



# Title: Optimization and improvement of the goods loading process in the transportation units

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# AGENDA

1. INTRODUCTION
2. METHODOLOGY
3. RESULTS
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5. CONCLUSIONS
6. REFERENCES

# 1. INTRODUCTION

This research work was carried out with the objective of optimizing and improving the process of loading the goods transported in a company that sells industrial products, where it was **required** to **diagnose** the shipping or departure area, pointing out the current problems of the company through from an Ishikawa diagram, Later the stages of the loading process were **identified** taking and recording the times carried out, **Likewise**; The items with the **highest** turnover and their **characteristics** were recorded, by **reviewing** historical loads, proceeding to the taking and recording of volumetric dimensions measurement in the; load units, to the packaging or boxes and wooden pallets with the support of a flexometer and the use of Hopewell Autocube 8200 (Volumetric measurements), through the use of AutoCAD some load simulations were carried out, comparing and **identifying** the empty spaces that They were left due to poor **arrangement, managing** to **optimize** them by increasing the amount of charge and this preventing the goods handled from being damaged during transport, in addition, an improvement in the times of **completion** of the stages of the **registered** process was **obtained** under constant supervision.

## 2. METHODOLOGY

### 2.1 Diagnosis of the Departures or Departures area

An Ishikawa diagram was **applied** to **identify** the problem in the area of shipments or **departures** of the goods, **considering** four aspects involved in the process of loading goods: assortment, method, personnel and supervision, **identifying** the **causes** and their impact on the company. , This results in the bad **arrangement** of pallets or pallets, the **packaging** (boxes) used in the load units and as a consequence; the **realization** of a slow process, empty spaces inside the loading unit, and not counting that the personnel in charge of carrying it out are not **supervised** in their process and are unaware of some important aspects such as; the volumetric measurements of the materials **involved**, shapes and weight of both the goods and the load units, wasting 100% of the **capacity** of the transport units to send the orders, as we can see.

# 2. METHODOLOGY

## 2.2. Measurement of times to carry out the preparation for the loading of goods.

**Table 1**  
**Record of times carried out in the Stages of the Preparation Process for the loading of goods**

<u>Stage of the process.</u>	<u>Time to be done</u>
1. Picking	5 hours
1. Picking authorization	5 minutes
1. Palletizing	20 – 30 minutes.
1. Empleado	15- 20 minutes.
1. Arrangement of goods in cargo 2. units	50 – 60 minutes.
<b>Total Time to Perform</b>	<b>6 hours 55 minutes.</b>

Source: Self made.

# 2. METHODOLOGY

2.3. Identification of the goods with the **highest** turnover in the company.

**Table 2**

*Goods with the highest turnover and their characteristics*

<u>No.</u>	<u>Name of Product</u>	<u>Features</u>
1	3m N95 Respirator	Disposable P / Powder.
2	3m Respirator	P / Vapores Organicos S..
3	Cartridge 3m	6000 Series For Steamers
4	Girdle Vallen 2500	Or W / Third Belt..
5	Overol Dupont Tyvek	C / Hood And Ela.
6	Headband Barricade	Standard Ama
7	Vallen 40h Boot	Brown C / C Steel Sole.
8	Facial Mica Vallen	Universal Clear.
9	Filter 3m N95	P / Particles And Neblin.

Source: Self made

# 2. METHODOLOGY

## 2.4. Measurement of internal and external dimensions of load units

**Table 3**  
*External dimensions of the unit and load capacity.*

<b>Load Units</b>	<b>Volume Capacity</b>	<b>Load Capacity</b>	<b><u>length</u></b>	<b><u>Width</u></b>	<b><u>Height</u></b>
<b>Single Axle Truck</b>	M3	3 Ton.	7.52 m	2.48 m	2.30 m

Source: Self made

# 2. METHODOLOGY

## 2.5. Volumetric measurement of packaging (Boxes) and pallets.

Table 4


*Internal dimensions of the unit and load capacity*

<b>Load Units</b>	<b>Volume Capacity</b>	<b>Load Capacity</b>	<b><u>length</u></b>	<b><u>Width</u></b>	<b><u>Height</u></b>
Single Axle Truck	M3	3 ton.	7.52 m	2.14 m	2.13 m

Source: self made.

