

An Introduction to Lean

Originally Presented to BEDO

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Compliments of PT Wooden Ships

Who is PT Wooden Ships?

PT Wooden Ships was founded by Paola Buendia and Mark Donovan in 1992 and has become Bali's leading knit factory. The company specializes in knit accessories and sweaters which are sold to top retailers worldwide. The company began implementing Lean in March of 2007 and believes that this system can have rapid positive transformational impact on the overall business environment in Bali and beyond. PT Wooden Ships is an active member of BEDO (Bali Export Development Organization) which is supporting the promotion of this system. Mark gives lectures regularly on this topic and has founded a Lean group that does onsite factory workshops to help with implementation.

For more information on Wooden Ships please visit:

www.wooden-ships.com.

Why are we giving this out?

- To help create more and better jobs in Bali
- To foster greater sharing and collaboration amongst business owners in Bali
- To improve the environment by eliminating waste
- Teaching is part of our learning process

WHAT IS LEAN?

- A business system for organizing and managing product development, operations, suppliers, and customer relations that requires **less human effort, less space, less capital, less materials, and less time** to make products with fewer defects to precise customer desires, compared with the previous system of mass production.

(Lean Lexicon, 2006)

- Pioneered by Toyota after World War II.
- Typically requires half the human effort, half the manufacturing space and capital investment for a given amount of capacity, and a fraction of the development and lead time of the mass production systems.

(Lean Lexicon, 2006)

Mass Production vs LEAN

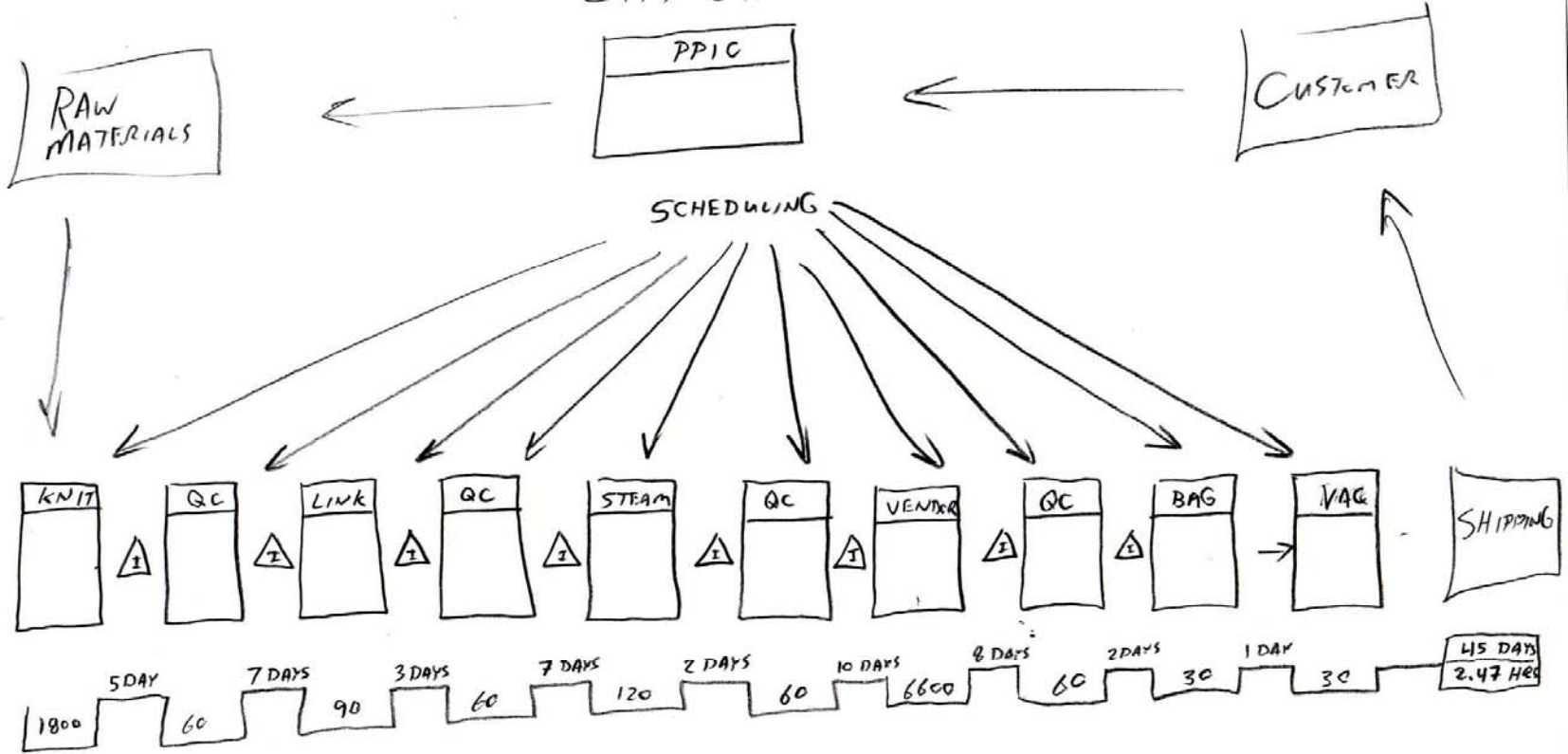
<u>Mass Production System</u>	<u>vs.</u>	<u>Lean System</u>
Individual processes are independently optimized however the overall system is de-optimized		Value Streams are optimized creating to maximize customer value
Materials are delivered infrequently and in large batches		Materials are delivered frequently and in small batches
Information is managed through complex systems instructing each production step what to do next and pushing products downstream		Scheduling is done at one point only
Customers often are subject to push selling to meet quotas and clear inventories produced to bad forecasts		Customers demand is satisfied with made-to-order just-in-time production the majority of the time
High inventory stocks with low turn-over.		Low inventory stock with high turnover.
Problems tend to pile up in large quantities before they are found or fixed		Problems are identified quickly based upon the first occurrence and the system is forced to stop until the problem is solved
Information flow and communication tend to be ineffective.		Visual tools are used to make the right information accessible to everyone in the process.

