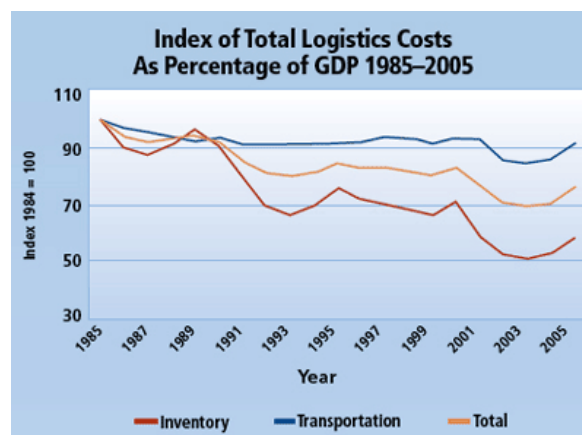


## LEAN LOGISTICS FLOW

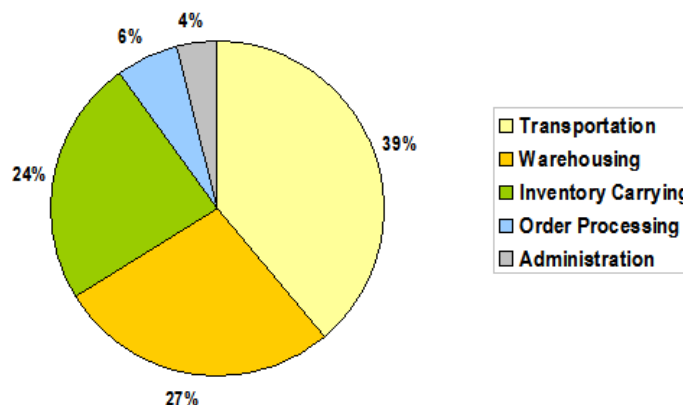
### OUR GOALS

Our first goal is to reduce **the total logistics costs** by increasing the speed as well as the flow of material and information. Waste and variation needs to be taken out from the Supply Chain.

Then the second goal is **visualize** where the waste is and **allocate resources** where the biggest opportunities for improvements are, so we can get the most out of them.



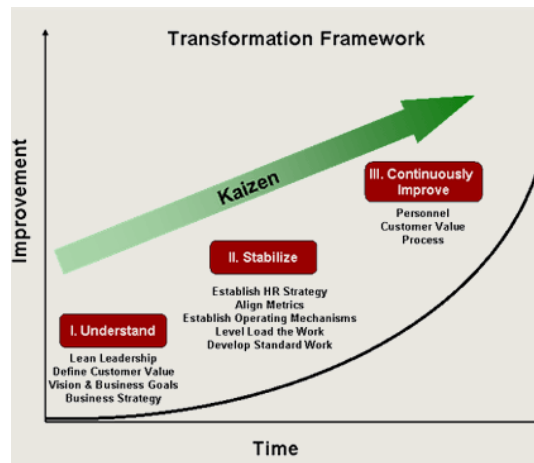
The main drivers of the logistics costs normally are transportation and inventory but the former has been having a great focus on the industry, but many times transportation costs are much higher than inventory costs. Further the external logistics normally has greater opportunity for cost reductions than internal logistics costs, but the main focus on industry also has been to improve internal logistics costs and stay there. We have a paradox in order to exemplify this of trying to squeeze more juice from an already squeezed orange. Probably we will not have much liquid available even if you apply a lot of force. This is the economic law of “decreasing benefits”.



World Wide Logistics Costs, 2002

[Escriba texto]

The third and also very important objective is to **improve the customer delivery** performance while also reducing the total logistics costs. For achieving this goal it is very important to apply lean tools and systemic improvement methods. The reason is that in the same system if we reduce inventory we normally affect the service to our customers, but in lean the challenge is to balanced inventories and improve service.



The fourth goal is to create a process for implementing **Kaizen** processes and never end the improving processes applying lean logistics tools at all levels of the organization. This is striving toward perfection endlessly.

