Webinar: How to "Plan For Every Part" for Lean Material Flow

Plan for Every Part (PFEP) Series

1: Introduction to Plan for Every Part and Inventory Sizing | May 16-17, 2017

2: Plan for Every Part and Inventory Layout | May 18-19, 2017

3: Plan for Every Part and Total Cost Management | August 21-22, 2017

www.scl.gatech.edu/courses

Georgia Tech Supply Chain & Logistics Institute

LeanCor TRAINING AND EDUCATION

Your Presenter: Brad Bossence

VP of LeanCor Consulting

LeanCor Supply Chain Group

Instructor,

Georgia Tech Supply Chain and Logistics Institute (GTSCL)

bbossence@leancor.com

Career Focus:

20 years of third party logistics and consulting experience with a specific focus in Lean and Japanese production system environments, including contract and operations management positions across the globe

Currently Responsible For:

Leading supply chain consulting projects for LeanCor customers in a wide array of sizes and industries. These have included operational excellence deployments, lean material flow implementation, and ROI assessments

Industry Groups & Speaker:

President of Atlanta WERCouncil, APICS, AME, CSCMP, GTSCL, Institute of Industrial Engineers, Lean Enterprise Institute, Georgia Center for Logistics, Honda Lean Network

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

About LeanCor Supply Chain Group

Trusted partner that specializes in lean principles to advance supply chains. "*We Teach. We Consult. We Do.*"

LeanCor TRAINING AND EDUCATION

Lean, Supply Chain, Six Sigma, Leadership Courses

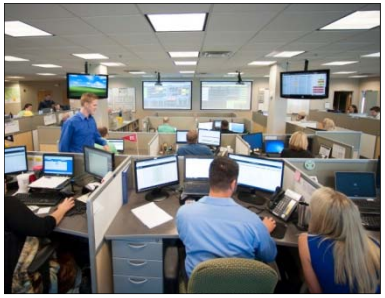
Public, Private, Online Settings

LeanCor CONSULTING

End-to-End Supply Chain Advancement Solutions

Diagnostic, Assessment, Design, Deployment

LeanCor LOGISTICS



Logistics Engineering & Transportation Management

Inbound and Outbound Logistics, Domestic and International Transportation

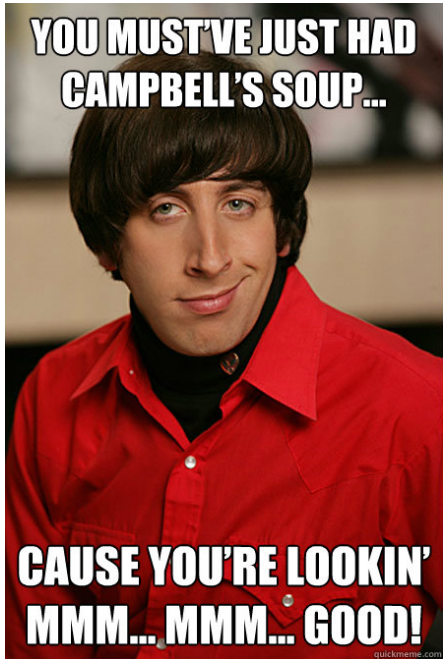
LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

United Technologies Corp. warned it will miss its 2016 goal for deliveries of a new jet engine by roughly 25%, the latest setback in one of the most important programs for the conglomerate. (WSJ, Sept 2016)

