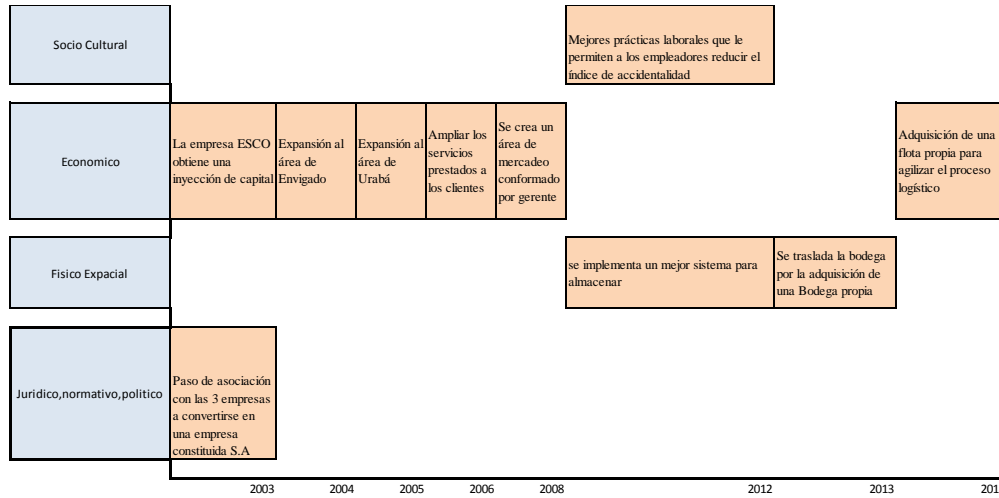
RETROSPECTIVE

Year	Event	Description of the event	Component / Dimension /
2003	Capital investment	ESCO obtained a capital injection by fusion with 3 small businesses	Economic.
2003	Social change reason	Step 3 association with companies to become a company incorporated SA	Legal.

2004	new headquarters	Expanding the area of Envigado to improve service nationwide	Economic.
2005	new headquarters	Expanding the area of Urabá to improve service nationwide	Economic.
2006	Expansion work lines	Expand the services provided to clients before civil engineering equipment and equipment presented for repair and construction of floors is implemented.	Economic.
2008	Implementation sales department	an area made up of marketing and marketing manager creates sellers	Economic
2012	Implementation of HSE	Better working practices that allow employers to reduce the accident rate of the company	Social
2012	Running new storage system	a better system for storing implemented since the change is coming cellar leased to own smaller	Physical
2013	relocating Bodegas	The winery moved by the acquisition of a winery	Physical space
2014	New transport fleet	Acquisition of a fleet to streamline the logistics process and minimize transport costs	Physical / spatial

Source: Made by myself

ILLUSTRATION 11 TIMELINE



Source: Made by myself

52. SCOPE

It is a company that provides equipment rental services for the construction of civil works with high levels of service quality. The company aims to be the best choice for customers through certified products and standardized processes, supported on human talent, innovations and new technologies applied to service efficiency. Their strategies are linked to the values of commitment, responsibility, trust, integrity and continuous improvement, taking into account the needs of their customers, and seeking the welfare of its employees and contributing to social responsibility and the environment, positioning itself as a leader in the market, achieving improve relations with customers.

TABLE 5

LIST OF VARIABLE RATE

#	CHANGE FACTORS	DEFINITION	CURRENT SITUATION	FUTURE SITUATION
1		a change arrume storage with manual	It is not implemented when	Vertical portable

	Trilateral Lifts	loading mechanical handling is implemented.	mechanical systems, the operation is purely manual.	storage shelf that gives the process more efficiently and safely.
2	Environmental sustainability	Contributing factors are affected the environment by the company.	They have not made measurements factors affecting the environment.	Make appropriate measurements and analyze the results to implement corrective measures, mitigating the possible environmental impacts.
3	software	internal company information that is reliable, and secure online.	Manual information that does not allow the company to maintain the flow of current information.	Instant information safe and durable
4	standardize processes	Establish the tasks of each operation process leading to a more efficient level.	Processes are not standardized generating uncontrolled activities and therefore can not be measured.	Analyze each process to optimize each resource, each thread standardizing the operation.
5	operational restructuring	Establish the tasks of each process, optimizing time and resources.	highly delayed and few operational processes and mechanical resources.	Analyze the flow distribution of materials to implement strategies to optimize each resource.
6	Technology	Investing in the right technology that allows the company to reach a continuous improvement model.	Few technological resources, manual tasks without measurement.	effective and measurable tasks with speed in operation

