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FACULTY OF ENGINEERING IN APPLIED
SCIENCES

CARRERA OF INDUSTRIAL ENGINEERING
IBARRA - ECUADOR

ARTICLE ENGLISH

TOPIC:

**"Standardization and Process Improvement Area
Postharvest Florícola FLORELOY Company SA in
the city of Cayambe "**

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CHAPTER I

Floriculture HISTORICAL ACKGROUND IN ECUADOR.

Flower industry in Ecuador.

Ecuador's agricultural exports have been characterized in the history of foreign trade by exclusive reliance on a particular product group. But the early nineties, flowers, exotic fruits, wood, vegetable fibers and manufactured goods, among others, sponsored by an openness to foreign trade and reduced tariffs, growing at rapid pace of 45.0% per annum

EXPORTS OF FLOWERS

	2010	2011	2012	Variación 2011/2010	Variación 2012/2011
Enero	57.333	60.523	71.680	5.6%	18.4%
Febrero	75.829	91.303	96.123	20.4%	5.3%
Marzo	48.964	50.852	52.362	3.9%	3.0%
Abril	53.573	59.544		11.1%	
Mayo	50.042	56.175		12.3%	
Junio	40.688	47.931		17.8%	
Julio	37.119	43.971		18.5%	
Agosto	41.236	48.909		18.6%	
Septiembre	46.922	51.144		9.0%	
Octubre	61.130	59.209		-3.1%	
Noviembre	45.883	53.261		16.1%	
Diciembre	49.042	52.854		7.8%	
Enero-Marzo	182.126	202.678	220.165	11.3%	8.6%
Total	607.761	675.675		11.2%	

(In Thousands of USD FOB) Fuente: BCE
(Comercio Exterior)

Historical Information.

Flower production began in 1982, the Ecuadorian farmers, both Costa and the Sierra decided to devote himself to

the cultivation of products which hitherto had greater representation in exports: flowers, mango, pineapple, broccoli, asparagus, passion fruit and other.

In 1992 the non-traditional production had increased significantly, but supplied the domestic market mainly. Entrepreneurs had to work hard to get open foreign markets and meet their demands. In some cases, coffee, cocoa and bananas were overshadowed. The cultivation of flowers for export in 1985, recorded FOB USD 526 million representing 0.02% of total exports and 0.1 % of agricultural exports, in 1990 come to constitute 0.5% of total exports and 2.0% of the farm. The production not only grew in the nineties for 2001 agribusiness sales abroad amounted to USD 2.059 million FOB. Represented almost 45.0% of total exports of Ecuador. Soon he was the multiplier effect of the sector, which in 2001 means 5.0% of total exports and 18.0% of agricultural areas constitute very prominent in the national economy, with growth of 70.4%.

However, since 1996, exports by way of flowers, suffer deterioration, caused by the increase in production costs and reduced prices worldwide flower. Hence, analysts conclude that it must export more flowers for the same dollar value FOB. Then the flowers are the main traditional export product of Ecuador, in 2003 accounted for USD 308.8 million nationwide in 2004, the \$ 354.8 million from flower exports meant 4.6% of the total and 19.0% of non traditional 2004 to December 2005 was generated USD 370.3 million, a

record export of flowers. The value traded in dollars, or sales in foreign markets and national reach approximately USD 370 million, of which 98.0% corresponds to foreign markets and domestic 2.0%.

Evolution of Ecuadorian flower companies.

Currently there are approximately 420 member companies. Among the factors that have influenced so that this activity has grown so we have:

- Plantations are settled in places favorable for floriculture, ie mainly in valleys, where lighting and temperature are suitable for high yield.
- The flower industry was able to get cheap labor, thus lower costs and competitive with other countries.
- The economic and political power has influenced the creation of flexible environmental laws provide guarantees for the sector.
- Agricultural exports are exempt from tariffs (ATPDEA Trade Preference Act).
- The amount of investment is very low compared to other countries, for example to cultivate and produce a hectare of flowers in Israel needed U.S. \$ 600 thousand in Holland USD 1,300. thousand and 350 thousand USD in Ecuador.

Production areas.

Ecuador has 23 provinces, of which there 33.677ha (approximately 334 km2) dedicated to the cultivation of flowers, flowers 73% corresponds to 26.4% permanent and transient flowers. The main producing flowers

are in: Pichincha (located in Quito, Cayambe, Czech Rumiñahui and Tumbaco) and Cotopaxi, next in importance Azuay and Guayas Imbabura (exclusively with permanent flowers). To a lesser extent the provinces with a group of flower production include: Carchi, Canar, Chimborazo, and Loja, representing 2.5% of the cultivated area of flowers. Consider the following table and graph.

Provincias	Has. 2004	%
Pichincha	2218,5	65,9%
Cotopaxi	542,9	16,1%
Azuay	194,0	5,8%
Guayas	164,0	4,9%
Imbabura	165,4	4,9%
Cañar	27,2	0,8%
Chimborazo	26,8	0,8%
Loja	8,0	0,2%
Carchi	21,0	0,6%
Total	3.367,7	100%

Fuente: Empresas Florícolas – Expoflore
Superficie de cultivo de flores por provincia.

Of the total area planted with flowers, approximately 59.6% are produced in greenhouses that are broken down into 54.3% of permanent flowers, 5.3% and 40.4% of transients in the open field (19.3 % 21.1% permanent and transient).

Main products flower.

The flower sector is the one that has transpired in recent years. The roses are noted for having the largest acreage has 2.053.6 (61.9%) as shown in the Table and Graph, followed by summer flowers has recorded 432.9 (13.1%) and gypsophilias with 370 ha (11.2%). Other varieties not exceed 10% of the total. **Variedades de flores y su exportación**

Tipo de flor	Toneladas	Porcenta
Rosa	17.803	65%
Clavel	945	3%
Crisantemo	157	1%
Otras	8.175	30%

Fuente: El HOY, 18 de enero de 2000, diseño A.E.

Geographical Location: location of the company where there is research.

The canton of Cayambe is located northwest of the province of Pichincha, see Figure 1.8., And is a land of many strengths, cultural wealth and fertile lands that benefit greatly to agricultural production



Mapas del Ecuador, la provincia de Pichincha y el cantón Cayambe¹.

Description of Cayambe Canton.

Cayambe is one of the 8 counties that comprise the province of Pichincha. Its capital, the city of Cayambe is located, 75 km northeast of Quito on the 2,700 m and is crossed by the equator.

The limits of Canton are not specified in the sense that the relevant documents that rest in the local government and not required. In a very general way the boundaries are: north of Imbabura province, south of Quito Metropolitan District and the Province of Napo, eastern provinces of Napo and Sucumbios and West Canton Pedro Moncayo and the Metropolitan

¹ <http://es.wikipedia.org/wiki/Cayambe> (cant%C3%B3n), Fuente: SIISE, Versión 2.0, 2000, INEC.

District of Quito . Imprecision of the difficulty stems boundary having an indicator of land area. Consider, according to INEC data that lie in the municipal cadastre offices indicating the surface of the canton and 1,350 km², which occupy 9.3% of the territory of the province, according to the census of 1990, comprises 2.7% of the population of the province. Cayambe is a space that has three major economic axis:

- Rural economies
- The flower industry
- The economy of service delivery

CHAPTER II

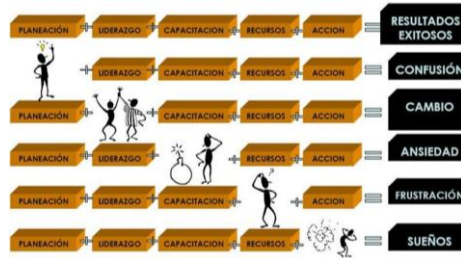
STANDARDIZATION AND PROCESS IMPROVEMENT TOOLS.

The goal of creating and implementing a strategy of standardization is to strengthen the organization's ability to add value. The basic approach is to start with the process as is done in the present, creating a way to share, document and use what they learned.

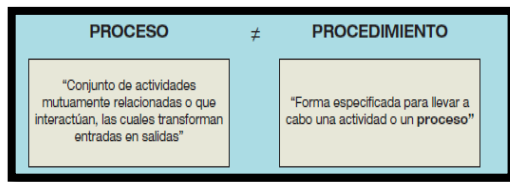
Introduction.

The standardization of business processes, companies, organizations, etc., Today is a tool or "goal" to achieve, for many organizations. Among many reasons, the demands imposed on us a global market, has made us change the world view and

business.



Etapas del Mejoramiento Continuo. Process vs. Process.



Process definition and procedure according to ISO 9000-2008

PROCEDIMIENTOS	PROCESOS
Los procedimientos definen la secuencia de pasos para ejecutar una tarea	Los procesos transforman las entradas en salidas mediante la utilización de recursos
Los procedimientos existen, son estáticos	Los procesos se comportan, son dinámicos
Los procedimientos están impulsados por la finalización de la tarea	Los procesos están impulsados por la consecución de un resultado
Los procedimientos se implementan	Los procesos se operan y gestionan
Los procedimientos se centran en el cumplimiento de las normas	Los procesos se centran en la satisfacción de los clientes y otras partes interesadas
Los procedimientos recogen actividades que pueden realizar personas de diferentes departamentos con diferentes objetivos.	Los procesos contienen actividades que pueden realizar personas de diferentes departamentos con unos objetivos comunes.