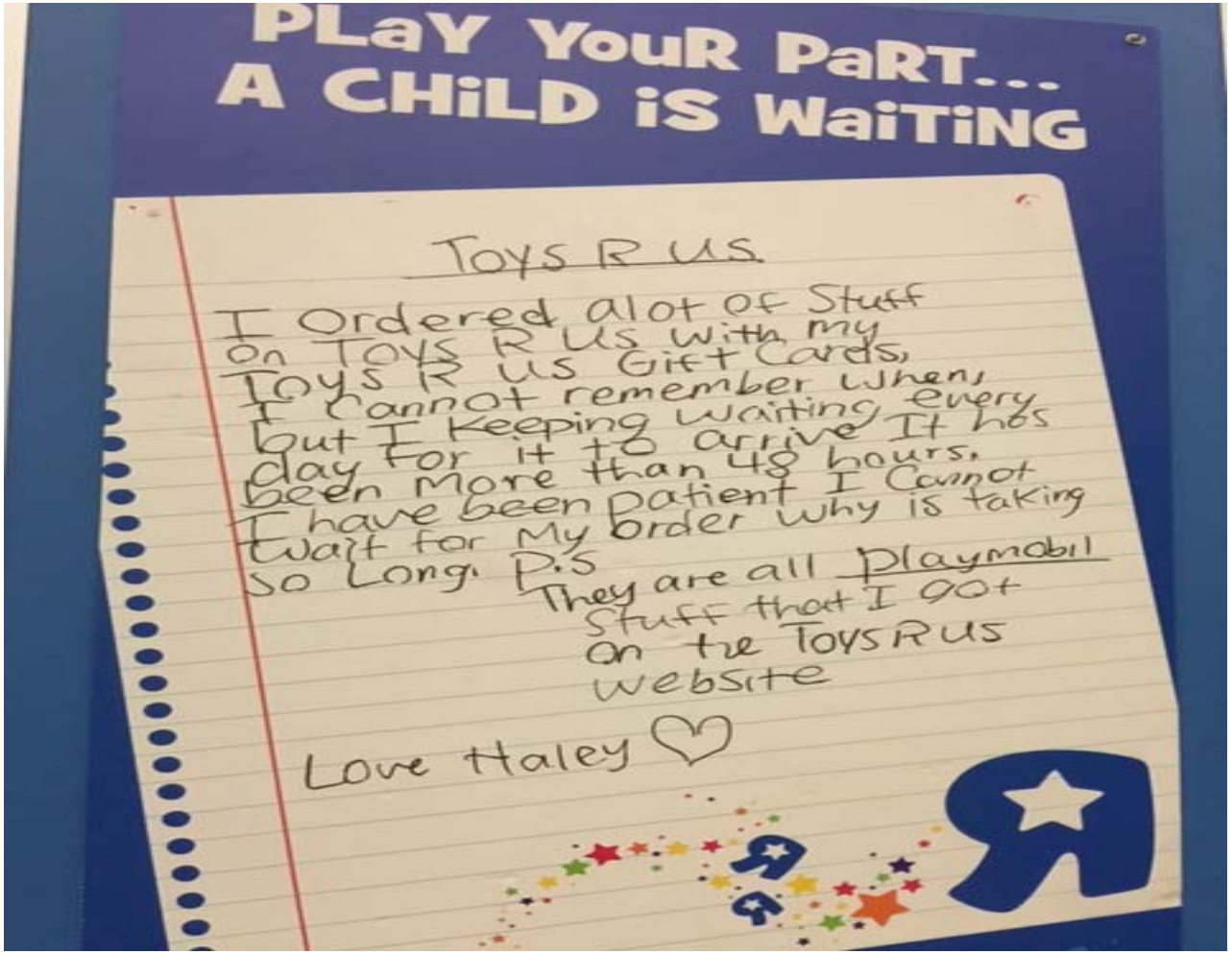
Apple says it won't have any iPhone 7 Plus phones available in stores on launch day. (Business Insider, Sept 2016)

Campbell Soup's winter marketing promotion caused a spike over and beyond the usual seasonal spike. Early production and inventory with overtime meant the cost of the excess production and inventory requirements far exceeded the revenue from the promotions.