7	Infrastructure	Establish structural changes in storage models that lead to an efficient operation, improving distribution processes and handling.	Bodega extradimensionada in size, higher costs and resources.	Bodega to measure use of space and height optimizing the operation.
8	regulations	Being at the forefront of standards or laws involving its processes, products or marketing defined by regulators.	Some of the processes are not meeting the required certifications.	Perform a process of certification of company processes.
9	Human talent	Develop human talent of its employees through career plan to help the company improve its processes, through innovative ideas that can be implemented in the company.	It has not implemented a plan to develop the talents of its employees. Because of the high flow of personnel	Establish a career plan for employees who want to develop their professional and personal skills.
10	Market competition	Establish marketing plans to develop possible customers.	Lack of marketing plans to refine the development of new customers.	Establish a strategic plan to capture new customers in the market
eleven	Environment	Analyze the environmental factors that may affect its economic and social activity and structures and contingency plans.	They have not identified all the factors that may affect the company.	Having identified all factors impact the company socially and economically.
12	customers	Maintain excellent relationship with customers that gives you confidence and commitment to meet its requirements needs.	Lack of work with clients so that in some cases do not have segmented customers.	Certify products supplied low quality standards and security, enabling positioning itself as a certified supplier.
		Having an innovative spirit for the customer,	Joblessness to innovative level.	Having a center of

13	Innovation	with the aim to keep their date with new technologies and contributing to environmental impacts products.		innovation and development, to assist the sales department to expand its portfolio
14	Market	Analyze market needs and reach customers with proposals to enable it to meet their needs.	No one has structured a marketing strategy.	Establish marketing plans in the company.

