

## Improved transport system, packaging in bakery companies

### Mejora del sistema de transporte, envase y embalaje en empresas panificadoras

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Received March 27, 2018; Accepted June 20, 2018

#### Abstract

To innovate and keep up to date in matters of marketing and product distribution has led to the constant development of supply chain management. In this sense, it is necessary to maintain a close relationship with suppliers of merchandise, raw materials and products. customers or distributors with the company itself, that is why nowadays ERP enterprise resource planning systems have become a fundamental part in small organizations and especially large companies; In this way, material requisitions (MRP) by their initials in English must satisfy the customer's demand at the same rate as the production level of the manufacturing lines. Therefore, the evaluation and proposal of improvement in the design and type of packaging and optimizing its physical and chemical characteristics based on Mexican standards and in the design of the transport, improving the delivery of the final product to the customer analyzing the box is carried out. teacher, the stacking, the management of the communication in the supply chain, the handling of the type of inventory and the processing of the orders for an ERP system and finally the redesign of the bakery plant in its production line. flour tortillas.

**Industrial processes, integrated production by computer, inventories, purchase, packaging, means of transport**

#### Resumen

El innovar y mantenerse actualizado en cuestiones de mercadeo y distribución de productos ha provocado que la administración de la cadena de suministro esté en constante desarrollo, en este sentido, es necesario mantener una cercana relación con los proveedores de mercancías, de materias primas y de los clientes o distribuidores con la propia empresa, es por ello que hoy día los sistemas de planificación de los recursos empresariales ERP (por sus siglas en ingles), han pasado a formar parte fundamental en las organizaciones tanto pequeñas y en especial las grandes empresas; dicho de este modo, las requisiciones de material (MRP) por sus siglas en ingles deben satisfacer la demanda del cliente al mismo ritmo que el nivel de producción poseen las líneas de fabricación. Por lo tanto, se realiza la evaluación y propuesta de mejora en el diseño y tipo de envase y embalaje optimizando sus características físicas y químicas en base a las normas mexicanas y en el diseño del transporte mejorar la entrega del producto final al cliente analizando la caja maestra, el apilamiento, el manejo de la comunicación en la cadena de suministro, el manejo del tipo de inventario y el procesamiento de los pedidos para un sistema ERP y finalmente realizar el rediseño de la planta de la empresa panificadora en su línea de producción de tortillas de harina.

**Procesos industriales, producción integrada por computadora, inventarios, compra, embalaje, medios de transporte**

**Citation:** GUTIÉRREZ-GARCÍA, Alfredo. Improved transport system, packaging in bakery companies. ECORFAN Journal-Republic of Cameroon. 2018, 4-6: 14-20.

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## Introduction

Proper packaging design, packaging and transport, is an essential part of the supply chain, as if taken from a customer perspective, we can identify that this will be focused on marketing, however, when this is done industrially it is focused on logistics (Bowersox, 2007). In this sense and anyway, these are always aimed at improving sales and lower costs. Put this way, the prospects for packing these aimed at meeting the need to improve the efficiency of the areas of transport and optimize cash resources, being these groups into a single unit, master box, container, pallets and others to take basis and propose the types of instruments for handling the materials are already mechanized, semi-automated and last and best instance, automated. And based on these needs, communication among those involved in the chain becomes substantial part of the context and the need to use tools to identify the products in each of the processes, somehow pass formulated barcodes, 2D, postcards, etc. ISBN Kanban cards within poka-yokes to create and eliminate possible confusion in the transfer, sorting, storage and delivery of products. In this connection, the method of transportation can be classified in rail, road, water, pipelines and air as shown in most cases direct consumer interaction and / or distributor may be considered according to its functionality and internal companies or external, ie, outsourcing logistics companies distribution as is the case of parcel delivery companies, this carrier type contract offer a wide variety of value-added services, such as sorting and sequencing products ,(Bowersox, 2007)

## Problem

A first visit in Panaderia Santa Teresita of the Child Jesus<sup>1</sup> was possible to observe that the flour tortillas product already has a design packaging and design of transport, however there is an area of opportunity to observe not have the ideals that requires the product as it is character food and has the potential to substantially increase sales if thoroughly evaluated indicators to restructure the production system and promote a strategy that suits the supply chain.