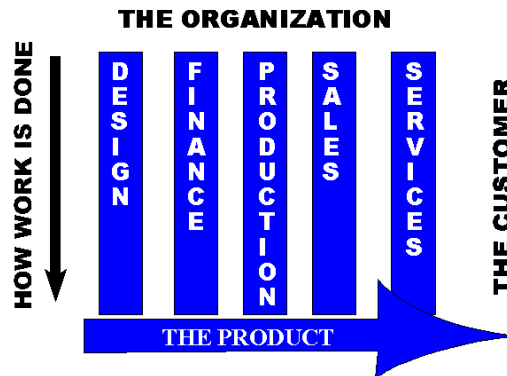
The fifth goal is to make the Supply Chain an "**Active**" logistics in which the customer has controlled over suppliers, 3PL's, custom brokers, etc. in such a way to being able to optimize the total logistics cost.

## INDUSTRY SITUATION

Normally lean implementation began by transforming the company into **lean manufacturing**. This implementation has followed internal lean logistics improvements. Many companies have being able to implement this but the majority of the costs are not pertinent only to manufacturing but to other areas like engineering, logistics, purchasing, finance, packaging, etc and these areas are rarely integrated in lean.

Departments have different objectives that many times affect the other areas. These **silos** work independently trying to achieve their goals many times affecting other areas more than the benefit they obtained. For example purchasing selecting a packaging based on lowest piece price and not taking into account the stackability. More cost will be incurred in transportation than in the piece price saving.

[Escriba texto]



Finally, lean is not **connected to external** manufacturing processes and external logistics. It is fundamental to connect Lean to the whole **Enterprise** that includes key business areas in which exist waste. Logistics is one of these key areas because it drives the whole supply chain cost and satisfies the customer requirements.



Normally the transportation is controlled by 3PL's (third party logistics) that normally have opposite objectives for the company. This means "The more they spend the more they earn". In this kind of management the logistics are normally run in a "**passive**" mode that means suppliers, 3PL's, custom brokers, customers, etc controlled our logistics but at a very high cost in transportation (utilization\*unit cost), inventory, customs, packaging, etc.

Inco-terms are set up with delivery at Buyer's Plant which limits the opportunities for improvements of the whole system. and obstructs further speed up of the material through consolidations, milk runs, etc. This is the concept of using a **Taxi or a Truck** Which mode is cheaper and better?.

The logistics management normally is focus toward keeping the operation running and doing many firefights. There is no organization (structure) for doing fundamental processes like logistics design, planning and control, so there is **no visibility** of possible cost improvements and **gap analysis** as well as standard **kaizen processes**.

Further lean is implemented to make **show** out of it instead of really focusing toward total logistics cost analysis. Many times lean implementers and leaders are evaluated by improvements around audits that are not really focus toward cost reductions and true total logistics cost reduction.

[Escriba texto]



## LEAN = ELIMINATION OF WASTE

**Corporate** leaves the plants alone only by giving few guidance, so every plant has to learn the hard way. No standardization exist about the systems implementation and processes. Many times corporate people do not understand fundamentals of lean logistics processes and some times forces wrong directions toward the plants. No scientific method is apply for improvement implementation (Plan-try-judge-standardized).

Some projects for cost reductions are focus on inbound logistics but many times outbound processes are more inefficient. The main issue is that **efficiency** is not normally measure or not measure correctly. Further, other logistic processes are not analyzed and controlled like reverse logistics for returnable packaging, etc.

Purchasing is focus toward getting the cheapest company by **unit base** and does not take into consideration the efficiency of the operation. Logistics companies run at low efficiency (cube and weight).

Normally, systems are very **disintegrated**. Excels are used for execution and kanban sizing and standard processes are not implemented to maintain these pull systems. MRP is still driving the supply part and forecast information for suppliers have a lot of variation due to wrong information and bull whip effects ("Garbage in garbage out2).

The weakest links need to be identified and improve in order to strength the whole supply chain.

## VISION

To become the preferred lean logistics consultant and advisor from our customer's perspective because of the value added to our customers.

## MISSION

Guide our customers on how to first identify opportunities for improving its supply chain and on how to implement lean logistics tools and systems in order to achieve the goals. We will advice and facilitate the changing process from traditional logistics management into lean logistics management.

## VALUES

Open communication to understand our customer's requirements first and act according to their needs.