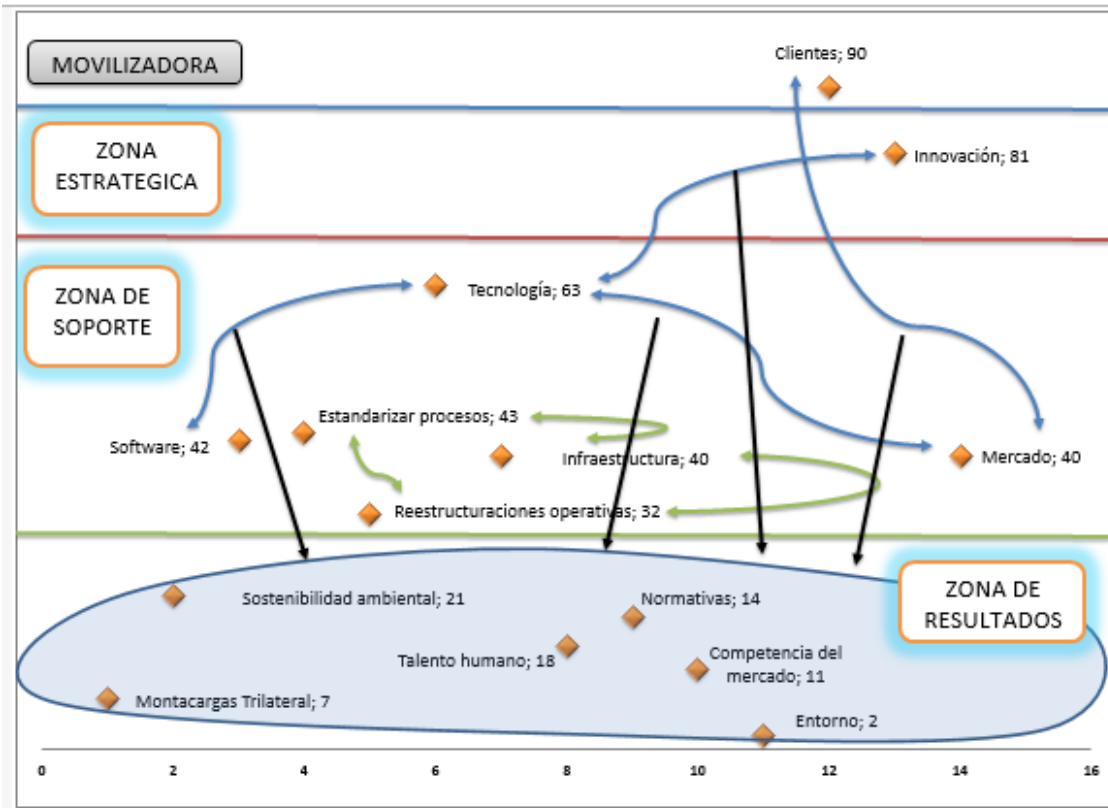
Source: Made by myself

table 7

Prioritization of FACOR EXCHANGE

#	Factores de cambio detectados	Diego Dairo Vergara	Van Camilo Rodriguez	Nadia Julieth Girálto	Pere Armando Reardon	Yuliett Ospina	Camilo Arias	Melissa Garcia	Alexander Ortiz	Rose Maria Paleyria	Renner Garcia	Escobar Marquez	Cristina Mejia	Byron Orozco	Ana Maria Parra	Guillermo Leon Moreno	Total
Variable1	Montacargas Trilateral	0	0	1	0	0	0	0	4	0	1	1	0	0	4	7	
Variable2	Sostenibilidad ambiental	5	1	4	2	0	0	1	0	1	0	0	7	0	5	21	
Variable3	Software	1	0	0	3	1	2	1	6	5	2	4	5	5	7	42	
Variable4	Estandarizar procesos	4	6	5	0	3	3	2	3	0	5	0	0	4	8	43	
Variable5	Reestructuraciones operativas	0	4	6	0	0	0	5	0	3	6	0	0	2	6	32	
Variable6	Tecnología	3	8	7	6	5	4	6	5	2	3	6	0	3	5	63	
Variable7	Infraestructura	6	7	3	4	2	1	3	0	1	0	3	6	0	4	40	
Variable8	Normativas	0	0	8	0	0	0	0	2	0	0	0	2	0	2	14	
Variable9	Talento humano	0	0	2	0	0	7	0	4	0	0	2	0	0	3	18	
Variable10	Competencia del mercado	0	0	1	0	6	0	0	0	0	0	0	4	0	0	11	
Variable11	Entorno	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Variable12	Clientes	8	5	0	8	8	8	8	7	8	8	8	6	0	0	90	
Variable13	Innovación	7	2	0	7	7	6	7	7	8	7	7	7	8	1	7	
Variable14	Mercado	0	3	0	5	4	5	4	0	6	4	5	3	1	0	1	
	Totales	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	

Source: Made by myself



Source: Made by myself

technique Pareto was performed, in which we place the factors of change with a value rating established by the numbers of factors, a rating of 8 gave 18 being the most important and 1 being the lowest, in this rating of experts they took 15 people who gave their opinion on the most important factors.

After performing the rating factors change, we show that customers come to the mobilizing area with a score of 90 points which we can relate in the first instance with technology and marketing with a rating of 63 and 40, shows us a strong settlement in the support area, we also see that innovation has a link with technology as this is a good partnership to meet expectations and in turn is linked to software located in the support area.

Within the support area also we have a connection between process standardization and operational restructuring which comply with administrative planning as support, both finally

connected with infrastructure which must be aligned to the needs of the company to meet 74
expectations

Finally in the outcome we have 6 factors of change in which the above factors are supported:

Environmental sustainability

regulations

Market competition

Human talent

Environment

trilateral Lifts

53. DESIGN

In implementing the chosen for the dolphin research method, a survey of five people involved in the distribution process and storage of Esco SA, Manager, head of distribution, commercial manager, cellar master, operator which was held from his knowledge of the issues presented by the company, answered the 7 questions.