<sup>1</sup>Bakery St. Therese of the Child Jesus is located in Prolongation Cortazar 44, fractionation Guanajuato, 37800 Dolores Hidalgo, Guanajuato. Founded in 1999.

In turn, the company has machinery in top condition as shown in Figure 1,



**Figure 1** Machinery and plant distribution *Source: Bakery Santa Teresita of the Child Jesus*

## Packaging design

The container which has the product of flour tortillas are made from polypropylene which is a very effective for the preparation of bags containing material hygroscopic food as tortillas flour because they require special care to be a food product. It has dimensions of 12 x 15 centimeters. Container colors cover the entire area which prevents partial view of the product (common in similar products)



**Figure 2** Package of tortillas *Source: Bakery Santa Teresita of the Child Jesus*

## Packaging design

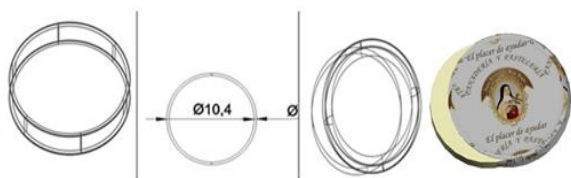
The company does not have is a packaging system, but only positions the finished product in a rigid container to prevent spoilage and easy storage in the mini stock at the time of outputting the product vendor that serves as distributed to retailers.



**Figure 1** Packing tortillas  
Source: Bakery Santa Teresita of the Child Jesus

**Improvement proposal**

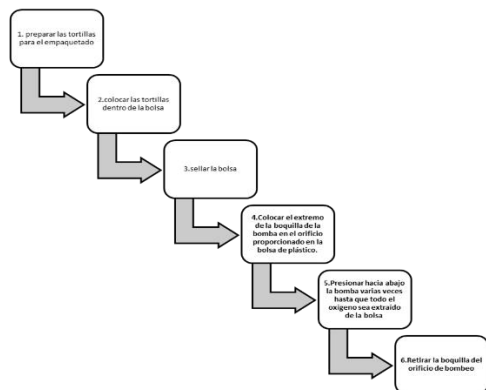
To improve the package has been chosen to design a novel and specific features system that give added value to the product, how cosiste to improve the image, keep it in top condition as long as possible and optimize their transportation to save space and thus lower costs in this connection in the image for the new container 4 flour tortillas shown.



**Figure 2** New package of tortillas  
Source: Authors

**Type and form of packaging**

The proposal is to realize a high vacuum to ensure that the product is retained for longer this method is to remove the air inside the packaging, in Figure 5 shows the steps for a good packaging using a hand pump due that if the product is packaged with an automatic machine could undergo various moisture damage since for its operation heat is used.



**Figure 3** High vacuum packaging  
Source: Authors

**Type and form of packaging**

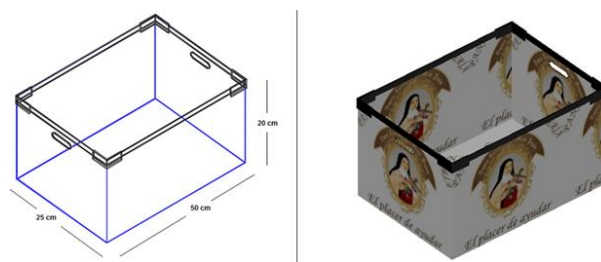
To prevent breakage of the product is placed alternative rigid plastic circular spacers inside the box as shown in Figure 6, this type of separator can be accommodated according to the diameter having the tortilla. The functionality is the separator will cover the product, so that when it is transported this does not move and lose its characteristics. The inner diameter of the inner packing is 20 cm in diameter, outer diameter of the separator is 22.5 cm. Considering the range that will give the tables within which estivos 5 packages were placed so that also the product is not compressed with both weight and flexibility of tortillas change, having a weight of 3.5 kg.