Strive for continuous improvement in our lean logistics systems knowledge.

[Escriba texto]

Share all the possible useful lean knowledge to our customers in order for them to eliminate waste and add value to their supply chain.  
Honesty and respect for our customers, suppliers and employees.

## STRATEGY

### SYSTEM KAIZEN FIRST

Our strategy begins by doing a logistics assessment in both systems and information flow as well as in the physical material flow. The first goal of this assessment is to evaluate the level of stability of the supply chain as well as the level of penetration of the lean logistics principles in the whole supply chain. The second goal will be to identify the key area for pilot projects with the highest improvement potentials in the following areas including cost savings and performance improvements:

	Inbound	Make	Outbound
-Inventory levels and associated costs	X	X	X
-Transportation costs	X		X
-Workers productivity in Logistics	X	X	X
-Warehousing (fixed and variable)	X	X	X
-Packaging	X	X	X
-Reverse Logistics	X	X	X
-Service Level to Customers (failure costs)			X
-Customs and brokers costs	X		X
-Systems/Information	X	X	X
-Lot Size	X	X	X
-Set Up costs		X	
-Ordering Costs	X		X
-Material Handling (People, devices, etc)	X	X	X

Supply <----- Make -----> Deliver  
Inbound Internal Outbound

The common approach is to improve first internal logistics and internal material flow (make). This is due to the fact that here is where the real value is added.

The other approach is to identify the opportunities by the Outbound Logistics first or Customer logistics, then internal or make logistics and finally the supply logistics or inbound logistics. This is also following the pull logic Customer to suppliers.

Finally there are no rules about how to approach the lean logistics implementation and that is why VSM is so important to identify the biggest opportunities for improvements.

[Escriba texto]

At this point in time top management approval to continue the process is key. A team formation needs to be done, with leader and members. Training for the team in Lean Tools needs to be planned. Later a Value Stream Mapping needs to be done of the whole supply chain process from customer to supplier's in order to visualize problems & causes and potential opportunities to improve (Value Stream Assessment Kaizen). Here first material flow needs to be mapped and confirmed physically. Later information flow (causes and effects) needs to be mapped and also confirmed Physically. Processes also need to be categorized in order to identify opportunities for improvement in operation ( 6 sigma and other tools). Opportunities need to be segregated on internal and external scope as well as resources per benefit and the feasibility of the project needs to be evaluated (resources, control over, etc). Projects that can be executed with internal resources need to have priority number one. Issue/ Causes /Actions / need to be mapped out. Ishikawa tools could be used in order to understand root causes as well as 5 W's analysis. Specific Goals (targets) need to be identified and kaizen process need to be correlated.

Then a future value stream map or what it is also called a value stream design needs to be done for the whole supply chain including target state and goals (measurements). At this point in time priorities need to be given to the projects and leaders assigned to each project. A detailed plan needs to be done with action / sub-actions, responsible , time and target. Finally a detailed review meetings need to be established with follow up of the improvement and status of plan vs time. Activities behind need to have a corrective action , responsible and dates before follow up meetings.

On the other hand a clear strategy needs to be layout in order to implement lean logistics principles like system integration, pull system, total cost, flexibility, quality, standardization and visual management. On the other hand, employee involvement, employee empowerment, PDCA's and all the elements around people engagement and development need to be addressed. The most important part to manage is people: leadership, follow up roles, knowledge, attitude and orientation toward the "True North" are key. Top down strategy is a must and leaders need to "walk the talk".

Further a clear strategy toward teaching lean logistics tools and elements of the system needs to be also addressed and executed for all levels. People many times resist lean implementation improvements due to lack of knowledge. Pilot areas in which people apply the tools is fundamental, so experimentation of system improvements takes place in a controlled way ( or environment). Theoretical as well as practical training is a must and gives people the opportunity to see results. Lean logistics is learned 80% by doing it.