LeanCor TRAINING AND EDUCATION

A Modern View of Warehousing



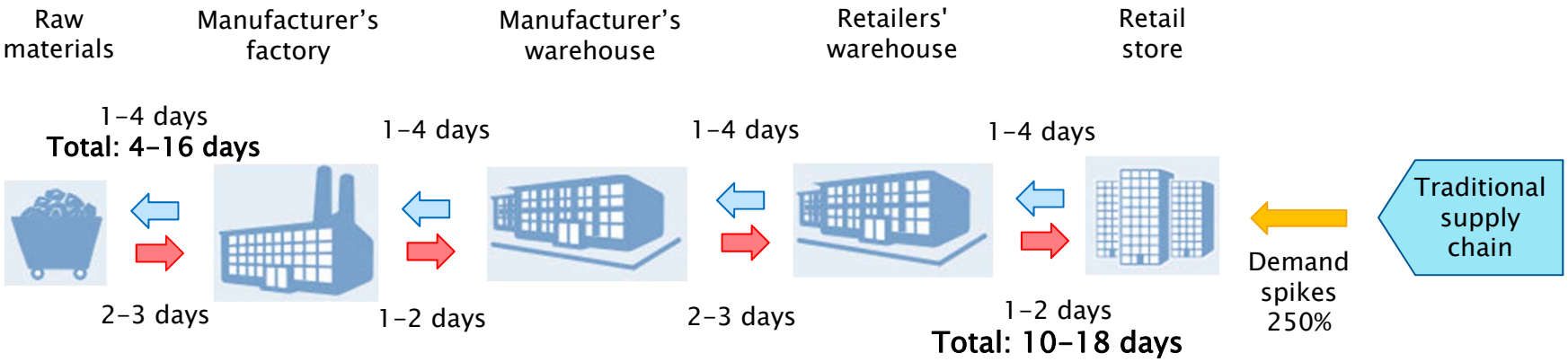
The Lean Supply Chain

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

The Power of End to End Right-Sizing

The flow of information and products across a hypothetical supply chain



Source: Adapted from BCG

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

No Collaboration = No Flow = No Cash

Lack of flow in receiving and put-away

Idle MHE

Outdoor storage

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

PFEP Series: Georgia Tech Supply Chain and Logistics Institute

- **Course 1: Introduction to Plan for Every Part and Inventory Sizing**

  Date: May 16th and 17th 2017

- **Course 2: Plan for Every Part and Inventory Layout**

  Date: May 18th and 19th 2017

- **Course 3: Plan for Every Part and Total Cost Management**

  Date: August 21 and 22 2017

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

Plan For Every Part

Plan for every part (PFEP) is a system that defines and sustains information about each part in the value stream:

- where it comes from
- how it is delivered
- when and how often
- how it should be stored and packaged
- the point of use and when to replenish.

The PFEP is the DNA of your value stream

A well designed and maintained PFEP System significantly reduces material shortages, inventories, supply chain complexities and costs.

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

PFEP Inputs

- Supplier / Purchasing
- Inbound Logistics
- Inbound Warehouse
- Replenishment Strategies
- Internal Conveyance
- Line Side Presentation

PFEP Part ID Card	
Item Number	Unique and consistent throughout the facility
Item Description	Part Name and color
Usage Locations	Detailed Usage Location (OpSeqs/ Cells)
WH Location	location where the material is stored
Eff from	Part usage affectivity start date
Eff to	part expiring usage date
Max Daily usage	Max daily usage of this part in all production lines
Hourly usage	Max hourly usage of this part in all production lines
2 - hour target per container	Max 2-hr usage of this part in all production lines
Usage per model	Number of parts required for 1 finished
Supplier/City	Name of the vendor and location
Supplier Quantity per Container	Count of material in one co
Supplier Container Description	Packaging of the cont rd box, reusable tote)
Supplier Container Measurement	Length, Width
Order Frequency and size	Frequen erial is ordered from the supplier and size
Transit Time	Tr ed from the supplier to the facility.
Part Weight	unit of material
Line Delivery Method	ulk, Repack (Kitting, Sequencing, downsized)
Line Station Container	(Tote size, Cart, Cardboard)
Line Container Q	Piece count of material in one line container
Line Container r Hr	Maximum number of containers required per hour
# Kanban Cards In oop	Number of pull signals that are in the system
# of Containers at Line	Maximum number of containers on line
# of containers at WH Location	Maximum number of containers in WH
Minimum Inventory in WH Location	Min. qty of inventory to be held at WH
Notes	Comments