Table 5


*Dimensions of the empty pallet or pallet*

<b><u>Pallet Image</u></b>	<b><u>Long</u></b>	<b><u>Width</u></b>	<b><u>Height</u></b>
	1.20 m	1.07 m	0.13 m

Source: Self made.

Table 6

*Dimensions of the Pallet or Platform with goods*

<b><u>Pallet Image With goods</u></b>	<b><u>Long</u></b>	<b><u>Width</u></b>	<b><u>Height</u></b>
	1.20 m	1.07 m	2.13 m

Source: Self made..

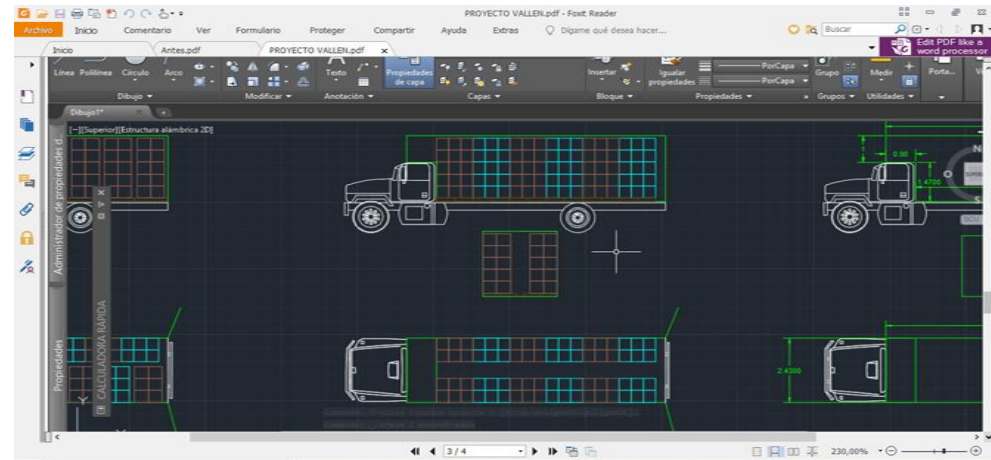


# 2. METHODOLOGY

## 2.6. ACCOMMODATION SIMULATIONS USING THE AUTOCAD TOOL

**Figure 5**

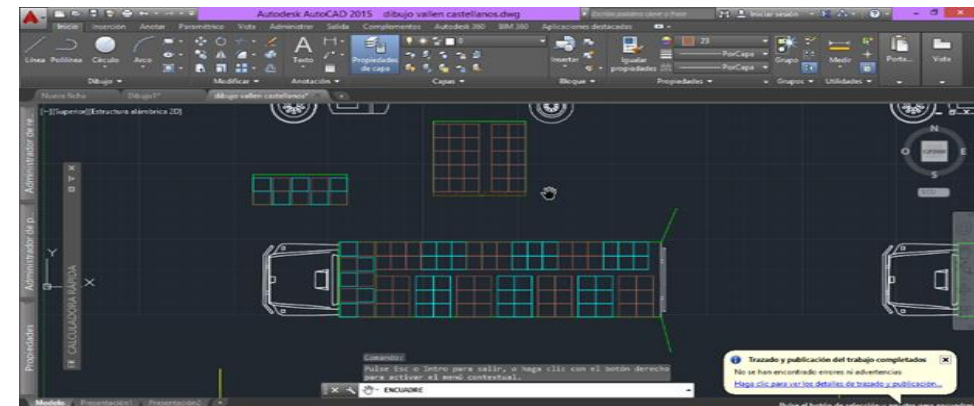
*Simulation of normal palletizing within the unit by the personnel of the area.*



Source: Self made...