Diferencias entre procedimientos y processes.

Standardization.

General Steps for Standardization for the benefit of time and productivity of your organization.

→ Describe the current process:

The purpose is to describe how this is done in the process, not as it should perform.

→ Planning a testing process:

Create a team you test the process, as currently do not apply.

→Execute and monitor the test: Required to collect information and get ideas from around the improvement

team to implement the process in question.

→Review Process: Use the information obtained to improve the process. Simplify the documentation, trying to keep it as simple and graphic as possible.

→ promote the use of process after revision:

If only a few people were involved in the testing process is required to spread the use of the new process to others.

→ Maintain and improve the process:

Make sure everyone uses the improved process, encourage them to seek further improvements in it. Develop methods to capture, test and implement the ideas of the people.

Standardization of Processes.

It is a dynamic process by which documents the work done, sequence, materials and security tools to use in them, providing continuous improvement to achieve global competitiveness levels.

Why is it necessary?

Eliminating process variability Ensure expected results

Optimize the use of materials and tools

Improve the quality and safety within the organization

Conditioning systems work and so that continuous improvement can be introduced

Benefits

Security (Eliminate unsafe working conditions to standardize the sequence

of operations and remove unnecessary items on the workstation) Quality (The standard work has a special focus on meeting customer expectations, and thus highlights those critical activities that are designed to meet the quality standards) Cost (costs are eliminated for damages for loss of material, and removed to a large degree the re-work that is extremely cost) Response Capability (Decreases the cycle time of each operation, the operating load balancing, so that you can increase the line speed and gain productivity by freeing man / hours) Organizational Development (standardized work activities are performed by the same people doing the work, which instills more organized at work and knowledge of standardization and continuous improvement)

A major challenge in product design is to reduce variations while preserving creativity. Toyota creates flexibility at high level in his system through standardization of low-level tasks.

You can define three broad categories of standardization.

→ Standardization of designs: Toyota achieves this through a common architecture for their products, modules and components shared or reused.

→ Standardize processes: Toyota achieves designing their products according to their manufacturing processes.

→ Standardization of engineering skills: provides flexibility in human resources and program planning. Standardization provides the

foundation for developing effective solutions to the problem of highly cyclical demand of resources in product design. It also helps to create stable and predictable delivery in time and quality, in an environment that we know by definition unpredictable. "If we want things to change we propose and implement new management alternatives, we can never improve if we work clinging to our old practice day after day"

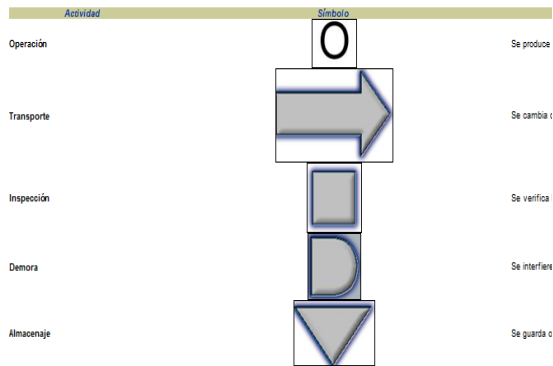
Flowchart of Processes.

Definition: A graphic representation of the sequence of all operations, transport, inspection, waiting and storage that occur during a process. Also includes information which is considered desirable for the analysis, for example the time and distance traveled. Sequences used for a product, an operator, one piece, and so on.

Objectives: To provide a clear picture of the whole sequence of events in the process. Improving the distribution of local and handling of materials. Also decrease waiting times, study operations and other activities in relation to each other. Also to compare methods, eliminating downtime and select operations for detailed study. identification

The diagram of the course must be identified by a title placed on top. Head it is common practice with the words travel process diagram. The information to identify you always

necessary.



Elementos del Diagrama Básico.

Illustration of symbols, the process diagrams for identifying an industrial activity.

Actividad	Símbolo	Operación	Transporte	Inspección	Demora	Almacenaje
Acción		Clavar	Llevar materiales en una carretilla	Examinar cantidad y calidad de ciertos productos	Materiales en espera de ser utilizados junto a la mesa de trabajo	Materias primas
Se produce		Taladrar	Llevar materiales con una pala	Leer el manómetro de una caldera	Empleado esperando el ascensor	Producto terminado
Se cambia		Pulsar un teclado	Llevar materiales a mano (ordenanza)	Examinar un impreso informativo	Documentos que esperan ser archivados	Documentos en caja
Se verifica						
Se interfiere						
Se guarda						

Símbolos de Diagramas de Actividad Industrial de la UNA

CHAPTER III TIME AND MOTION

Motion Study

We describe the definition of a study of movements from two points of view to better understand their concept and

the techniques used to carry it out.

Economy of movement

Husbands Gilbreth developed this technique, but was perfected by Ralph M.

Barnes. These principles of motion economy are not all applied in the study of movement, since they are best used in a study of micro movements.

Three subdivisions: addressing:

- A. The use of the human body.
- B. A disposition and conditions in the workplace and
- C. The design of tools and equipment

The Human Factor in Decision-Times

To perform a time study is important to consider not only the resources of equipment, techniques, requirements, also be taken into account all factors affecting the productivity of labor such as work environment, physical, emotional and physiological area or workplace.

Study Times

It is a technique to determine as accurately as possible, based on a number of observations, the time to perform a particular task under a performance standard pre-set

Scope.

It should combine the best available techniques and skills to achieve an efficient man-machine relationship. After establishing a method, the responsibility for determining the time required to manufacture the product is

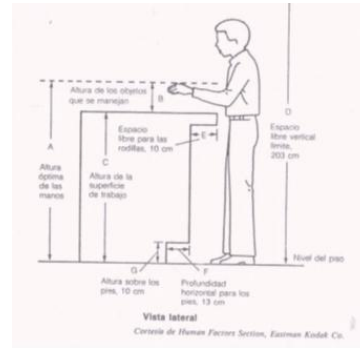
within the scope of this work. Also included is the responsibility of monitoring compliance rules or predetermined standards, and that employees are paid appropriately for their performance.

Standard Time.

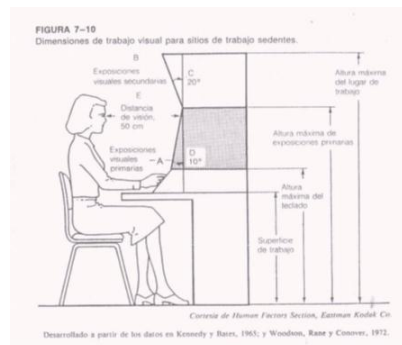
Definition: The result of a time study. Is the time required for an operator of average, fully qualified and trained and working at a normal rate, perform the operation. A standard time determines the amount of production expected output of a worker and used to plan and control the direct costs of labor.

The assessment rate: Within the study of the clock time is very important because it has great relevance because the worker when they take the time usually tends to decrease its normal rhythm of work to show that the action is difficult or in many cases the opposite happens demonstrating great skill, for these reasons the assessment is used to achieve data rate as real as possible. Table 3.2. We have the assessment rate based on 60 approved by the ILO.

Fees: No operator can maintain a standard step every minute of the day. Can take place three kinds of interruptions for additional time to be allocated. The first is personal interruptions, such as trips to the bathroom and drinking, the second is the fatigue that affects even the strongest individuals in the work lighter



Dimensiones de recomendadas para Sitios de Trabajo Sentados



Dimensiones Recomendadas para un Sitio de Trabajo de Pie

Posición de los brazos		Segundo dígito del Código de postura.
Los dos brazos bajos Ambos brazos del trabajador están situados bajo el nivel de los hombros.		1
Un brazo bajo y el otro elevado Un brazo del trabajador está situado bajo el nivel de los hombros y el otro otro, o parte del otro, está situado por encima del nivel de los hombros.		2
Los dos brazos elevados Ambos brazos (o parte de los brazos) del trabajador están situados por encima del nivel de los hombros.		3
Posición de espalda		Primer dígito del Código de postura.
Espalda derecha El eje del tronco del trabajador está alineado con el eje caderas-piernas.		1
Espalda doblada Existe flexión del tronco. Aunque el método no explicita a partir de qué ángulo se da esta circunstancia, puede considerarse que ocurre para inclinaciones mayores de 20° (Mattila et al., 1999).		2
Espalda con giro Existe torsión del tronco o inclinación lateral superior a 20°.		3
Espalda doblada con giro Existe flexión del tronco y giro (o inclinación) de forma simultánea.		4
Posición de las piernas		Tercer dígito del Código de postura.
Sentado		1
De pie con las dos piernas rectas con el peso equilibrado entre ambas		2
De pie con una pierna recta y la otra flexionada con el peso desequilibrado entre ambas		3
De pie o en cuclillas con las dos piernas flexionadas y el peso equilibrado entre ambas Aunque el método no explicita a partir de qué ángulo se da esta circunstancia, puede considerarse que ocurre para ángulos muslo-pantorrilla inferiores o iguales a 150° (Mattila et al., 1999). Ángulos mayores serán considerados piernas rectas.		4
De pie o en cuclillas con las dos piernas flexionadas y el peso desequilibrado entre ambas Puede considerarse que ocurre para ángulos muslo-pantorrilla inferiores o iguales a 150° (Mattila et al., 1999). Ángulos mayores serán considerados piernas rectas.		5
Arrodillado El trabajador apoya una o las dos rodillas en el suelo.		6
Arrodando		7

POSICIONES Ergonómicas Segun la Actividad Realizar una. Fuente. OWAS (Sistema de Análisis de Trabajo Ovako), Capacitación del IESS (Factor de Riesgo Ergonómico).