Example

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

Connecting Through PFEP

7 Supplier Sourcing

6 Inbound Logistics

5 WH and Supermarket Design

4 Raw Material Inventory Strategy

3 WH to Lineside or Retail Material Conveyance

2 Lineside or Retail Material Presentation

1 Lineside Inventory or Retail Store

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

Replenishment Strategies

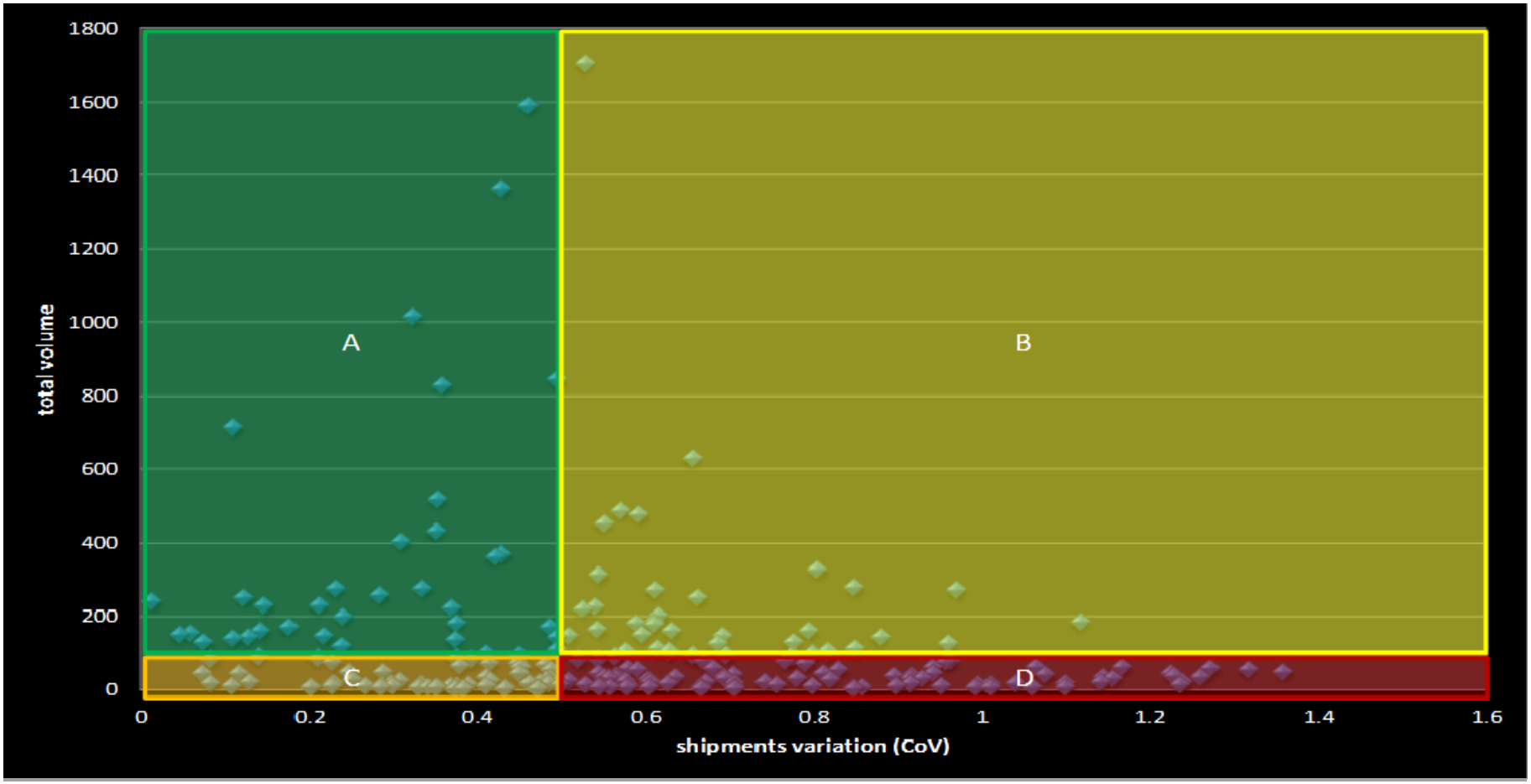
Week	A	B	C	D	E	F	G	H	I
1	100	150	50	0	10	25	75	5	0
2	50	0	50	0	12	30	75	6	0
3	25	150	50	350	8	35	75	7	0
4	60	0	50	0	10	40	75	5	0
5	20	150	50	0	12	45	75	6	0
6	0	0	50	350	8	50	75	7	0
7	60	150	50	0	10	55	75	5	0
8	25	0	50	0	12	60	75	6	0
9	90	150	50	350	8	65	75	7	0
10	150	0	50	0	10	70	75	5	2400
11	60	150	50	0	12	75	75	6	2400
12	20	0	50	350	8	80	75	7	0
Quarterly Volume	**660**	**900**	**600**	**1400**	**120**	**630**	**900**	**72**	**4800**
Average	**55.0**	**75.0**	**50.0**	**116.7**	**10.0**	**52.5**	**75.0**	**6.0**	**400.0**
Standard Deviation	**42.3**	**78.3**	**0.0**	**172.3**	**1.7**	**18.0**	**0.0**	**0.9**	**934.2**
Coefficient of Variation	**0.8**	**1.0**	**0.0**	**1.5**	**0.2**	**0.3**	**0.0**	**0.1**	**2.3**