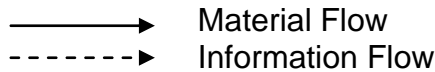
The process for System Kaizen is the following:

**IDENTIFY - INVOLVE - ANALYZE - IMPROVE - EXECUTE - JUDGE**

[Escriba texto]







The image shows a template for an A3 Summary Report, divided into two columns. The left column contains sections for:
 

- Title that summarizes problem**
- Background & Importance**: This section is only needed if the Title doesn't sufficiently define the problem, and any changes in demand.
- Current Conditions**: Graphs, numbers, and facts that clearly depict the AS IS state in a way that invites analytic questions. (Go to the gemba)
- Root Cause Analysis**: What are the root causes for problems? (Go back to the gemba; keep asking 'why?') Give us Root Cause Fishbone, or just keep answering 'Why?'
- Goals and Targets**: What specific outcomes are desired?

 The right column contains sections for:
 

- Target Condition**: Graphs, numbers, and facts that clearly depict the Desired state, and the gap between current & desired.
- Countermeasures**: Proposed actions to address each root cause; start with ALL ideas, then archive those that don't pass group evaluation.
- Implementation Plan**: Miniature summary of a more detailed Gantt or To Do List. Reviews are usually both periodic & upon completion.

## A3 Summary Report

## POINT KAIZENS SECOND

After the implementation of the system kaizens standards need to be established in the 3 key thing: Inventory, time (takt), flow - process steps, etc. Deviation from the defined standards need to be identified and attacked with a standard continuous improvement processes.

Standard → Visualization → Problem Identification → Analysis → Actions → Monitor

Why the problem happened?

Why the problem was not detected?

The other source of point kaizen is the ideas of the people about improvement processes.

## PREREQUISITES

In order to do a successful implementation of Lean Logistics tools it is desirable to have some stability in the manufacturing processes. It is preferred to have already implemented Lean Manufacturing. It is necessary to learn the tools to achieve the lean logistics.

### Basics

5's

Standards Operation Procedures

### Intermediate

Kanban

Pull System

Flow Layout

Cell Manufacturing

Jidoka (Autonomation)-Poka Yokus

VSM-VSD

SMED

[Escriba texto]



TPM

Visual Management

OEE

### **Advanced**

Leveling-Heijunka

2 Loops Heijunka

One piece Flow

Ship to Line

Ship to Truck

Ship to Supermarket

External Pull System (Maquilas)

Close PDCA Cycles for improvements

## **Basic Principles of Lean Logistics**

- Voice of the Customer (for every loop beginning from final customer).
- Lean Logistics Visibility (Inbound, Internal, Outbound)
  - +Level of Lean Penetration
  - +Level of Supply Chain Stability
- Value Stream Mapping (VSM)
- Value Stream Design (VSD) based on Lean Concepts
- Implementation Strategy and people involvement-empowerment
- Information flow mapping, Systems Integration
- Standardization, Transparency and CIP (Continuous Improvement Processes)
- Lean Logistics Implementation Strategy
- Measurement of Logistics Quality and Improvement Systems
- Total cost of ownership and total supply chain costs (Silos elimination)
- Holistic improvement approach
- Pull system & kanbans & Lean Systems Standardization-Utilization (Pull)
- Flexibility in the Supply Chain (volume and mix)
- Continuous flow of parts and information

## **LOGISTICS STRUCTURE**

### **External Logistics Source:**

Lean logistics model: Order Mgt.. Supplier Management, packaging (pallet), transportation management, logistics design, consolidation-cross docking, milk runs, delivery windows and yard management.

Prerequisites: Standardization of windows, frequencies, information, transportation routes, volumes, packaging, etc.

### **Logistics Design >>>> Logistics Planning >>>> Logistics Control**

Frequencies

Windows

Performance Monitor

Modes

Routes

Jidoka

Types

Control

Transportation Mgt

Consolidation

Pull System (Qty)