CHAPTER IV PRODUCTIVITY AND PRODUCTION

Productivity. Importance of Productivity.

The only way for a business to grow and increase profitability (or earnings) is increasing its productivity. And the key instrument that results in increased productivity is the use of methods, time study and a payroll system. For example, the total cost to cover in a typical manufacturing company, is composed of approximately 15% of direct labor, 40% overhead.

What is Productivity?

Productivity can be defined as the ratio between the amount of goods and services produced and the amount of resources used. In manufacturing, productivity is used to evaluate the performance of the workshops, machinery, work equipment and employees. Productivity in terms of employees is synonymous with performance. In a systematic approach we say that something or someone is productive on a number of resources (inputs) in a given period of time gets the most out of products.

Productivity concept in various international organizations.

OECD (Organization for Economic Cooperation and Development). Productivity is equal to output divided by each of the production elements. ILO (International Labour Organization). The products are produced as a result of the integration

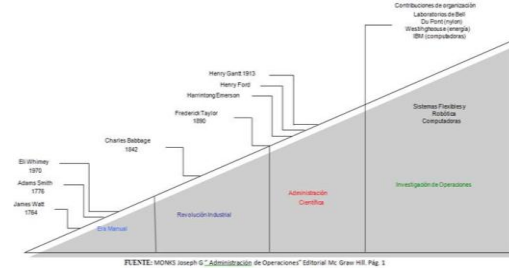
of four main elements: land, capital, labor and organization. The relationship of these elements to produce a measure of productivity. EPA (European Productivity Agency). Productivity is the degree of actual use of each element of production. It is mostly a mental attitude. Seek continual improvement of what already exists. It is based on the conviction that one can make things better today than yesterday and better tomorrow than today. Requires continued efforts to adapt economic activities to changing conditions and implement new techniques and methods. It is the firm belief in human progress

“Productividad evalúa la capacidad del sistema para elaborar productos que son requeridos (que se adecuan al uso) y a la vez el grado en que se aprovechan los recursos utilizados, es decir el valor agregado”. How

INNOVATIVE HOME CONTRIBUTION

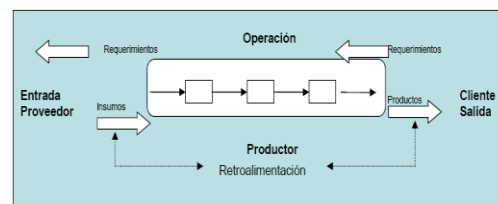
Frederick Taylor's scientific management philosophy, use of training, study times and standards
 Henry Ford assembly lines for mass production
 Emerson Harrington Promoting the efficiency of organizations
 F.W. Harris First model of economic order quantity (EOQ)
 Henry Grant Using programming systems
 Walter Shewhart Statistical Quality Control
 Elton Mayo attention to behavioral

factors



Gráfica 4.1. Historia de los estudios sobre la producción

1.1.1. Funcionamiento del Sistema de Producción.



Gráfica 4.2. Relación básica de los procesos²

CHAPTER V

CURRENT DIAGNOSIS OF PROCESSES IN THE AREA OF POST-HARVEST FLORELOY SA

Company Description Florícola FLORELOY SA
 ELOY FLOR Inc. is located in the city of Cayambe, Pichincha province (North Pan Km.3 diversion Guachalá Castle), (See Exhibit 1). The company was incorporated on March 17, 1998, as a corporation. The land where he started the company belonged to the Castle Guachalá.
 Company Summary Description Florícola Floreloy S.A.

²Henderson García, Alan. **Antología del Curso Taller: Rediseño de Procesos y Agilización de Trámites.** Instituto Centroamericano de Administración Pública – ICAP-. San José, Costa Rica, 2006.

Nombre del Proyecto	FLORELOY S. A.
Ubicación del Proyecto	Provincia de Pichincha / Cantón Cayambe / Parroquia Juan Montalvo / Detrás del Castillo de Guachala / panamericana norte Km3
Empresa operadora	RAZÓN SOCIAL: Floreloy S.A. DIRECCIÓN: Panamericana Norte km 3, desvío al castillo de guachala. CORREOELECTRÓNICO: floreloy@hotmail.com
Representante legal:	Ing. Pablo Monard
Actividad:	Empresa dedicada a la realización todo tipo actividades relacionadas con explotación, cultivo, propagación, siembra y explotación productos agrícolas, pecuarios, ganaderos, forestales, florícolas e insumos de los mismos.
Tipo de empresa:	Producción
Principal producto	Flores (Rosas)

Flower exports Eloy, figures in percentages

The company exports its products Floreloy flower in percentages according to information provided by the National Association of Flower Producers and Exporters of Ecuador, to the following countries:

- 66.66% Canada and the U.S.
- 19.29% Germany, Austria, Belgium, Spain, France, Holland, Italy and Switzerland
- 11.47% Russia
- 2.58% Chile

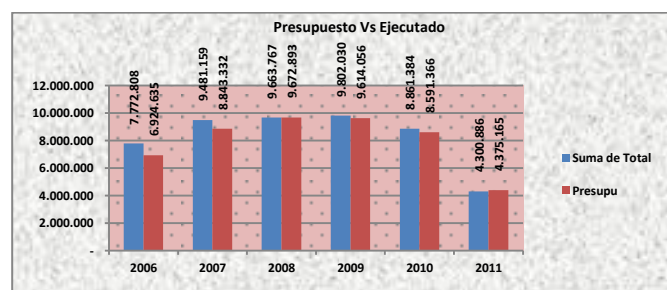
Quantitative data Floreloy Production.

Area of Cultivation and Post-Harvest: Every company is way through forecasts and whether the objectives that were raised at the beginning of a

stage have been met, FLORELOY has a database where we can find its production and analyze the current state of the company. Let's look at Table 5.3 and Figure 5.1. Where Vs is the proposed data obtained

Año	Total	Presupuestado
2006	7.772.808	6.924.635
2007	9.481.159	8.843.332
2008	9.663.767	9.672.893
2009	9.802.030	9.614.056
2010	8.861.384	8.591.366
2011	4.300.886	4.375.165
Total general	49.882.034	48.21.448

Tallos anuales presupuestado vs el obtenidos. Fuente: Base de Datos Empresa.



Tallos presupuestados VS Tallos Ejecutados desde año 2006 hasta mayo 2011. Fuente: Base de Datos Empresa.

Description of the area of Post Harvest Company SA Florícola FLORELOY

Raw Materials Used for Post-Harvest.

The main raw material are the different varieties of roses that are grown under greenhouse and crop care staff, mainly women being more sensitive and have a natural care. This area is supported in different areas such as maintenance, pest control, irrigation, administration, warehouse, etc. That is growing is the main supplier of raw materials to post-harvest.

Characteristics of roses according to customer specifications:

Varietades de Flores

VARIETADES DE LA EMPRESA					
N°	VARIEDAD	N°	VARIEDAD	N°	VARIEDAD
1	AMELIA	19	ESCIMO	37	MANITOU
2	ANASTASIA	20	ESPERANCE	38	MOHANA
3	AUBADE	21	FAITH	39	MONDIAL
4	BLIZZARD	22	FOREVER YOUNG	40	ORANGE SKY
5	BLUSH	23	FRAGRANT DELICIOUS	41	POLAR STAR
6	CABARET	24	FREE SPIRITS	42	RED PARÍS
7	CAROUSEL	25	FREEDOM	43	RIVIERA
8	CHERRY BRANDY	26	GOLD STRIKE	44	ROCKSTAR
9	CHERRY O!	27	HIGH & MAGIC	45	ROSITA VENDELA
10	CIRCUS	28	HIGH & PEACE	46	SEXY RED
11	COOL WATER	29	HOT MERENGUE	47	SOULMATE
12	CRAZY ONE	30	IGUANA	48	SWEETNESS
13	CREME DE LA CREME	31	IMAGINATION	49	TARA
14	CUMBIA	32	JADE	50	TOPAZ
15	DARK ENGAGEMENT	33	KIKO	51	VENDELA
16	DEJA VU	34	LA BELLE	52	VOODOO
17	DUETT	35	LA PERLA		
18	ENGAGEMENT	36	MALIBÚ		

crop, which must meet different specifications set forth above as the correct point in court.