Which Candidates are best for "Pull"?
Which Candidates are best for "MTO/BTO"?
Which candidates are best for "Flow"?

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

Part Visibility and Stability



LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

Poll Question

- How many different types of inventory buckets does your company plan ? What are they ?

Types Of Inventory

CYCLE STOCK | BUFFER STOCK | SAFETY STOCK

- **Cycle Stock** is the inventory available to meet normal customer demand between the times stock is replenished.
- **Buffer Stock** projects against common cause variation (demand variation, delays in logistics)
- **Safety Stock** guards against special cause (Internal manufacturing, supplier, or logistics) variation – things that you cannot control or predict

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

Supermarket Sizing

Supermarket Sizing Calculations	
Cycle Stock =	Average Daily Demand X Replenishment Interval
Buffer Stock =	Confidence Interval Factor X Standard Deviation of Demand X Replenishment Interval
Safety Stock =	Total Lead Time X Average Daily Demand X Risk Factor %
Cycle Stock + Buffer Stock + Safety Stock =	Total Supermarket Inventory

Confidence Interval Factors for Buffer
Multiply Standard Deviation of Demand by
1 X Std Dev = 84% Service Level
1.5 X Std Dev = 93% Service Level
2 X Std Dev = 98% Service Level
3X Std Dev = 99.9% Service Level

Which factors impact inventory?

1. **Cycle Stock**: frequency in which you receive from suppliers/production.
2. **Buffer Stock**: purpose of product (service level), variation in demand, frequency in which you receive from suppliers/production.
3. **Safety Stock**: Total lead time to order and get inventory from supplier, globalization, supplier quality and on-time delivery, transportation issues