**Figure 4** Packaging with dividers  
Source: Authors

**Design master box**

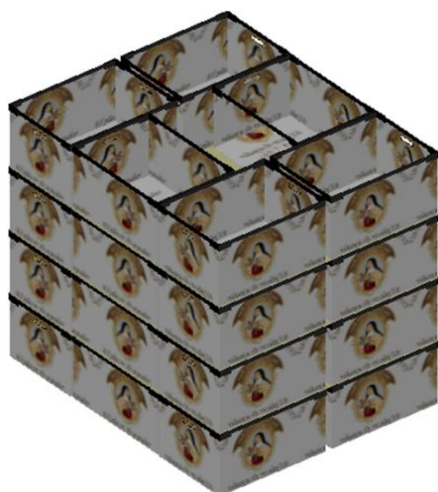
It consists of a rigid container measures 25 cm wide \* 50 cm long \* 20 cm high, with company logos around the container being also returnable type as it is intended that these reach the customer and serve as counter for product as shown in figure 7.



**Figure 5** Design master box  
Source: Authors

### Type stacking

For grouping into a single unit, master boxes are designed to be clustered in spiral, this provides greater stability when being transported to the retail customers and guarantee the integrity of the product to the end consumer, in this sense, this is shown in figure 8.



**Figure 6** Type stacking boxes teachers  
*Source: Self Made*

### Communication tolos

To achieve effective communication within the supply chain, it is necessary to generate codes serve as product identification and, in this sense, efficiency is reflected in the time, errors and costs. That is why each package will have a linear code Code 128<sup>2</sup> taking reference to the following obtain as shown in Figure 9.

- Customer No. 08
- Seller: 31
- Manufacturing date; 160618
- Expiration date: 300618
- Lot 97
- Contact Name: Jose Morales. (JR)



**Figure 7** Barcode for container  
*Source: Authors*

2d code allow these store more data than linear, in the sense that will be used in the master box and data to be used are as follows as shown in Figure 10.

- Customer No. 01
- Seller 03
- Manufacturing date; 160618
- Expiration date: 300618
- Lot 97
- Company: Abarrotes López
- Contact Name: Jose Morales. (JR)
- Phone: 01 418 182 6856
- Website:  
<http://panaderiasantateresita.mex.tl/>

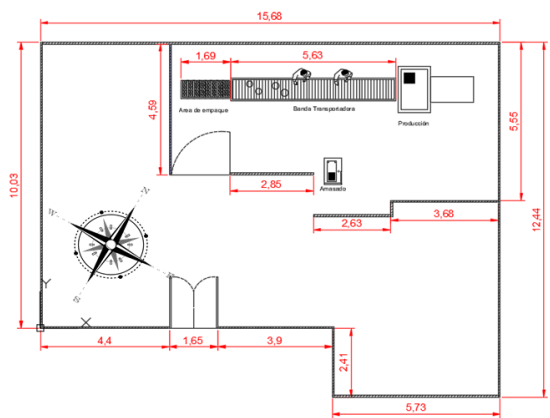


**Figure 8** 2d code for master box  
*Source: Authors*

### Plant design

Proposed to improve efficiency in manufacturing processes tortilla production system is based on the reorganization of the machines, body sense, start from left to right cyclically in the northwest of the production line until the area kneading for begin cooking of tortillas, then place the finished product in individual carton south area, locations that can be identified in figure 11.

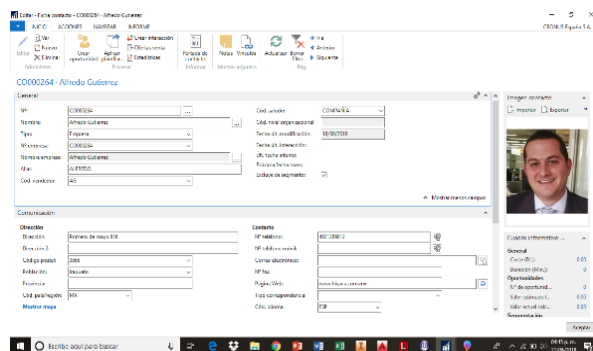
<sup>2</sup> Code 128 is a bar code that supports alphanumeric data which helps further customize communication in the supply chain.