The cars carrying the net with flowers have a margin of arrival to room between 18 min. At 30 min according to the designated area. Since the driver starts to pick up the first screen to complete a maximum of 35 meshes in the event that it is supplied in its entirety, this variation in time can not be exceeded and will begin a process of dehydration of the flowers



Current line of Post-harvest processing.

In the room postharvest processing line of roses today is within the parameters established by the company for proper and successful prosecution, this implies that the motion and time established for each of the points at which one or other

a rose is a change or transformation is accepted for the budgets of both performance / labor as Bonches processed / day.

The current processing standards are:

- Receipt of the flower in the fourth pre-cold. The arrival process occurs when the flower enters the cold room pre-from post-harvest

- Skater: Requires an average of 9 to 10 tables of supply, ie to be in the obligation and responsibility that the number of tables are constantly supplied with mesh flower, ie 2 tubs of 8 stitches per table classification: a processing and waiting. This avoids the presence of dead time at the time that the classifier would be without flower processed by the poor performance of the skater. The skater caters to every table in the room where the flower is processed according to the planning and priority of flowers by request, also according to whether the program to supply the sorters to avoid repetition of the same variety to the classifying a week.



Fotografías-Patinador

- Classification: At this stage of the flower processing requires the ability to process more or less mesh flower is directly proportional to the time that this person is working in room. Specifically classification by more familiar with the problems of roses and, preferably, in each specific variety, for the skill to manipulate the stem so that there is no doubt when classifying the quality of the flower as the export. The time set in living room, which is within the range of acceptance in the processing of flower are: 18 mesh / hour, which may fluctuate depending on the time that the worker is in this work as mentioned above



Fotografías-Clasificación.

- Boncheo: Similarly, this process is estimated and taken as reference embonchar capacity of each worker versus the amount of roses that will supply the classifiers, usually designated for each flower bonchador Trees for a sorting table. It is essential to prevent loss of fine pitching and excess stems per tree, to thereby prevent abuse of the buttons and all circumstances that one way or another breach of the peace process, create downtime and lost causes economic to the company.

- Yields established within the company for this operation are Bonches average 15 per hour and can fluctuate depending on how quickly classifier / a at the time and the speed of supply to the embonchador / ay in the bonchador in assemble their respective branches, arming button type of the variety, the quantity to be in the same class and field to be undertaken.

- Transfer to Quality Control: the

transfer of Bonches is through a conveyor belt where you place the branches armed and moving to the area of quality control.

- **Quality control:** In this part of the process should start taking into account that the stems of roses are already a good amount of time without hydration and therefore should begin to speed the pace of the process if you want to have or a rose export quality. Regarding the time set by the company for this operation was established which will have the necessary time in which the person who will oversee the business.

- **Transfer to hydration:** This process is done in a quick and convincing. Fast by the fact that the predecessor to this operation, quality control, and meets in full the branches of the estate that is processed in this room and hydration results in the transfer to be done with the same speed with which it arrives the product, at the front desk of the quality control is placed bouquets and approved the same to be transferred to the respective tubs. Convincing by the fact that they make tubs with the parameters set by the production department, which must be met to the satisfaction of being fixed characteristics established by the customer when ordering

Traslado e hidratación de ramos

Análisis de los procesos del área de Post-Cosecha.



Abreviaturas de los cargos que ocupa el talento humano en los procesos de post-cosecha:

The abbreviations of the charges can be identified where we have the initials of each position so that they can identify process flows and designate them as directly responsible for each activity in their care

SIGLAS	SIGNIFICADO
ECCB	Encargado de Control de Calidad de Bonches
SP	Supervisor de Post-Cosecha
JP	Jefe de Post-Cosecha
AJP	Asistente de Jefe de Post-Cosecha
SFE	Supervisor de Frío Empaque
AFE	Ayudante de Frío Empaque
ECCB	Encargado de Control de Calidad de Bonches
ELB	Encargado de Ligar Bonches
EDB	Encargado de Deshojar Bonches
EPCB	Encargado de Poner Capuchón en Bonches
EDB	Encargado de Digitar Bonches
AUB	Ayudante de Ubicación de Bonches
APF	Ayudante de Pre-Frío
SPF	Supervisor de Pre-Frío
EFN	Encargada de Flor Nacional
AB	Asistente de Bodega
JS	Jefe de Sistemas

Tabla 5.1. Abreviaturas de los cargos del talento humano de Post-Cosecha.

Elaboración: Nataly Molina (Dic. 2011).

Líderes del Proceso: JP, AJP, SP

Description of process activities in Post-Harvest: Then describes the activities performed during the Post-

Harvest, the person responsible for each activity.

Actividades del Proceso		
N°	Actividad	Responsable
1	Bajar Mallas de Coches Registra y Pulverizar(Recepción)	SPF
2	Surtir y clasificar las mallas de acuerdo a la variedad	APF
3	Dotar de mallas de rosas a las clasificadoras/ers	Patinador
4	Clasificación	Clasificador/a
5	Sacar mallas vacías y Limpiar	Limpiador/es
6	Tomar flor Nacional y Ubicar en el sitio correspondiente.	EFN
7	Surtir el puesto de material	Bonchador/es
8	Bonchar la flor en las mesas	Bonchador/es
9	Controlar calidad de los bonches	SP/ECCB
10	Cortar los tallos de los bonches	ECCB
11	Realizar el deshoje y ligar de los tallos de los bonches	ELB
12	Colocar capuchón a los tallos de los bonches	EPCB
13	Ingresar al sistema los bonches y ubicar en las tinas	EDB/AUB
14	Ubicar los Bonches en el cuarto Frío	SFE/AFE
15	Ubicar los pedidos en un sitio adecuado	SFE
16	Empacar bonches y Cargar al furgón	AFE

Tabla 5.2. Descripción General de Actividades de los Procesos de Post-Cosecha. Elaboración: Nataly Molina (Dic. 2011).

Process tree diagram Postharvestthe

activities of their leaders that exist within each process. Thus easy to visualize the whole process of post-harvest see graphs

Mapeo de Procesos Actuales.

DESCRIPCIÓN	SIMBOLO	CANTIDAD
Operación		24
Inspección		5
Almacenamiento		2
Transporte		9
Demora		2

Tabla 5.3. Resumen de las actividades del diagrama de flujo del proceso. Elaborado por Nataly Molina

Áreas en cultivo	M recorridos Por Área Camino Central (Post-Fin a Cada Área)	m totales en cada recorrido por área (Recorrido de todos los bloques)	Total metros recorridos desde cada área (recorrido de todos los bloques) hasta post-cosecha
	m	m	m
Área Uno	266	1838	2104
Área Dos	351	1034	1385
Área Tres	460	498	958
	620	578	1198

Tabla 5.4. Resumen de metros recorridos de los cocheros al recolectar las mallas de flor y llevarlas a post-cosecha. Elaborado por Nataly Molina

CHAPTER VI

TIME AND MOTION STUDY IN THE ACTIVITIES OF CLASSIFICATION AND BONCHEO, PROPOSED STANDARDIZATION AND IMPROVEMENT IN THE PROCESS OF POST-HARVEST.

FLORELOY Company, along each year has a balanced production, dates, Valentine and Mothers Day where

Collection of Information.

- Variety of blocks in the crop (Raw Material Post_Cosecha)
- Classification of varieties by their characteristics in easy and difficult.
- Direct labor and indirect

there are peaks of production, making it necessary to analyze the times and especially critical processes of classification and boncheo.

Classification and Boncheo.

For the time study was designated classification activities and boncheo

Postharvest.

- Current Yield Boncheo activities and Classification

Application Timing Technique for taking time in activities

clasificación. Toma boncheo and stopwatch to time with the activity of boncheo

Trabajador	# Actividades Improductivas	% Actividades Improductivas	# Actividades Productivas	%Actividades Productivas
Aida	6	14%	38	86%

Beatriz	4	8%	46	92%
Javier	7	18%	38	84%
Sandra	5	11%	40	89%
Lupe	6	16%	31	84%
Total	28	13%	193	87%

Tabla 6.1. Resumen del Muestreo del trabajo. Elaborado por Nataly Molina.