**Figure 6**

*Simulation of the proposed arrangement of the palletization within the load unit.*



Source: Self made..

# 2. METHODOLOGY

## 2.7. COMPARISON OF THE TIMES TAKEN FROM THE CHARGING PROCESS UNDER SUPERVISION

Table 11

*Comparison of Times Taken in the stages of preparation for loading goods.*

<u>Stages of the process.</u>	<u>Previus Time Registered</u>	<u>Current Time Recorded</u>
Picking	5 hours	4 hours
Picking authorization.	5 minutes	5 minutes
Palletizing.	30 minutes	15 minutes
Emplayado.	20 minutes	10 minutes
Arrangement of merchandise METRI in cargo units.	1 hour	45 minutes
<b>Total Time Spent</b>	<b><i>6 hours 55 minutes</i></b>	<b><i>5 hours 15 minutes.</i></b>
<b>Time difference Obtained</b>	<b>1 hora con 40 minutos</b>	

Source: Self made..

# RESULTS

This research work highlights the **improvements** made to the stages of a process of loading goods from the area of shipments or **departures** to the charge units for transport and that; In addition, this process was carried out without constant supervision, generating some negative effects **such as** leaving empty spaces within the units, risking the safety of the products during the transfer, thus impacting productivity, making it difficult to achieve the objectives **established** in the company. **Nevertheless**; This demands constant **improvement**, optimization and **updating** of processes, to achieve extremely positive aspects and with great benefits for the company, offering better customer service as well as operating costs, for this case study, **improvements** were achieved with Support of simulations in AutoCAD, the loading of the **merchandise** in the unit, and by taking and recording times in each stage of the process, knowing the specific **characteristics** of the **merchandise**, its volumetric measurements, involving the personnel in charge of carrying it out, managing to increase the load capacity of the unit by 14% from 600 to 682 boxes of goods, by **rearranging** them, while in the recording of the times **occupied** in the **realization** of the stages of the process **executed** with supervision, an optimization was obtained of this in 1 hour and 40 minutes (21% less), with respect to the time usually carried out. **Although** this study was only **applied** to a specific process, taking into account the stages **involved** and **focused** on a company dedicated to the sale of industrial safety products, in subsequent studies other important **characteristics** should be **considered**, since; Each company has different qualities and needs to **contribute** to continuous improvement, optimizations, and adjust the **loading** maneuvers that they carry out.

# ANNEXES

THE 4 IMPORTANT POINTS THAT WERE CONSIDERED TO DETERMINE THE CAUSE

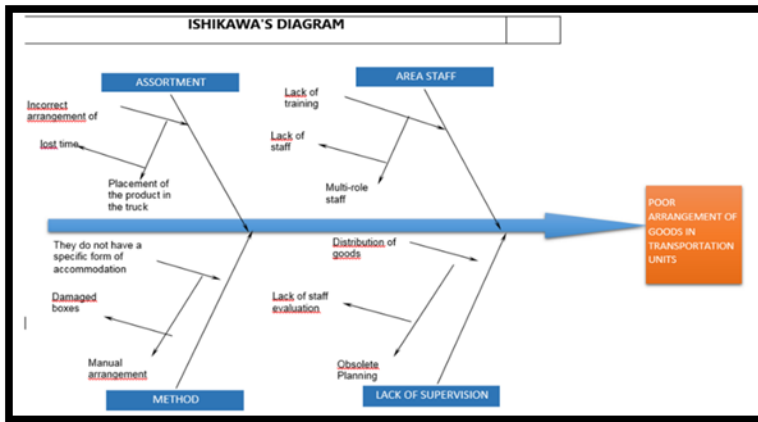
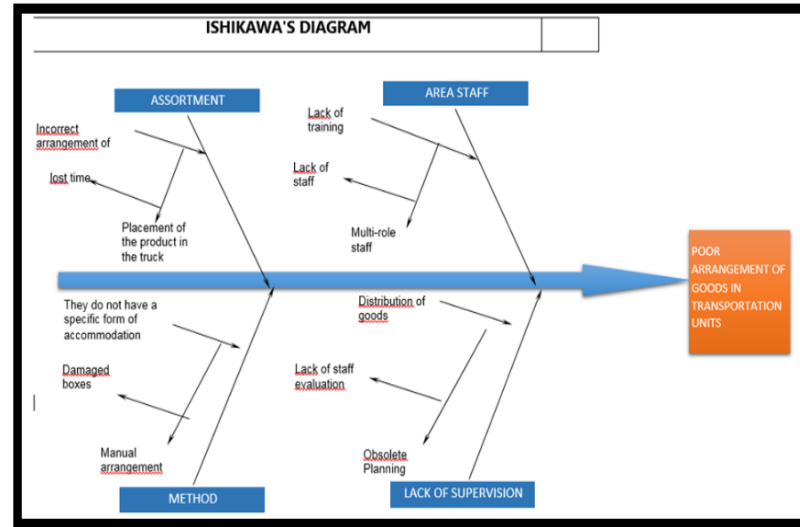