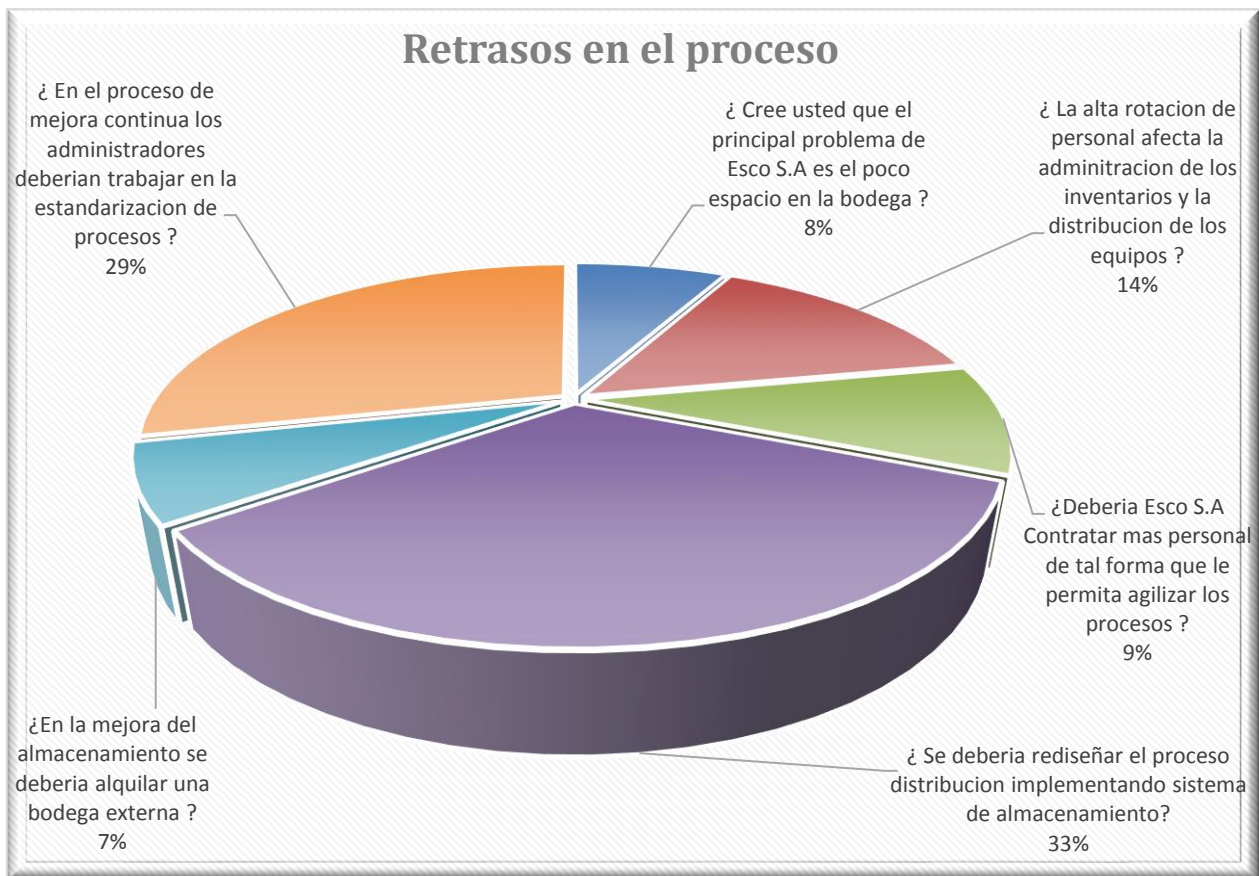
SURVEY PROCESS PROBLEM RETAROS

Storage and distribution problems

ESCO SA The company currently has 7 people who are responsible for installing and removing the construction equipment on trucks. Which not only used for this function but also to clean and repair the damaged equipment, usually this equipment is operated in arrumes and not have any kind of packaging that makes a delayed process and ineffective, the team is extremely difficult to handle since it is heavy and has risks, so should have a good amount of people.

Storage and Distribution Survey		Qualificat ion	Percent age
instructions			
Please read the following questions and grade as follows 5 as the highest score in its discretion to 1 as lower-rated			
1	Do you think that the main problem of Escos SA is little room in the cellar?		
2	Is the high staff turnover affects inventory management and distribution of equipment?		
3	Escos SA Should Hire more staff so that allows you to streamline processes?		
4	Is should redesign the distribution process by implementing storage system?		
6	In improving storage should hire an outside cellar?		
7	In the process of continuous improvement managers should work process standardization?		
	Total		

Source: Made by myself



Source: Made by myself

54. ANALYSIS OF DATA

By getting the results we find that the best option for solving the problem is the implementation of a storage system with a result of 33% followed by standardizing processes with 29%, that doing the analysis is very convenient implementation storage system to standardize processes that will allow the regular company material flow and optimization of labor.

The resources they will become the company but will for rollover defined at last productivity for customers.

Are you implement new strategies for internal distribution in the company to give a twist to the process of storage and handling company which builds and redesigns the basis of storage to give

a future projection in the efficiency and effectiveness of each of the interconnected processes 77
internally it is here where you see the real utility of this project when we see the results in optimized processes.

If the behavior of costs in period of one year, arrume show some advantage, displayed in spending increasing stability in store as they will not require the purchase of any asset is analyzed.

For a period of two or three years returnable packaging shows a clear advantage for its life, making reducing costs. This is because buying will not be packing in that time span of two or three years.