En conclusión nuestros valores aproximados de p y q son:

p	13%
q	87%

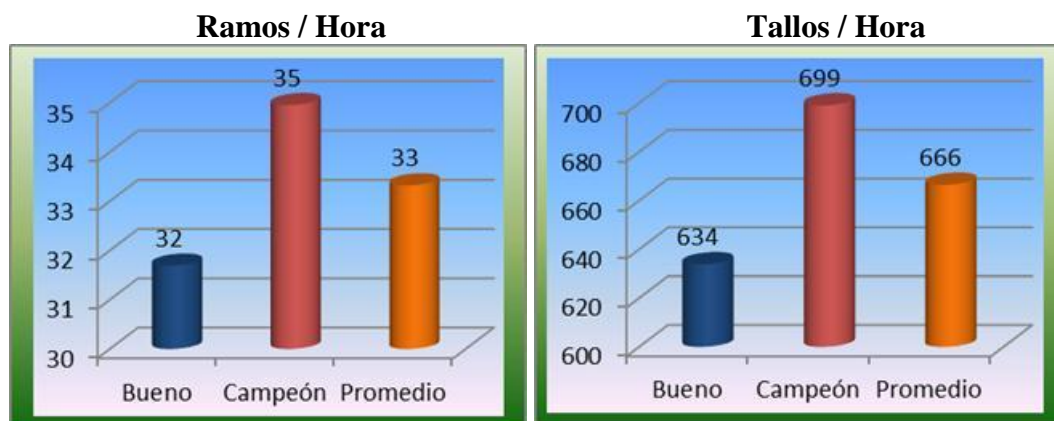
Calculo del número de muestras para la actividad de boncheo

Calculo:

$$n = \frac{1,964^2 * 13 * 87}{10^2} = 31 \text{ observaciones aproximadamente para la actividad de boncheo}$$

– Actividad de Boncheo ramos de 20 tallos

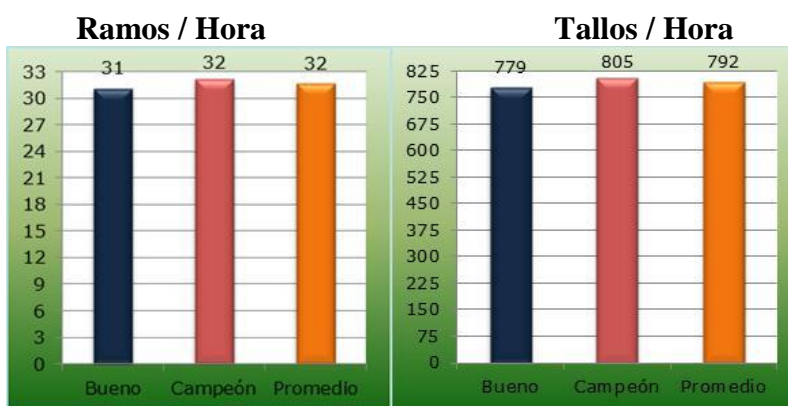
De acuerdo a nuestros cálculos el tiempo estándar para la actividad de bonchar ramos de 20 tallos es de 1,80 min/ramo, con un promedio de 33 ramos / hora y 666 Tallos/hora,



Ramos/Hora y Tallos/hora promedio como estándar en boncheo de ramos de 20 tallos. Elaborado por Nataly Molina

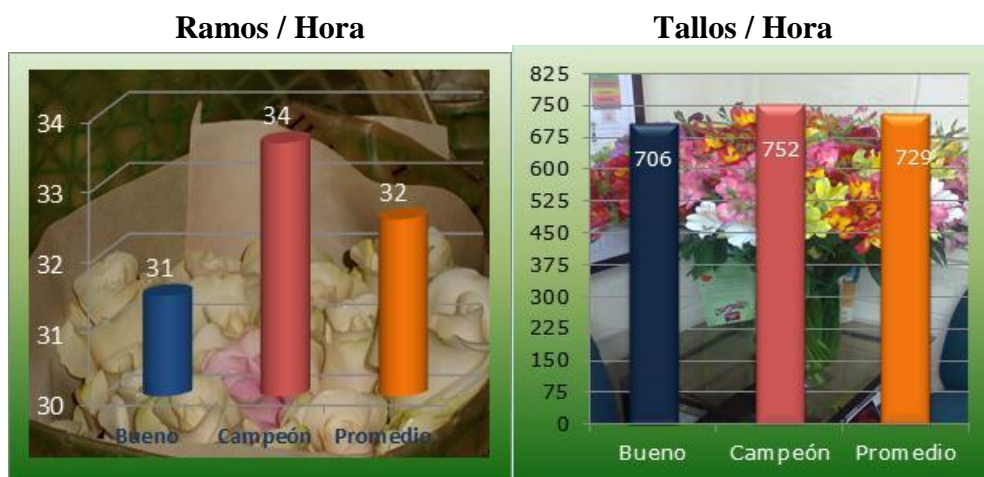
– Actividad de Boncheo Ramos de 25 Tallos

De acuerdo a nuestros cálculos, tabal 6.15., el tiempo estándar para la actividad de bonchar ramos de 25 tallos es de 1,89 min/ramo, con un promedio de 32 ramos / hora y 792 Tallos/hora,



Ramos/Hora y Tallos/hora promedio como estándar en boncheo de ramos de 25 tallos.
Elaborado por Nataly Molina

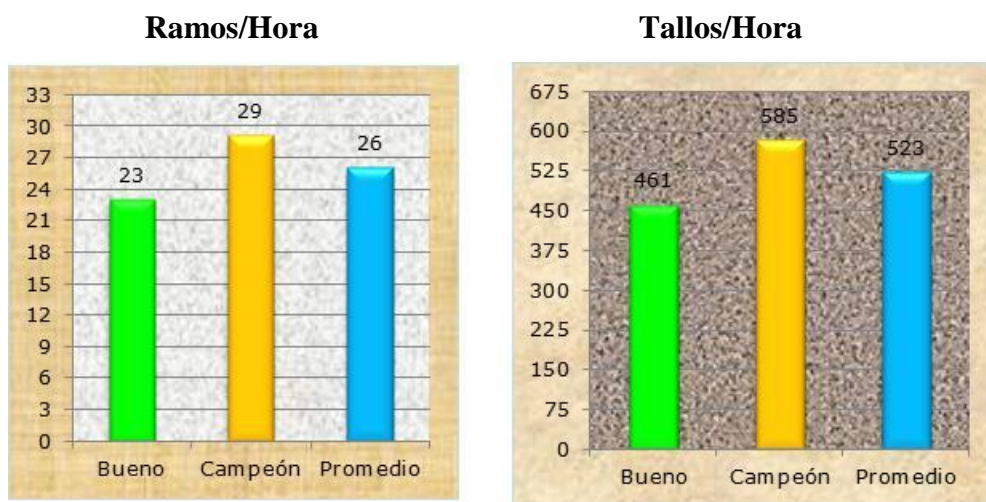
Resultados promedio entre ramos de 20 y 25 tallos:



Gráfica 6.1. Ramos/Hora y Tallos/hora promedio como estándar en boncheo de ramos de 25 y 20 tallos. Elaborado por Nataly Molina.

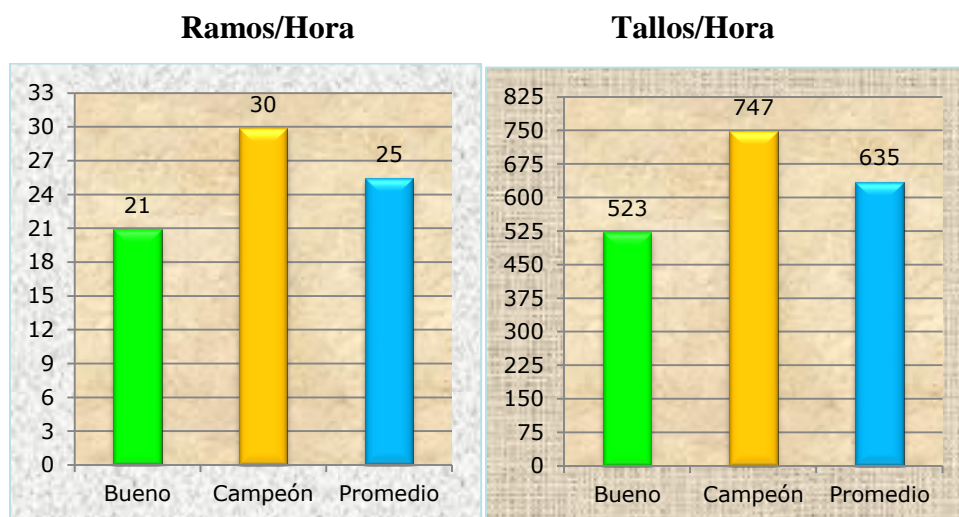
Datos recolectados en la toma de tiempo con cronometro de la actividad de boncheo en la mesa actual de trabajo.

- Actividad de Boncheo ramos de 20 tallos.