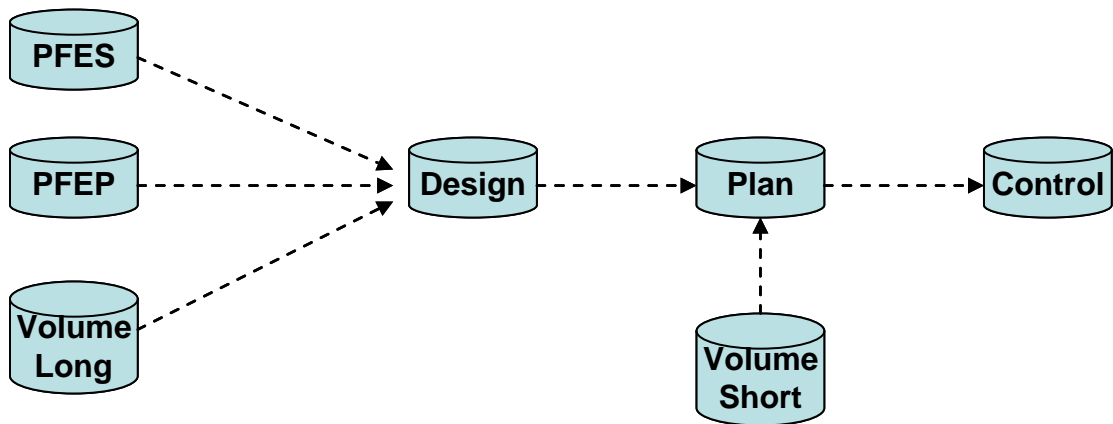
Info Flow

Packaging (PFEP) E&R

Supplier Location

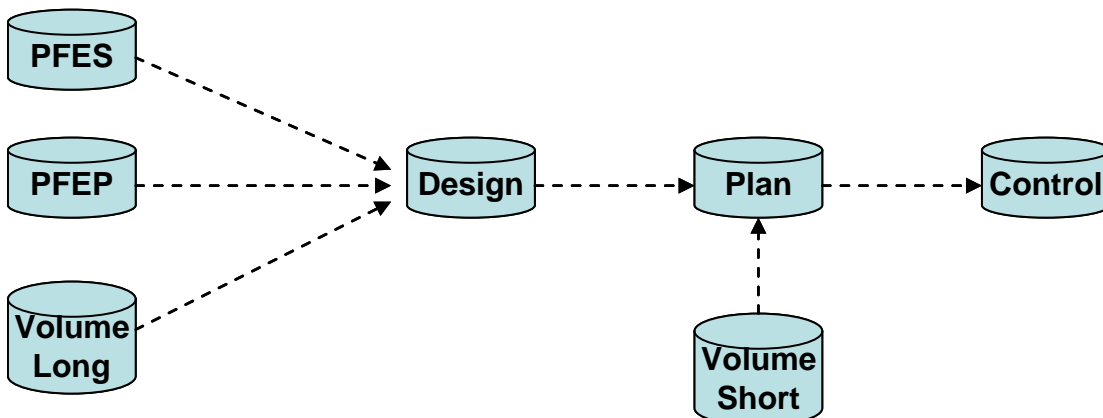
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Volume Plan  
Milk Runs



### External Reverse Logistics (Source)

<b>Logistics Design</b>	>>>	<b>Logistics Planning</b>	>>>	<b>Logistics Control</b>
Frequencies		Windows		Performance Monitor
Modes		Routes		Jidoka
Types		Volume-Pick		Transportation Mgt
Consolidation				Control
Info Flow				
Packaging (PFEP)				
Supplier Location				
Volume Plan				
Milk Runs				



### Key Principles Application:

- Logistics Visibility (Inbound)
- Value Stream Mapping (VSM)
- Value Stream Design (VSD) based on Lean Concepts
- Information flow mapping, Systems Integration
- Standardization, Transparency and CIP (Continuous Improvement Processes)
- Measurement of Logistics Quality and Improvement Systems

[Escriba texto]

- Total cost of ownership and total supply chain costs (Silos elimination)
- Pull system & kanbans & Lean Systems Standardization-Utilization (Pull)
- Flexibility in the Supply Chain (volume and mix)
- Continuous flow of parts and information

**Key Lean Logistics Fundamentals:**

**Logistics ownership:** Incoterms need to be negotiated delivery at suppliers, so we can optimize the total system through consolidation, frequency increments, etc. Further suppliers will charge some additional costs for managing the transportation.

**Active logistics:** The customer company controls supplier performance, frequencies, 3PL´s, etc in an standard way. Measurement of the performance against the standard is continuously measure and feed back to suppliers.