By contrast returnable packaging does improve delivery times and order of business without the required reduction for the same operation staff.

It analyzed in graphic returnable packaging continue to show their reliability at the time of the final decision, this is largely due to resistance material of which are elaborate design, among other advantageous features that allow this packaging is introduced in the supply chain of the company for external process.

55. PROJECT EXECUTION

By analyzing the associated costs storage packaging for metal pallets in the company ESCO SA, on information provided by the Accounting Area costs associated to supply and store these racks belonging to the references mentioned are determined.

Looking for optimization of direct and indirect logistics operations and their respective processes address the need to reduce references to a type of packaging to store to reduce the financial and logistical costs, being referenced a type of model standardized enterprise-wide which arrume will replace storage.

To make a simple model the cost analysis with the model stowage will be made. Leaving based on the same consumption in monthly costs.

As you can see you are being implemented this type of shelving in the company and is organized with corridors and alignment of the winery.

After diagnostician of the company as the result of the research presented, it can be concluded that the implementation of a storage system is feasible for operation as a result of these factors that influence delays are minimized processes.

The proposal for the implementation of a storage system ESCO SA is very positive, because with this new practice reduces time by 50% and staff lower in the maneuver loading and unloading, as with mechanical aid operation is the efficient, well operators who previously were part of this activity are distributed in different departments of the company, allowing all processes have a simultaneous operation and to ensure that the activities or sub-processes are standardized and can perform better control by managers.

Conducting an analysis of the proposed equipment is very feasible, since their economic investment is not very shocking financially speaking, because their costs are very favorable compared to the benefits they bring to the different processes also relating them to reduce costs, space, safety and labor are very important because each process with the implementation of the storage system will optimize its activities, time and space.

The processes of loading and unloading of the company with the proposal is optimized so that now for each thread only one person is needed depending on the need. But since the financial approach is the company benefited because each process will flow without generating delays and cost overruns labor.

The storage model proposed is certified by providers of structures that are intended to install in addition to this a number of very rigorous tests of stability, weight and handling which show the efficiency and good practical performance that give the company made this system. Besides information historical accidents faced with accidents in the trial period for this system which shows a big difference in safety for employees.

The financial viability will be reflected in the present value of costs the company's entire operation, this operation will have several cost reductions as time and personnel required, which

happens to require six people for cabinets only one person who can perform all mechanical operation and infrastructure support another part will implementa. Por viability at the time that the system achieves a high utilization of space as it was losing a lot of vertical storage by poor infrastructure and that the system had managed to increase the storage capacity. 79

57. FINDINGS

Important things to note in this project in the academic subject is the feedback that is generated in the field of research and consultation through different sources, authors, works, success stories and implementation and related research topic work.

The aspects taken into account for the fulfillment of the objectives was to maintain focus for the development of each of the topics to be developed in which it was argued clearly and precisely each of the advantages presented two alternatives Grade this project. Performing essentially parallel in which the reader or reading valuer keep focused and keep the wire to reach the best selected alternative

58. RECOMMENDATIONS

The importance of the proposed system emphasizes the need to be disseminated, explained and discussed with board members from all areas involved in the development process.

And mention of the suitability of any program or project to be executed in the middle of rental construction here make use of the proposed system was made. Once you understand its use and its potential, they must adopt in programming plans using this scientific and statistical input, including a process of analysis and research to determine the various uses that the system could provide in the case of each program or project

In addition it is recommended to use the system vertically to improve the use and distribution of space. In this sense, it could save a significant amount of space where the spaces usually become useless for their hard to reach as they are better take advantage heights. This is a very important aspect because people currently lack space and need to look for alternative and

intelligent measures to help them to continue their development and execution even when 80 space conditions are reduced.