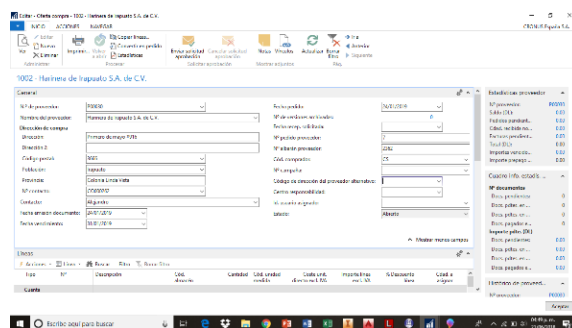
**Figure 11** Layout of the production area  
*Source: Authors*

**Order processing**

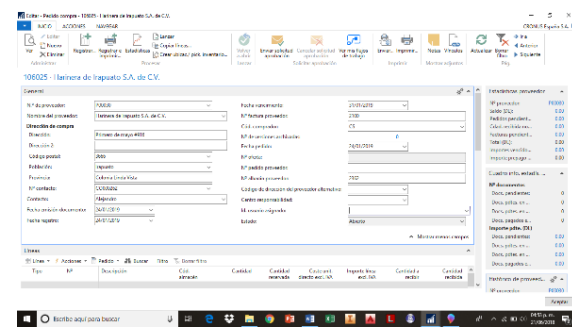
The supply chain management is increasingly geared to meet the needs of customers and suppliers, including them so that they work in one system, in this regard it is how you can integrate a CRM system<sup>3</sup> and SRM<sup>4</sup> to make the ERP<sup>5</sup> optimize the time download and upload information to the servers involved in the entire ordering process-manufacturing-distribution-sales and / or avoid losing time to be giving instructions to each of them, in this line technology plays a leading role, which is why this activity from being carried out by a computer software like Microsoft Dynamics NAV is. In this regard Figures 12 to 18 show how to use this technology in the company Panadería Santa Teresita of the Child Jesus.



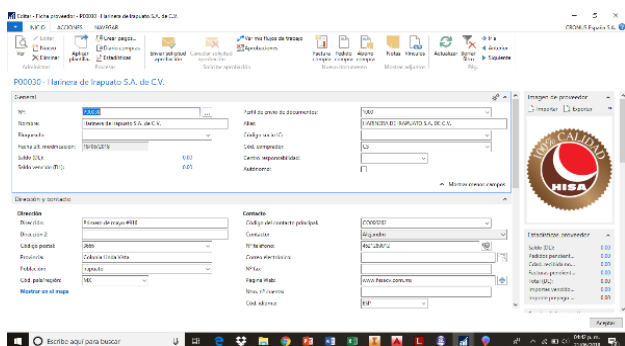
**Figure 10** Contact sheet  
*Source Provider: Authors.*



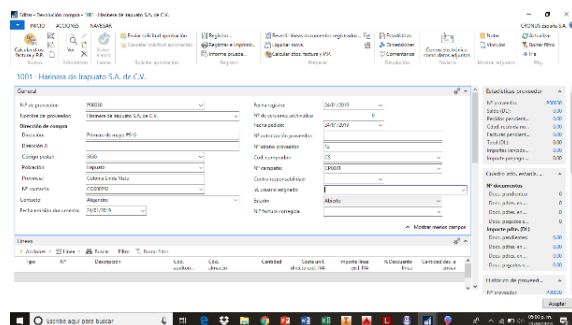
**Figure 11** Bid sheet supplier  
*Source: Authors.*