**No Consignment:** only hides waste and should be eliminated (Inventory managed by whom and costs paid by whom?).

**Lean Logistics management:** is focus not only toward making the system operate but toward the continuous elimination of waste and continuous improvement of the system including logistics quality. Further Total Logistics Cost should be calculated for every change and improvement process to see the total effect.

Inbound Transportation is incidental waste (can not be eliminated) but excess transportation of what is needed should be eliminated.

**Integration:** Suppliers and 3PL´s etc must me integrated in the system as partners. Suppliers and 3PL´s waste also needs to be eliminated as next phases.

Who **makes** the parts **keeps** the parts in the whole supply chain.

**Total logistics cost:** any decision for improvement needs to be based on Total Logistics Cost not partial or silo cost calculation.

**Cross Docks:** material should never be store in the supply chain.

**Internal Logistics Source:**

**Logistics Design >>>> Logistics Planning >>>> Logistics Control**

Receiving Management

Packaging, repackaging

Supermarkets

Internal milk runs

Point of use delivery

Material handling

Pull Systems,

Ship to lines

PFEP

Conveyance Devices

Layout

Material Orientation

Kanban Size,

Route List,

Route Times,

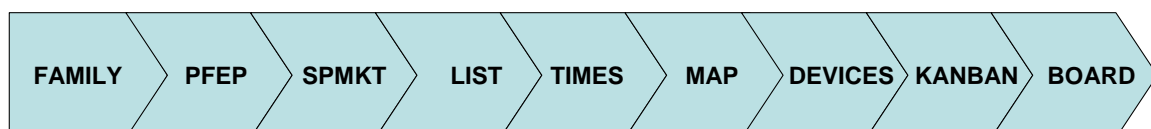
Route Boards,

Route Map

Performance Monitor

CIP

Visual Management-PDCA.

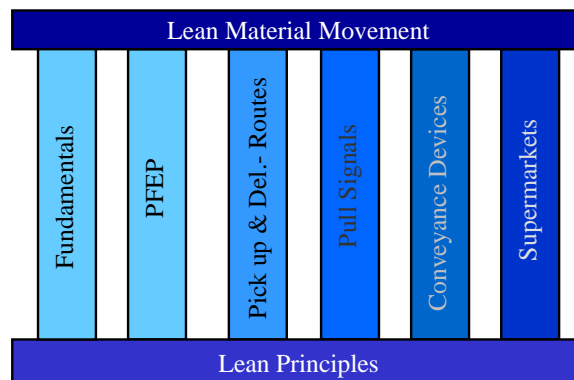


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## Key Principles Application:

- Logistics Visibility (Supermarkets)
- Value Stream Mapping (VSM) & Information flow mapping,
- Value Stream Design (VSD) based on Lean Concepts
- Standardization, Transparency and CIP (Continuous Improvement Processes)
- Measurement of Logistics Quality and Improvement Systems
- Pull system & kanbans & Lean Systems Standardization-Utilization (Pull)
- Flexibility in the Supply Chain (volume and mix)
- Continuous flow of parts and information.

**Key Lean Concepts:** Taxi or Truck concept, everything on wheels, Fork lift only permitted in receiving and shipping, tuggers for internal milk runs, point of use delivery, everything on wheels.



## Internal Reverse Logistics (Source)

**Logistics Design >>>> Logistics Planning >>>> Logistics Control**

Packaging Std

Transition Point

Internal milk runs

Point of use Pick Up

Material handling

Ship to Truck

PFEP

Conveyance Devices

Layout

Cleaning & Preparation

Expandable disposal

Route Times

Route Map

CIP

Visual Management-PDCA.

## Key Principles Application:

- Value Stream Mapping (VSM) & Information flow mapping,
- Value Stream Design (VSD) based on Lean Concepts
- Standardization, Transparency and CIP (Continuous Improvement Processes)
- Visual Management

**Key Lean Concepts:** Tuggers for internal milk runs, never return empty (loops), standardization, transition points design, return area layout (LIFO lanes) to suppliers.