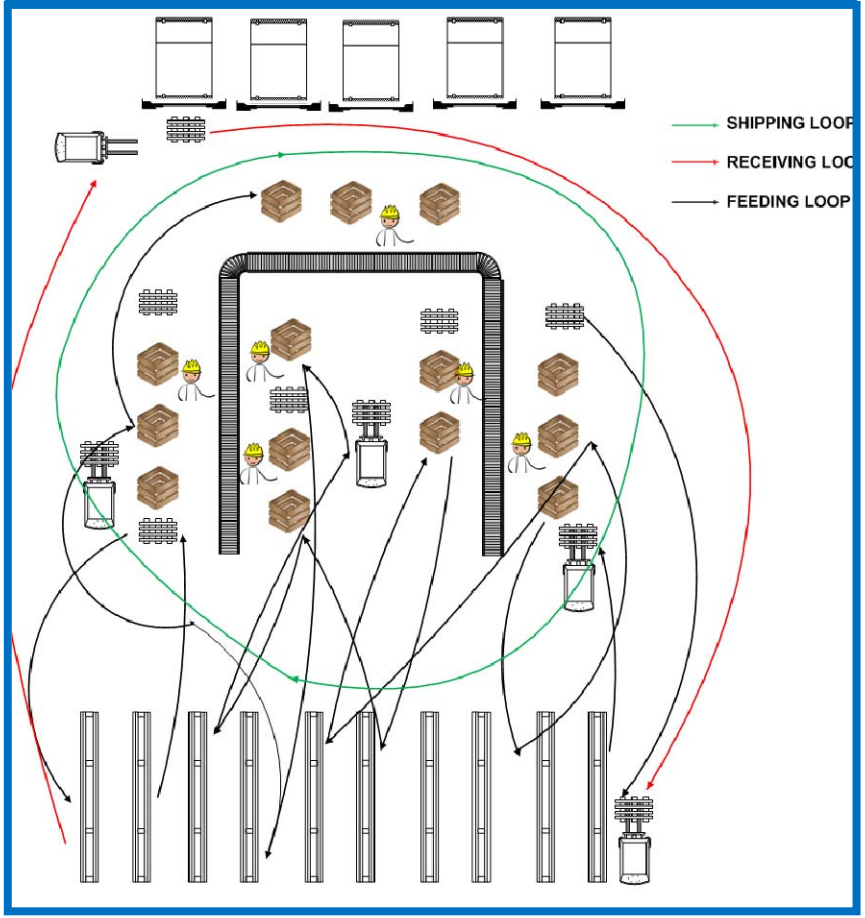
Which inventory types should we have lineside?
What happens to inventory as we increase frequency?
What happens to Safety Stock if we reduce lead times?

LeanCor TRAINING AND EDUCATION

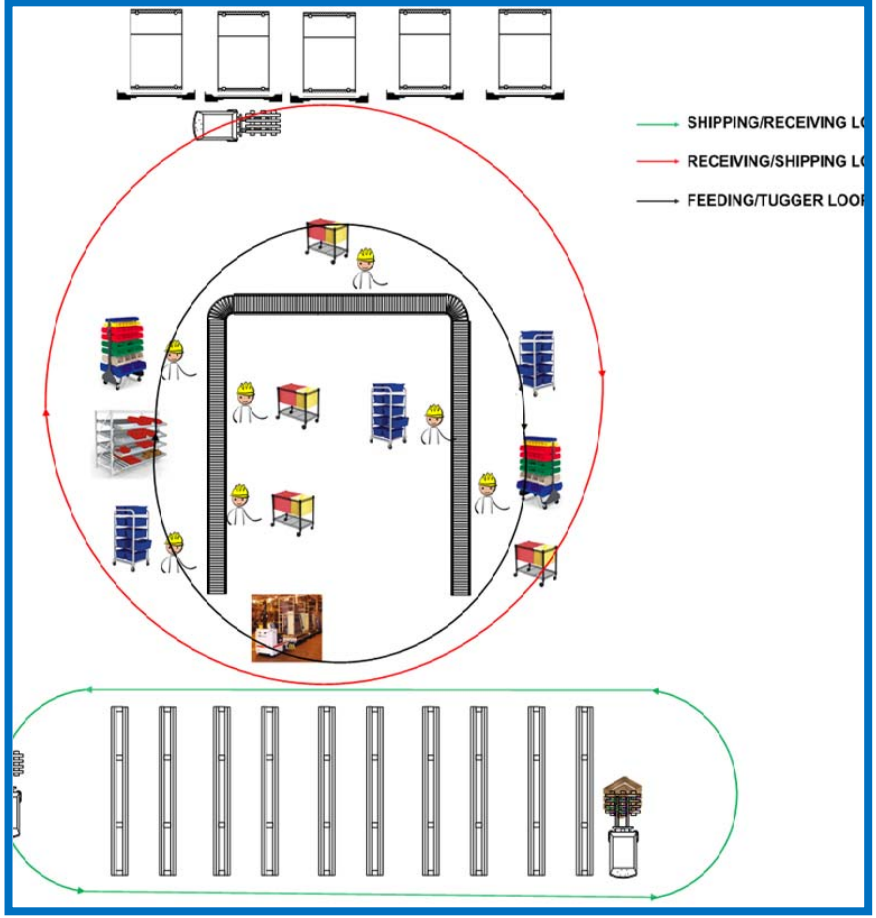
Georgia Tech Supply Chain & Logistics Institute