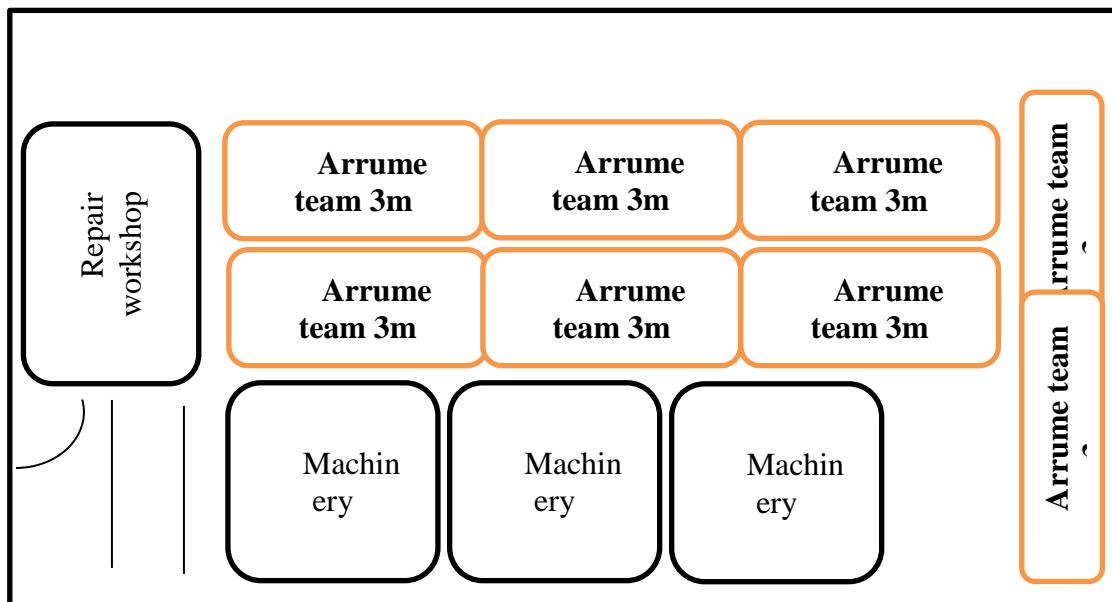
A clear example of this are the buildings that today are used; formerly there was no objection to build widthwise in extensive grounds of land, but with the rapid development of the populations they have to think of a different, more space-efficient way as are the buildings. This building model saves space but may contain if the same capacity inhabitants. Here it is shown how this strategy fits our lifestyle and conditions that sometimes seem limiting when we do not have technologies like this.

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61. ATTACHMENTS

ANNEXED 2

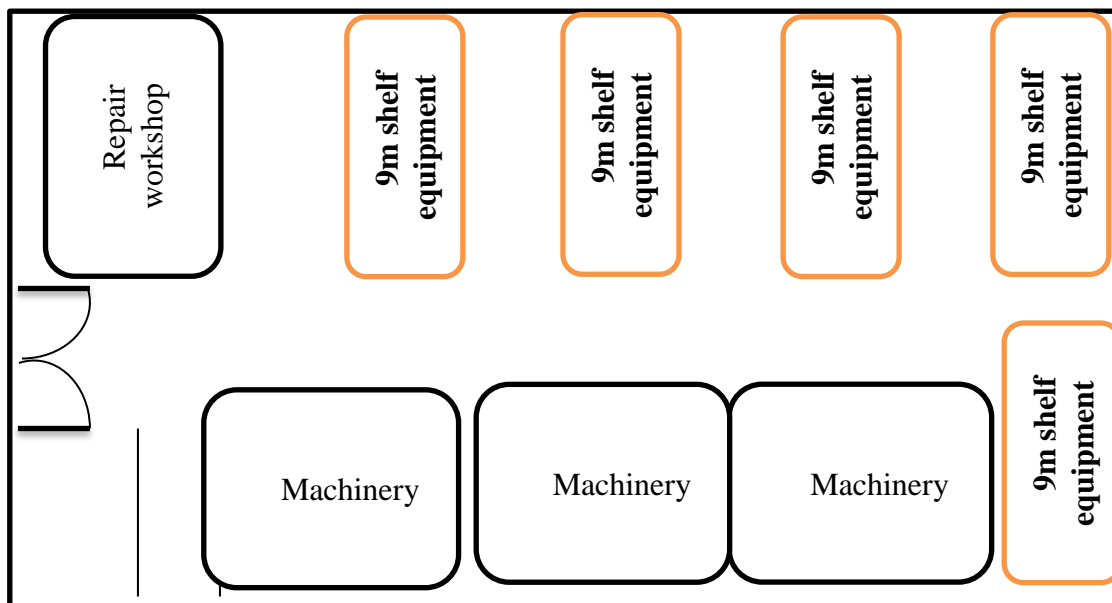
PREVIOUSLY DISTRIBUTION



Source: Own

ANNEXED 3

DISTRIBUTION NOW



Source: Own

ANNEXED 4

PROBLEMS Storage 1



Source: Made by myself

This is the maximum height for this type of arrume which makes it complex to handle and store.

PROBLEMS SHELF LIFE 2



ANNEXED 6

CHARGING EQUIPMENT MANUPULACION