[Escriba texto]

## Internal Logistics Make Logistics Design >>>> Control

## Logistics Planning

## >>>> Logistics

Focus Layout

FIFO Lines or Supermarkets

Pull Between Lines

One point of sequence

Leveling-PFEP

Heijunka

Conveyance Devices

Pull System

Supermarket

One piece flow-Cell

Takt-Balancing

Supermarket Size

Kanban Size

Material Orientation POU

Safety Stock

Visual Management

PDCA Cycles

### Leveling Process:

Volume & Parameter > ABC > PFEP > Leveling (net) > Sequencing > Measure (BTS)

### Key Principles Application:

-Logistics Visibility (Supermarkets)

-Value Stream Mapping (VSM) & Information flow mapping,

-Value Stream Design (VSD) based on Lean Concepts

-Standardization, Transparency and CIP (Continuous Improvement Processes)

-Pull system & kanbans & Lean Systems Standardization-Utilization (Pull) between lines

-Flexibility in the Supply Chain (volume and mix)

-Continuous flow of parts (one piece flow) and information.

-Jidoka or perfect quality.

**Key Lean Logistics Concepts:** Quick Change Over (SMED), Stabilization, "Who makes the parts keeps the parts", Takt, continuous flow, Heijunka (Level Planning), Lean conveyance devices-return of empties, Build to Schedule, EPEI, One Point of Sequence, OEE, Level Push or Level Pull, Incidental Time Elimination (By orientation), demand management, in process kanban, FIFO lanes.

## Internal Reverse Logistics (Make)

### Logistics Design >>>> Logistics Planning

### >>>> Logistics Control

Returns of empties

Conveyance devices

Layout design (for returns)

### Key Principles Application:

-Standardization, Transparency and CIP (Continuous Improvement Processes)

-Layout design

-Continuous flow of returns

[Escriba texto]

**Key Lean Logistics Concepts:** Standard Loops and flow, never run empty, everything on wheels, carts, FIFO,5's

## Internal Logistics Deliver

<b>Logistics Design</b>	>>>> <b>Logistics Planning</b>	>>>> <b>Logistics Control</b>
Layout-Flow		
Ship to Truck		
Supermarket		
Staging areas		
PFEP	Kanban Sizing	
Demand Mgt	Shipping Window	
Conveyance Dev	Buffer Calculation Mgt.	Delivery
Performance		Windows
Milk Runs		
Compliance		

## Key Principles Application:

- Logistics Visibility (Supermarkets F.G.'s)
- Value Stream Mapping (VSM) & Information flow mapping,
- Value Stream Design (VSD) based on Lean Concepts
- Standardization, Transparency and CIP (Continuous Improvement Processes)
- Measurement of Logistics Quality and Improvement Systems
- Flexibility in the Supply Chain (volume and mix)
- Continuous flow of parts and information.

**Lean logistics concepts:** Milk runs: route map, route board, route time, ship to truck., frequencies of deliveries.

## Internal Logistics Deliver (Reverse)

Logistics Design	>>>> Logistics Planning	>>>> Logistics Control
Layout-Transition		
PFEP	Kanban for Pack	
Times Board		Route
Devices		
Supermarket Empties		
Route Maps		

## Key Principles Application:

- Pull system & kanbans & Lean Systems Standardization-Utilization (Pull)
- Continuous flow of packs and information
- Standardization, Transparency and CIP (Continuous Improvement Processes)

**Lean logistics concepts:** Milk runs: route map, route board, route time, route list, ship to truck., frequencies of deliveries, transition areas for drop off full and pick up empties of packs.

## External Logistics Deliver

### Logistics Design

Frequencies  
Monitor  
Modes  
Types  
Mgt  
Distribution Points  
Info Flow  
Packaging (PFEP)  
Customer Location (PFEC)  
Volume Plan

### >>>> Logistics Planning

Windows  
Routes

### >>>> Logistics Control

Performance  
Jidoka  
Transportation

### Key Principles Application:

- Logistics Visibility (Pick Up to delivery)
- Value Stream Mapping (VSM) & Information flow mapping,
- Value Stream Design (VSD) based on Lean Concepts
- Standardization (routes frequencies, deliveries), Transparency and CIP (Continuous Improvement Processes)
- Flexibility in the Supply Chain (volume and mix)
- Continuous flow of parts (Frequencies acceleration)
- Jidoka or perfect quality to customer

**Key Lean Logistics Concepts:** visual management, shipping process follow up, deliveries compliance, logistics ownership, active logistics, distribution points, proof of delivery.