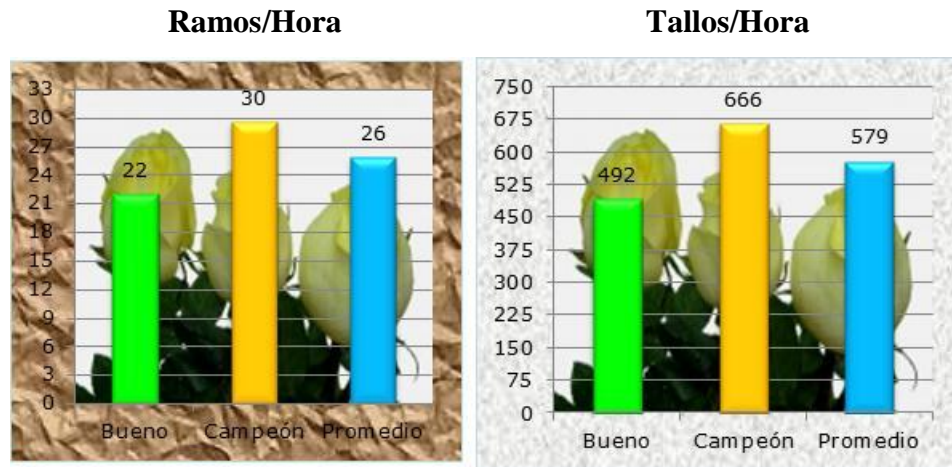
Gráfica 6.2. Ramos/Hora y Tallos/hora promedio como estándar en boncheo de ramos de 20 tallos-mesa actual. Elaborado por Nataly Molina

– Actividad de Boncheo ramos de 25 tallos en la mesa actual.



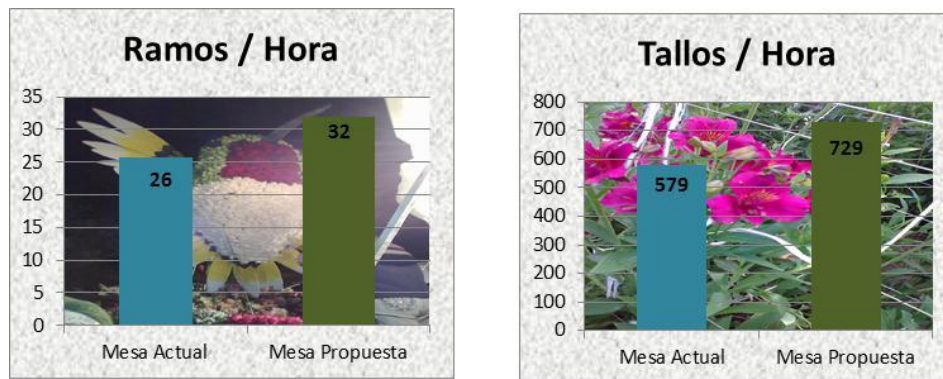
Gráfica 6.3. Ramos/Hora y Tallos/hora promedio como estándar en boncheo de ramos de 25 tallos-mesa actual. Elaborado por Nataly Molina

Resultados del promedio entre la actividad de boncheo de ramos de 20 y 25 tallos en la mesa actual del proceso.



Gráfica 6.4. Ramos/Hora y Tallos/hora promedio como estándar en boncheo de ramos de 25 y 20 tallos-mesa actual. Elaborado por Nataly Molina.

Resumen del incremento de la productividad en la actividad de boncheo aplicando la propuesta de mejora.



Gráfica 6.5. Resultados de la acción de mejora en el boncheo. Elaborado por Nataly Molina.

With the implementation of the improvement we obtain an increase of 26 branches to 32 branches per hour embonchados ie each person per hour increased 6 branches.

To reach these results make some changes in the pattern of daily work of those involved:

The current bench is not correct as can be seen in the graph 6.11. It is therefore recommended that ergonomics table it can be seen in the graph 6.12. It eliminates the action of the worker to move from their jobs to the storage of materials, as the time taken to do this is described in Table

6.22 where we analyze the worker in a work day time shifts 3 7 minutes and employs in its position supplying the material so that it loses about 21 minutes in the day, using the tables move this action is eliminated and is used to perform time-optimized about 9 Bonches more as required.

Tiempos de Desplazamiento empleado por el trabajador en ir al almacén de material y surtir su puesto de trabajo.			
# de veces promedio que se desplaza la persona durante su jornada de trabajo a solicitar pedidos.	Tiempo empleado en dirigirse a solicitar el tipo de pedido de acuerdo a la variedad clasificada.(Min)	Tiempo Total Empleado en solicitar el pedido por variedad (Min)	# de Ramos que se pueden realizar en este tiempo
3	7	21	9,1

Tabla 6.2. Tiempos de Desplazamiento empleado por el trabajador en ir al almacén de material y surtir su puesto de trabajo.

They also remove the action to request the administrative orders by the people responsible embonchan to see on the computer and report orders by variety and customers.

In detailing the time spent by embonchadores to perform the action before explained,

Tiempos de Desplazamiento empleado por el trabajador de boncheo a solicitar pedidos a realizar según las variedad de flor en espera.			
# de veces promedio que se desplaza la persona durante su jornada de trabajo a solicitar pedidos.	Tiempo empleado en dirigirse a solicitar el tipo de pedido de acuerdo a la variedad clasificada.(Min)	Tiempo Total Empleado en solicitar el pedido por variedad (Min)	# de Ramos que se pueden realizar en este tiempo
4	5	20	9

Tabla 6.3. Tiempos de Desplazamiento empleado por el trabajador de boncheo a solicitar pedidos a realizar según las variedad de flor.

1.1.1.1. Toma de tiempo con cronómetro para la actividad de clasificación

Trabajador	# Actividades Improductivas	% Actividades Improductivas	# Actividades Productivas	%Actividades Productivas
Diego	9	20%	36	80%
Olga	7	15%	40	85%
María	10	22%	35	78%
Blanca	8	18%	36	82%
Delia	9	23%	30	77%
Total	43	20%	177	80%

Tabla 6.4. Resumen del Muestreo del trabajo clasificación. Elaborado por Nataly Molina.

SSE also remove the action to request the administrative orders by the people responsible embonchan to see on the computer and report orders by variety and customers.

In detailing the time spent by embonchadores to perform the action before explaine

p	20%
q	80%

Calculo del número de muestras para la actividad de clasificación

Calculo:

$$n = \frac{1,964^2 * 20 * 80}{10^2} = 62 \text{ observaciones aproximadamente para la actividad de clasificacion}$$

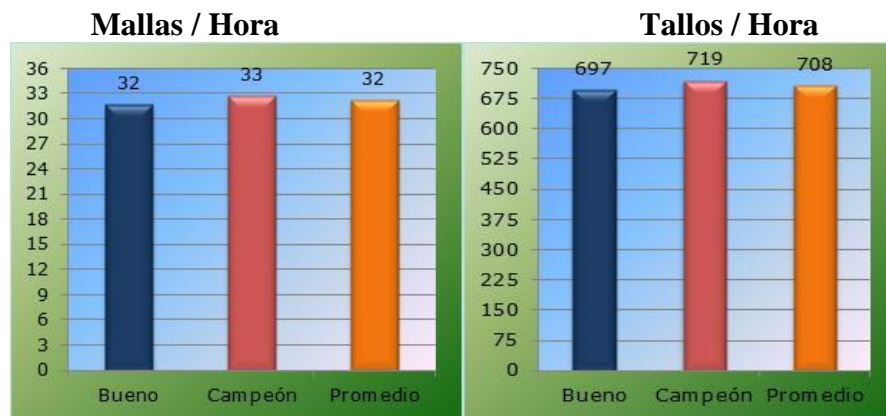
Datos recolectados en la toma de tiempo con cronometro de la actividad de clasificación.

- Clasificación de variedades de flor identificadas como fáciles

Cálculo de suplementos para la actividad de clasificación.

For the first element have 12% of additives, in the second element are 14% of supplement.

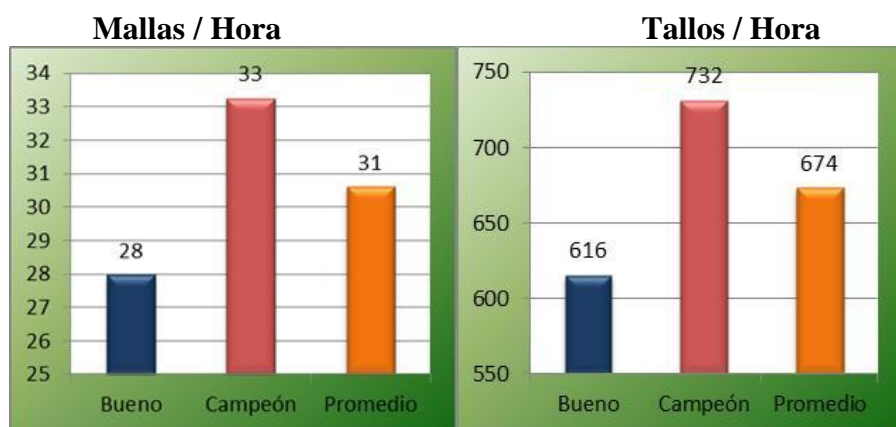
The standard time for the activity easy classification of varieties is 1.86 min / field, with an average of 32 mesh / hour and 708 stems / hour,