**Figure 15** Sheet purchase order to supplier  
*Source: Authors.*



**Figure 9** Provider tab  
*Source: Authors*

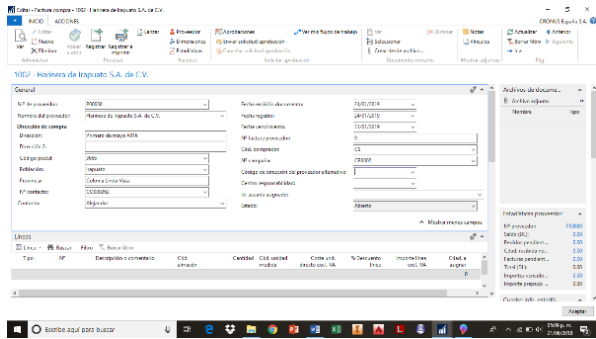


**Figure 12** Tab Return / customer / supplier warranty  
*Source: Authors.*

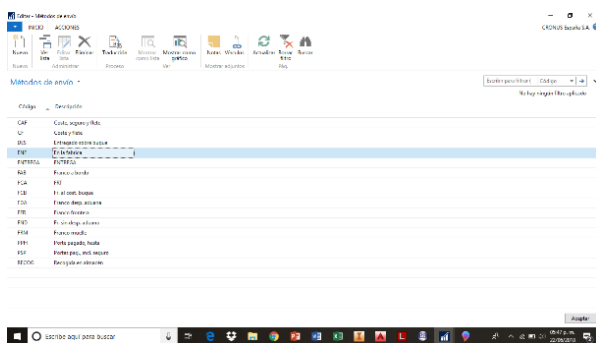
<sup>3</sup> CRM is based on relationships with customers, a management model throughout the organization and is in contact at all times with the client to check the status of your order administration.

<sup>4</sup> SRM is to manage relationships with suppliers, which works the same way as the CRM.

<sup>5</sup> ERP is an enterprise resource planning, this includes the CRM, SRM, Manufacturing, Human Resources, Accounting and others.



**Figure 13** invoice record customer  
*Source: Authors*



**Figure 14** Tab for shipping method customer  
*Source: Authors*

**Conclusion**

The creation of all indicators to have a supply chain in the logistics of materials, is an arduous activity and very complex, however, it is necessary to start with relevant actions for continuous improvement is exponential every moment and make it to state of maturity that requires the market today.

This section has proposed the design of some of the indicators that are basic part to begin, this is creating a better package that is attractive to the consumer and packaging affording an optimization of the master box will serve as transportation by taking into account the type and form of stacking order to streamline the spaces in the means of transportation and storage;<sup>6</sup>.

**Annexes**

The process of making flour tortilla in the company in question has the following range of activities:

**Kneading:** In this first part of the process, the flour ingredients of the formula (shortening, salt, oil, baking powder, conserplus, dirpogel, suaviplus, suavimul) stirring. About 20 minutes.



**Figure 15** Mixing of ingredients  
*Source: Bakery Santa Teresita of the Child Jesus*

**Boleo:** In this part of the process is given round cut to form the Testal [round]. About 45 minutes per item.



**Figure 20** Boleo flour  
*Source: Bakery Santa Teresita of the Child Jesus*

**Rest:** It is essential to let the dough before baking. Lasts on average 45 minutes this process.

<sup>6</sup> MRP is planning material resources needed to manufacture the products that the customer needs.  
ISSN-On line: 2414-4959  
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**Figure 21** Rest for fermentation  
Source: Bakery Santa Teresita of the Child Jesus

Pressing and firing: In this part of the process, press the Testal<sup>7</sup> to give the tables round shape.



**Figure 16** Training tortilla  
Source: Bakery Santa Teresita of the Child Jesus



**Figure 17** Cooking tortilla  
Source: Bakery Santa Teresita of the Child Jesus

Cooling: Is this part of the process, the tortilla for immediate packaging cools.



**Figure 18** Cooling tortilla  
Source: Bakery Santa Teresita of the Child Jesus

Packaging: With the cold tortilla and ready, packed in with custom packaging material company. And he settles into tray with 10 packs each.



**Figure 19** Packaged tortilla  
Source: Bakery Santa Teresita of the Child Jesus

## References

- Bowersox, D. (2007). *Administración y logística en la cadena de suministros* (2 ed.). Ciudad de México, México: McGRAW-HILL. Recuperado el 18 de Junio de 2018
- Jananía, C. (2008). *Manual de tiempos y movimientos Ingeniería de Métodos* (1 ed.). Ciudad de México, México: Limusa. Recuperado el 19 de Junio de 2018
- Microsoft. (20 de Julio de 2018). *Información general de Microsoft Dynamics NAV*. Obtenido de <https://dynamics.microsoft.com/es-mx/nav-overview/>
- Paz, R. (2008). *Canales de distribución: gestión comercial y logística* (3 ed.). Buenos Aires: LECTORUM-UGERMAN. Recuperado el 25 de Julio de 2018

<sup>7</sup> Testal is the ideal amount for the right size of the finished omelet weight.