## External Logistics Deliver (Reverse)

### Logistics Design

Frequencies  
Monitor  
Modes  
Types  
Consolidation Points  
Info Flow  
Packaging (PFEP)  
Customer Location  
Volume Plan  
Cross Docks  
Material Flow Map

### >>>> Logistics Planning

Windows  
Routes  
Verifications

### >>>> Logistics Control

Performance  
Jidoka  
Transportation Mgt  
Inventories Ctl.  
Pick Up verification

### Key Principles Application:

- Logistics Visibility (Pick Up to delivery)
- Value Stream Mapping (VSM) & Information flow mapping,
- Value Stream Design (VSD) based on Lean Concepts
- Standardization (routes frequencies, deliveries), Transparency and CIP (Continuous Improvement Processes)
- Flexibility in the Supply Chain (volume and mix)
- Continuous flow of parts (Frequencies acceleration)
- Jidoka or perfect quality to customer

[Escriba texto]



## **Key Lean Logistics Concepts**

Cross docks, consolidation raw material, logistics ownership, visibility, 3PL's control. Pick up verification, modes selection, cycle inventories, loop management and calculation, visual control (From-to), color code, labels management, cleaning, storing, etc.,

## **LEAN LOGISTICS IMPLEMENTATION FALACIES**

- One piece flow at whatever cost in the total supply chain. Decrease lot size at whatever cost in order, make and deliver. Cube problems, set up cost problems, etc.
- Logistics improvements in one area make higher costs in other areas increasing the total overall costs of the Supply Chain.
- Isolated tools and systems disintegration will give the best result (ERP and systems elimination). Use excel sheets for planning and kanban calculations.
- Focus on implementation of lean tools instead of focusing lean tools to deliver the expected results. Implement tools for its own sake.
- Cost calculation show improvement but hard numbers (finance) do not show any.
- Do not use systems. Excel can be perfectly use for planning, etc.

## **HOW TO AVOID THESE FALACIES**

Value Stream Map and Design need to be focus toward clear business goal. Begin with the end in Mind. Then all the projects in logistics need to be evaluated as Total Logistics Costs and Service Improvements. Different areas of the company need to be involved in the projects. People need to be evaluated based on the results to the company not by isolated departments (mainly purchasing). Training on these concepts is a must prior to the full launch of the projects.

Total logistics cost should include: vendor, transportation, customs, inventory, handling, quality, ordering cost. We must focus on bigger cost gaps in order to reduce continually the gaps of theoretical limits.

Finally the scientific approach needs to be used for the PDCA cycle. Plan, try, judge, standardize. Pilots for learning and seeing results needs to be applied. Training, coaching, involvement and teaching leaders how to lead lean and waste elimination in the company.

## **OUR SERVICES**

### **Consulting**

Lean Logistics Strategy implementation  
Evaluation and opportunity gap analysis  
Information and Systems Integration for Lean  
Lean Tools development.  
People Lean Coaching and Development.

[Escriba texto]

Supplier's development Programs and coaching.

## **Training**

Kaizen Workshops for VSM and VSD.

Training about lean tools, systems and implementation processes

Lean Logistics Management

Lean Logistics Implementation Model

## **Basics**

5's

Standards Operation Procedures & Processes

Visual Management

## **Intermediate**

Kanban

Pull System

Flow Layout-Continuous flow

Jidoka (Autonomation)-Poka Yokas

SMED in Logistics

OEE

## **Advanced**

Leveling-Heijunka

2 Loops Heijunka

One piece Flow

Ship to Line

Ship to Truck

Ship to Supermarket

External Pull System (Maquilas)

Close PDCA Cycles for improvements in Logistics

Total Logistics Cost

## **Operation**

Future Lean Supply change management (3PL).

## **Conclusion**

The logistics operations have a great opportunity for improvement. Lean has many tools to achieve the goal of reducing the Total Logistics Cost through stabilizing the operations first then applying the Kaizen process to reduce and/or eliminate waste. The logistics process needs to be measured and continuously improved.