Gráfica 6.6. Mallas/Hora y Tallos/hora promedio como estándar en clasificación de variedades fáciles. Elaborado por Nataly Molina

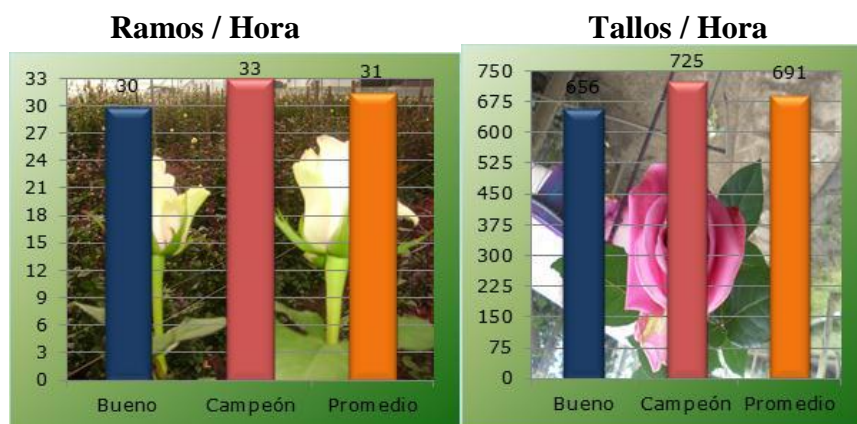
- Clasificación de variedades de flor identificadas como difíciles

The standard time for the activity of classifying varieties difficult is 1.97 min / field, with an average of 31 mesh / hour and 674 stems / hour, we see in Figure 6.10., We find performance data or productivity worker (meshes / hour and stems / hour) qualified well, champions.



Gráfica 6.7. Mallas/Hora y Tallos/hora promedio como estándar en clasificación de variedades difíciles. Elaborado por Nataly Molina

Resultados del promedio entre la actividad de clasificación de variedades fáciles y difíciles.



Gráfica 6.8. Mallas/Hora y Tallos/hora promedio como estándar en la actividad de clasificación. Elaborado por Nataly Molina.

Resumen de tiempos estándar de las actividades de boncheo mesa recomendada y clasificación.

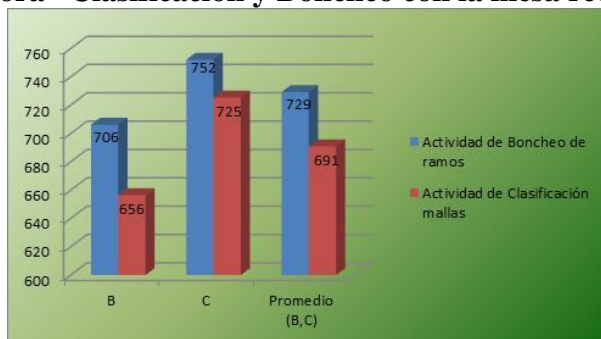
Actividad de Boncheo de ramos			
Tipo	Min/Bonche	Tallos/Hora	bonch./hr
B	1,91	706	31
C	1,79	752	34
Promedio (B,C)	1,85	729	32

Actividad de Clasificación mallas			
Tipo	Min/Caja (malla)	Tallos/Hora	mallas./hr
B	2,02	656	30
C	1,82	725	33
Promedio (B,C)	1,92	691	31

Tabla 6.5. Tallos Procesados por hora de Clasificación y Boncheo Mesa Recomendada. Elaborado por Nataly Molina.

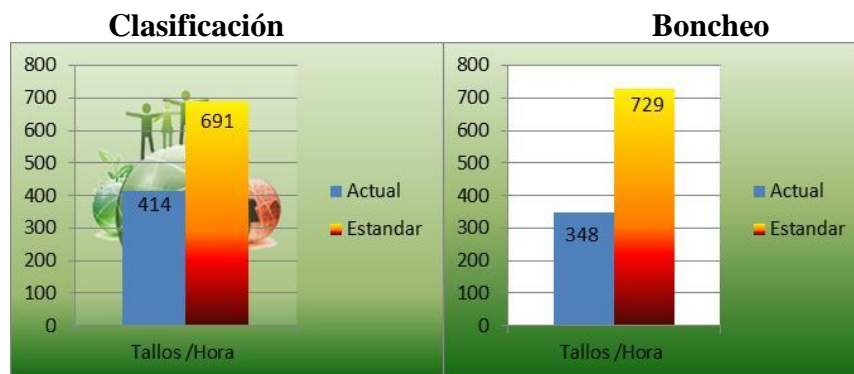
Podemos observar el resumen en la gráfica

Tallos / Hora –Clasificación y Boncheo con la mesa recomendada



Gráfica 6.9. Tiempo estándar Tallos/hora Clasificación y Boncheo mesa recomendada. Elaborado por Nataly Molina.

Datos de rendimiento actual y propuesto (estándar) en las actividades de clasificación y Boncheo mesa recomendada.



Planificación y Control de la Producción en Post-Cosecha

Planificación de la Mano de Obra de las actividades de Boncheo y Clasificación

Boncheo:

$$\text{Productividad Proceso Boncheo (Eficiencia)} = \frac{17}{26} * 100\% = 65,38\%$$

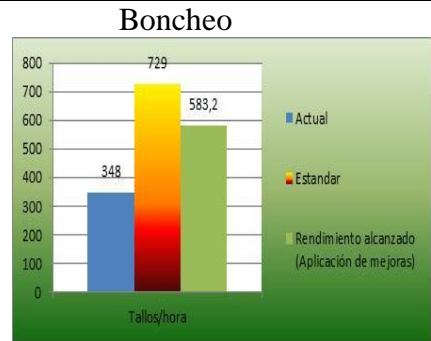
Clasificación

$$\text{Productividad Proceso Clasificación} = \frac{18}{31} * 100\% = 59,89\%$$

Analysis of Results

In the current process works boncheo to 48%, which is due to existing bottlenecks and delays in the quality control and factors such unnecessary activities taking preventive action, corrective and improvement is achieved in 80% yield boncheo activity.

Cuadro Resumen			
	Tallos/Hora	%	Incremento %
Estándar Empresa	382,5	65	Línea base
Estándar Propuesta Incompleta	579	79	14
Estándar Propuesta Completa	729	95	30



Acciones Correctivas y Preventivas Para la Mejora Continua en el área de Post-Cosecha.

Acciones correctivas:

1. Información veraz y Oportuna:
2. Mesas Ergonómicas:

Resultado análisis Causa – Efecto para la acción de Boncheo



Gráfica 6.10. Diagrama Causa –Efecto: Variación del rendimiento en la actividad de boncheo, Elaborado por Nataly Molina.

Análisis de la mesa actual en la acción de boncheo y la mesa prototipo para la mejora del rendimiento:

Fotografías de la mesa actual:



Área colindante con la banda transportadora

Parte frontal de la mesa

Gráfica 6.11. Fotografías de la mesa de boncheo actual en Post-Cosecha, Elaborado por Nataly Molina.

Mejora-Prototipo: Mesa ergonómica y adaptada al método de trabajo actual para la actividad de boncheo.



Gráfica 6.12. Fotografías de la mesa de boncheo ergonómica y adaptada al método actual el boncheo en Post-Cosecha, Elaborado por Nataly Molina.

"The application of ergonomics is not only beneficial to workers (improvement of working conditions, safer and healthier) but also for the company (increased productivity)"

Desperdicio de material en Post-Cosecha

Variable Forma	Producción	Recursos	Ejemplo
Forma 1	Aumenta	Rebajan	Output goes from 100 000 to 130 000 stems, reducing the use of 900 hours, then its productivity is 144.44 stems / hour
Forma 2	Aumentar	Iguales	Output rises from 100 000 to 120000 stems and times remain the same, or 1000 hours, so as to obtain a productivity of 120 stems / hour

Forma 3	Igual	Rebajan	The output remains at 100 000 and the stoop of the 100th hour to 900 hours to a productivity of 111.11 stems / hour
Forma 4	Rebaja	Rebajan en >%	The production cut stems 100 000 90 000, this equates to a reduction of 10%. Stoop of 1000 hours to 800 hours which equates to a reduction of 20% of the hours. In this way the productivity is equal to 112.5 stems / hour
Forma 5	Aumenta	Aumentan en <%	Output increases from 100 000 to 115000 stems, equates to an increase of 15% of production. The hours also increased, from 1000 to 1050 hours, representing an increase of 5%. The productivity is equal to 109.52 stems / hour

Tabla 6.6. Formas de Incrementar la productividad y eliminación de desperdicios . Elaborado por Nataly Molina.

Preventive action in the quality control section.

In all the process activities of flowers is important to product quality, service and price, when there is poor quality in any area of organizational errors and mistakes of all kinds.

For example (The data are random): During a week of harvest were obtained but only 142000 160000 stems stems were free of defects.

$$\text{Efficiency} = 142000/160000 * 100 = 88.75\%$$

The efficacy was 88.75% is the% meeting the target with stems of good quality, indicating that efficacy did not meet the quality.