Traditional vs Lean Conveyance

Traditional



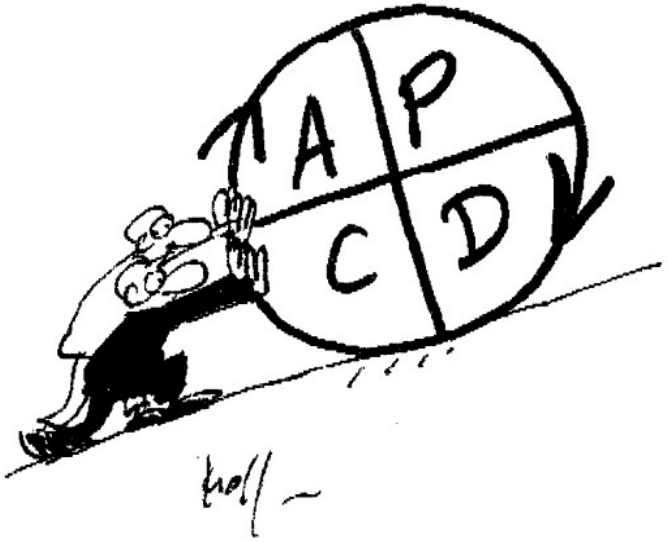
Lean



LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

Lean Thinking 101: "Entropy"



We Must Add Pressure

1st and 10, Do It Again

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

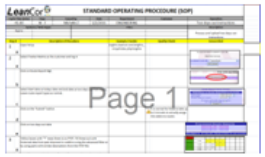
5S and Visual Management

Plan vs. Actual Hourly Board

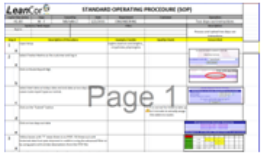
Line	Fuel Line Cell		Team Leader	Barb Smith		
Quantity Required	690		Takt Time	40 sec.		
Time	Plan	Actual	Plan	Actual	Problems/Causes	Sign-off
6-7	90	90	90	90		
7-8	90	88	180	178	tester failure	
8-9	90	90	270	268		
9-10	90	85	360	353	tester failure	
10-11	90	90	450	443		
11-12	90	90	540	533		
12-1	90	86	630	619	bad parts (valves)	

Updated Standard Operation Procedure

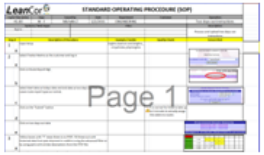
Unloading SOP



Receiving SOP



Putaway SOP



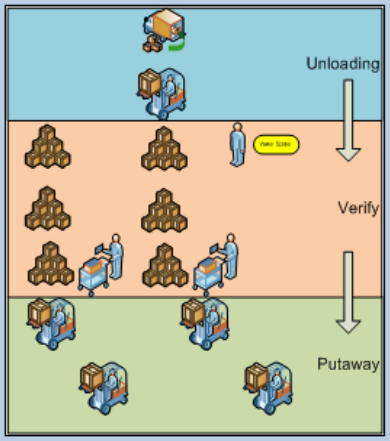
Area 5S Picture

Green Cone: Ready for Putaway

Red Cone: Issues

Yellow Cone: Fab/Inspection

Dock to Stock Process Flow Chart



Daily Meeting

Safety Message

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

Inbound Visibility and Trust

Legend
This route starts running today.
There are orders on this route that have due dates on the delivery date.
There are orders on this route that have due dates before the delivery date.
There are no orders on this route that have due dates on or before the delivery date.