Figure 1  
Diagnosis of the Departures or Departures area



Source: self made..

# ANNEXES

some photographs taken for this research work



**Figure 4**  
*Image of the measurement of the dimensions of the boxes that are handled for the orders.*



**Figure 7**  
*Image of the normal arrangement of boxes in the company's cubing process.*



Source: Self made...

**Figura 2**  
*Image of the external dimensions of the Load Unit*



Source: Self made.

**Figure 10**  
*Image with the correct arrangement of the cubic capacity in the load unit*



Source: Self made,

# REFERENCIAS

- [1]. Escudero Serrano, M. J. (2019). Logística de almacenamiento 2. Ediciones paraninfo, SA.
- [2]. Espinoza Robles, L. E. (2020). Análisis de los riesgos asociados a la manipulación de mercancías y las medidas de seguridad para evitar incidentes logísticos.
- [3]. Ferrer, M., Ariza, Y., Martínez, J., Garizao, J., & Pulido-Rojano, A. (2019). Modelo de optimización colaborativo para la minimización de los costos variables de transporte de carga por carretera en Colombia. *Investigación y desarrollo en TIC*, 10(1), 26-36.
- [4]. González, M. J. S. (2018). Optimización de la cadena logística. COML0210. IC Editorial.
- [5]. Guzmán, G. C., & Serrato, R. B. (2018). Desarrollo De Un Método De Cubicaje Para Una Pyme En El Sur De Guanajuato. *Jóvenes En La Ciencia*, 4(1), 1438-1443.
- [6]. Jiménez Castillo, J., Bueno Solano, A., Jiménez Sánchez, J. E., & Cedillo Campos, M. G. (2015). Cubicaje y su efecto económico en el costo logístico del transporte y competitividad empresarial. *Publicación Técnica*, (440).
- [7]. Laza, C. A. (2019). Preparación de pedidos. MF1326. TUTOR FORMACIÓN.
- [8]. Maraví, G., Matuk, D., & Chong, M. (2019). Impacto de la infraestructura en las operaciones logísticas. *Gestión de carga y entrega de mercancías. Memoria Investigaciones en Ingeniería*, (17), 31-46.
- [9]. Oleas-Lara, C. X., Mazón-Fierro, G. J., & Carrasco-Zárate, E. D. (2020). Optimización del proceso logístico en el transporte y las operaciones de exportación mediante fórmulas matemáticas en los KPI's. *Dominio de las Ciencias*, 6(3), 756-773.
- [10]. Soto Correa, H. A., & Rivadeneira Naranjo, N. Y. (2019). Plan logístico de transporte de carga contenerizada para la Empresa Transcarprimen SA (Bachelor's thesis, Guayaquil: ULVR, 2019.).



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