Another example of control is the measure of success can be seen in: The development of branches suppose for a day of work produced 350 lines of which 250 branches are of good quality.

$$\text{Efficiency} = 250/350 * 100 = 71.14\%$$

This means that 71.14% of the branches are made of good quality. Also provides a format where developed to identify the defects and branches placed on it which will help control the previous variants.

Mapeo de PROCESOS adecuados.

Diagrama de flujo del Proceso Recomendado.

DESCRIPCIÓN	SIMBOLO	CANTIDAD
Operación	○	20
Inspección	□	5
Almacenamiento	▽	1
Transporte	⇒	8
Demora	D	2

Resumen de las actividades del diagrama de flujo propuesto

Propuesta de Eliminación de actividades Innecearias en Pre-Frío.

Cálculo de Ahorro de la acción innecesaria en Pre-Frío: “Colocar las mallas pulverizadas en las tinas móviles”.

# Mallas promedio (Equivalente al llenado de una tina móvil)	Tiempo empleado en coger la malla de la tina de recepción y colocarla en la tina móvil.	
	s	min
16	25,12	0,41867

Tabla 6.7. Tiempo Empleado en la actividad a eliminar.

El promedio obtenido por las diferentes muestras, es decir que la persona a cargo de llenar una tina móvil con mallas, empleará un tiempo promedio de 25,12 segundos o 0,42 minutos.

Tallos	Mallas	# viajes Tinias Móviles	Tiempo empleado en coger la malla de la tina de recepción y colocarla en la tina móvil.	
			s	min
30000	1363,636	85,2273	2140,91	35,681818

Tabla 6.8. Tiempo Empleado en la actividad a eliminar durante una jornada de trabajo y una determinada producción.

Horas empleadas				USD(\$)			
Día	Semana	Mes	Año	Día	Semana	Mes	Año
0,595	3,56818	15,46	185,5	1,002	6,0110305	26,05	312,6

Tabla 6.9. Análisis del costo del Tiempo Empleado en la actividad a eliminar.

The productivity of a company is the soul of it, ie quality tools is to see the company towards a fura, productivity is to look within and to analyze the performance of your current system. Here's an example to explain it better (The data are relevant).

Post-harvest processing 180,000 in one week shoots, employing 45 people who each work 40 hours.

$$\text{Productivity MO} = 180\ 000 / (45 * 40\text{hr-Man}) = 100 \text{ stems} / \text{hra_hombre}$$

Now suppose that the production increased to 280000 stems working 20 extra hours worked or 60 hours per worker.

$$\text{Productivity MO} = 270\ 000 / (45 * 60\text{RH-Man}) = 100\text{tallos}/\text{hra_hombre}$$

It is clear that production increased by 50% but did not increase productivity, this is

important especially when you have no awareness of productivity and its importance.

This often occurs in the Valentine season or seasons for the company are key times of increased production. This means that to meet a demand that is outside the resort to regulate the recruitment, overtime or send more support staff from other areas to meet demand and the required quality and comply with increased production and the company's thinking is that the price increase justify the extra cost but we have not really achieved a higher productivity of operational performance.

Compliance with the quality and quantity is set to deliver something that companies should always do what they can not forget is that any disproportionate use of resources leads to be unproductive and uncompetitive in the sector.

Advantages of measuring productivity (primary indicator of each area of the company)

Getting to simplify the planning of company resources (schedule of activities, budget and production costs). Knowing the actual level of productivity and power compared to its competitors even have a competitive advantage. Strengthen the culture of measuring productivity in every area of the company thereby strengthening the continuous improvement of all resources used for the company. Coming to modify the level of productivity goals and specific strategies to reach the improvement of it. The measure creates a competitive action. Possible causes that prevent the improvement of productivity. survey data see Appendix No. 10)

Lack of motivation, confidence and initiative. People believe them to be more productive to allocate more work. Personnel management systems weaknesses (emotional instability, mistrust) Work methods studied (let the workers carry out their activities as they see fit, lack of tandardization).

Lack of training on productivity, continuous improvement and involvement in the mpany's strategic plan. Etc.in the company's strategic plan. Etc

CHAPTER VII

DESIGN OF A PROPOSAL FOR MONITORING PLAN FOR THE IMPROVEMENT OF THE PROCESS.

Control of continuous improvement Audits for Quality.

It is a systematic and independent examination to determine whether activities and results relating to the quality comply with the provisions previously established, and whether these arrangements are implemented effectively and are suitable to achieve objectives.

It is essential that the company is operating normally, with all personnel on location at the time of the audit, in order for the auditor to fill in a valid registration. If the company is not running and / or no production staff on location, the audit may be conducted. Please ensure that audit staff have the opportunity to tour the business and is adequately addressed in the areas of inspection.

Planning the Audit. Annual Program

The head of the department prepares the annual quality audit internal quality audit system that provides quality at least once a year. When necessary changes the frequency of audits considering:

Results of previous internal audits and division.

Where there are shortcomings in the quality of service.

Selecting the Audit Team.

The team conducting the audit consists of a lead auditor selected by the quality department head (who can be rotated in each audit) and internal auditors who are qualified by the head of quality if they meet the following guidelines:

Having completed high school or business career.

Approve the training course for internal quality auditor.

Approve training course lead auditor (who complies with this requirement may be appointed lead auditor).

Have completed a minimum of 12 months working in the company.

To ensure objectivity and impartiality of the audit of internal auditors should not be assigned direct responsibility over the area to be audited and may be supported by external auditors as it deems appropriate department head of quality in this case the external auditors shall submit a copy its proof of approval to the course of internal quality auditor or copy of approval certificate and documents lead auditor to validate her experience as an auditor. Upon completion of the audit will evaluate the performance of the auditor.

CONCLUSIONS

1. The standardization process facilitates the recognition of factors that alter our processes and are hard to notice at first glance. To standardize core business processes, results in a stable to generate consistent quality product according to customer needs and low cost. During the investigation and contact with other entities engaged in the production of roses, it was noted that many organizations, whose efforts have been unsuccessful in trying to implement improvement systems show serious reservations about the usefulness of standardization and fear, above all, bureaucratize your business and invest too many resources on tasks that do not provide any benefit.

2. With raised and documented processes from receiving to shipping, In the areas of pre-cold room and cold room. Contribution to the identification of unnecessary activities and resource optimization.

Removing activities

DESCRIPCIÓN	SIMBOLO	CANTIDAD
Operación	○	24
Inspección	□	5
Almacenamiento	▽	2
Transporte	⇒	9
Demora	D	2

DESCRIPCIÓN	SIMBOLO	CANTIDAD
Operación	○	20
Inspección	□	5
Almacenamiento	▽	1
Transporte	⇒	8
Demora	D	2

You get a better worker performance of 42 activities to 36 activities are reduced due to

Cuadro Resumen			
	Tallos/Hora	%	Incremento %
Estándar Empresa	382,5	65	Línea base
Estándar Propuesta Incompleta	579	79	14
Estándar Propuesta Completa	729	95	30

improved training and established processes.

1. With the improved flow chart flower cars in the cold pre eliminate handling activities and contact abuse, reducing the percentage of waste stems from abuse in the receipt of meshes in this area and disposal activities. To "take the mesh pulverized reception tubs and place them in mobile tubs" will optimize 35 minutes a day, worker fatigue and action handling reduced by a percentage that abuse stems, economically by eliminating this action and use the time spent on higher value activities optimizes the company approximately \$ 312 annually

Horas empleadas				USD(\$)			
Día	Semana	Mes	Año	Día	Semana	Mes	Año
0,595	3,56818	15,46	185,5	1,002	6,0110305	26,05	312,6

Análisis del costo del Tiempo
Empleado en la actividad
eliminada.

1. The time study in the activities of classification and data boncheo allowed to determine the basis for reaching performance standards but do not forget that you can not claim 100% of these standards, because there are factors affecting the performance and not can be controlled by the nature, for

example the weather. By having this information the Head of the standard can plan resources in time, labor and materials with greater control.

2. In boncheo activity made the change of the current bench table design improved, now has more space and better distribution of location of materials. with the new prototype of the bench took a sampling of performance data for the new standard for working conditions including most of the design of the table, eliminating unnecessary activities such as moving the person to source materials for three times a day, which is approximately 9 minutes per person, if also the elimination of the activity to request ordering information during the day is done according to the varieties that have worked, ocupándole about 9 minutes per person, taking these factors into account the results of the study were boncheo performance of 729 stems / hour during the test time of application of the new methodology could be identified chelates eliminate unnecessary second activity is not being carried out with which often hinders the process of return and therefore a yield of 579 stems / Time but we can still identify the improvement in performance.

3. With the proposed audit plan for improving the quality of the processes will remain a culture of compliance and follow up on deviations detected, it benefits more as performed periodically, because they keep better in the standards quality of the different processes. (See Chapter VII).

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"No job is so important, no service so urgent, that do not permit taking the time to do the job regardless of the quality, safety and environment."