Current Status - As of 10/17/2016

Memo to suppliers: Please stack your freight if it is stackable based on your packaging.

Route #	Route ID	Orloe Route ID	Route Type	Supplier	Plant	Available Pickup Date	Available Pickup Time	Additonal Info
No Adhoc Routes to Display								

Route #	Route ID	Orloe Route ID	Route Type	Carrier	Trailer #	Start Date	Delivery Date	Delivery Time	Status	First Due Date	Additional Info
RB9I12F	42854	369947	direct	INTERCON CARRIERS		10/21/2016	10/27/2016	7:45	Booked	Fri, 10/28/2016	Stops
RB9I11F	42853	369952	direct	INTERCON CARRIERS		10/21/2016	10/27/2016	6:30	Booked	Fri, 10/28/2016	Stops
RB1L4F	42759	369955	direct	XPO LOGISTICS - LTL		10/21/2016	10/25/2016	19:00	Booked	Wed, 10/26/2016	Stops
RB2L10F	42760	369949	direct	XPO LOGISTICS - LTL		10/21/2016	10/24/2016	19:00	Booked	Tue, 10/25/2016	Stops
RB2L13F	42855	369951	direct	XPO LOGISTICS - LTL		10/21/2016	10/24/2016	19:00	Booked	Tue, 10/25/2016	Stops
RB2L22F	42856	369956	direct	XPO LOGISTICS - LTL		10/21/2016	10/24/2016	19:00	Booked	Mon, 10/24/2016	Stops
RB4L12F	42857	369950	direct	XPO LOGISTICS - LTL		10/21/2016	10/24/2016	19:00	Booked	Mon, 10/24/2016	Stops

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

In Depth Visibility by Part

Past due part on workbench

	Main Route	RB3M1F - ZF LENKSYSTEME BUILDING 2	Planned Data	Value	Planned Data	Value	Pickup Date	10/21/2016
	BOL #	119171119172	Total Pallets	39	Total Cubic Feet	904.92	Total Non-Mixed Pallets	
	Estimate Arrival Date	10/21/2016	Total Spots	20	Planned Floor Area	29700.00	Total Mixed Pallets	0
	Estimate Arrival Time	21:00	Total Weight (lb)	32760			Total Pallets' Weight (lb)	
	Packing Slip #: / Invoice #:	View Planners			Hazmat? No	UN # / Group	Freight Class 65	

	Part #	Description	Dock Due Date	PO release #	Order Qty	Revised Qty	Shipped Qty		Hot Part
☐	7805552219	RACK	10/24/2016	4500017304:1	2176.0				☐
☐	7806552504	RACK	10/24/2016	4500017306:1	384.0				☐
☐	7806552506	RACK	10/24/2016	4500017307:1	128.0				☐
☐	7806552514	RACK	10/24/2016	4500017308:1	2304.0				☐

Adjust PO

Save Changes

Add New Part:

Part #	Description	Dock Due Date	PO release #	Order Qty	Lead Time	Planner #

Unique ID	
Piece Price	

Add new part

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

The Future

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute

PFEP Series: Georgia Tech Supply Chain and Logistics Institute

- **Course 1: Introduction to Plan for Every Part and Inventory Sizing**

  Date: May 16th and 17th 2017

- **Course 2: Plan for Every Part and Inventory Layout**

  Date: May 18th and 19th 2017

- **Course 3: Plan for Every Part and Total Cost Management**

  Date: August 21 and 22 2017

Instructor Contact Information:

Brad Bossence – Vice President
bbossence@leancor.com or 678-876-9009

LeanCor TRAINING AND EDUCATION

Georgia Tech Supply Chain & Logistics Institute