PT Wooden Ships – Case Study

March 2007

- Average Lead-time: 2-3 Months
- Boxes piled everywhere
- Goods missing constantly
- Goods frequently dirty or damaged
- Regular theft
- Schedules never accurate
- Chaos every shipment
- High staff turnover
- Constant frustration
- Considering larger factory

PRE - LEAN CITY CAP



**HOW LONG DID IT
TAKE TO MAKE ONE PIECE?**

**BEFORE LEAN:
2-3 MONTHS**

AFTER LEAN:

2–3 Days

AND AS LITTLE AS

2–3 HOURS

HOW CAN THAT BE?

- Incomplete Raw Materials
- Unbalanced process capacities
- Excessive administration
- Frequent re-work required
- Machinery and/or staff not available
- Constantly changing priorities

HOW DO YOU GO FROM

2 MONTHS

TO

2 HOURS ?

ELIMINATE WASTE (MUDA)

Only a small fraction of the steps we carry out actually create the value the customer is paying for.

WHAT ARE EXAMPLES OF WASTE?

EXAMPLES OF WASTE

- Inventory
- Administration
- Re-work
- Redundancy
- Counting
- Searching
- Most reports (status, performance, etc.)
- Most meetings
- Most time spent at the computer

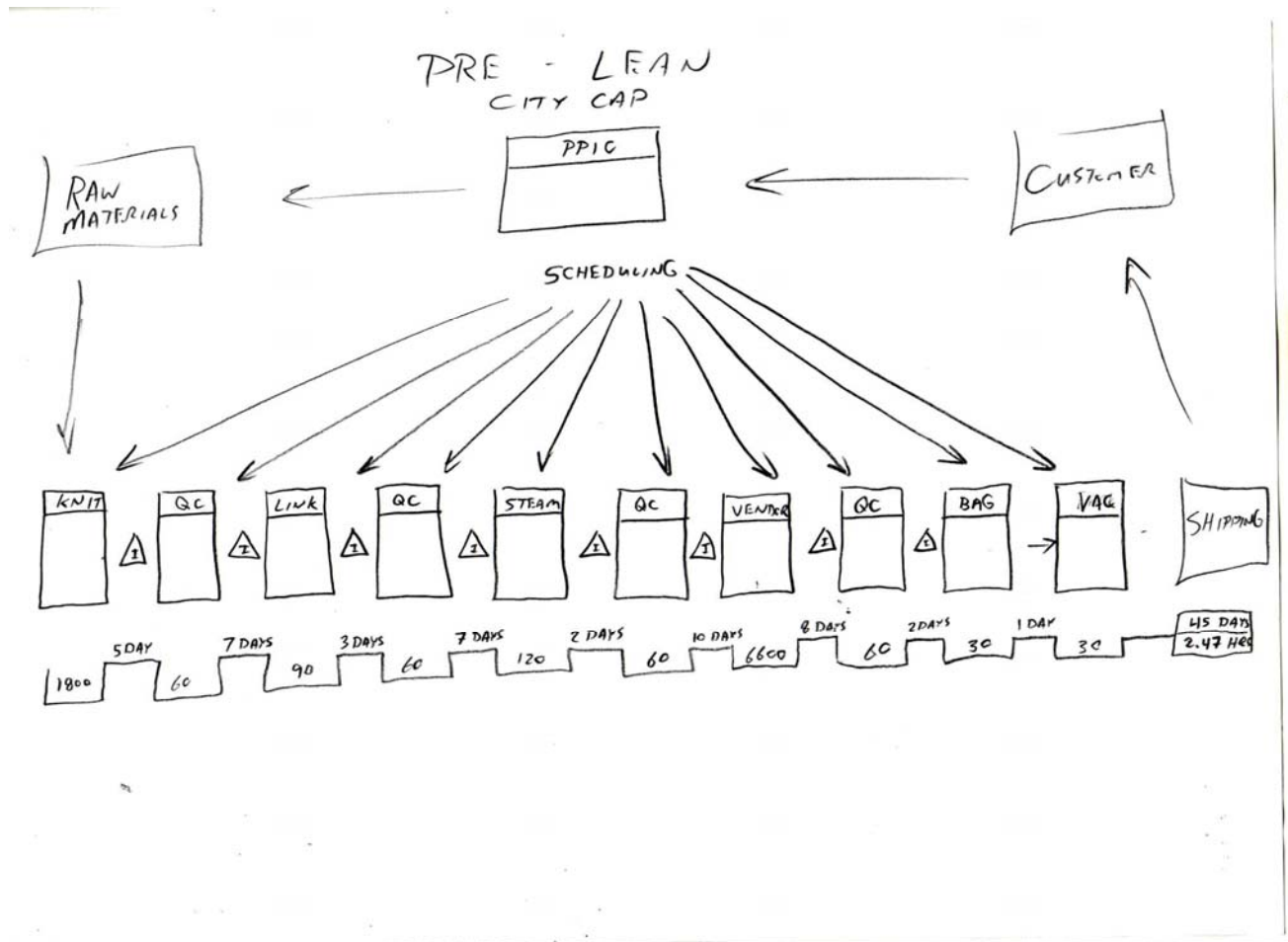
HOW DO YOU GET RID OF WASTE AND BUILD BRILLIANT PROCESSES?

**USE LEAN TOOLS TO
ELIMINATE WASTE AND USE
SINGLE-PIECE FLOW INSTEAD
OF BATCH-AND-QUEUE**

LEAN TOOLS

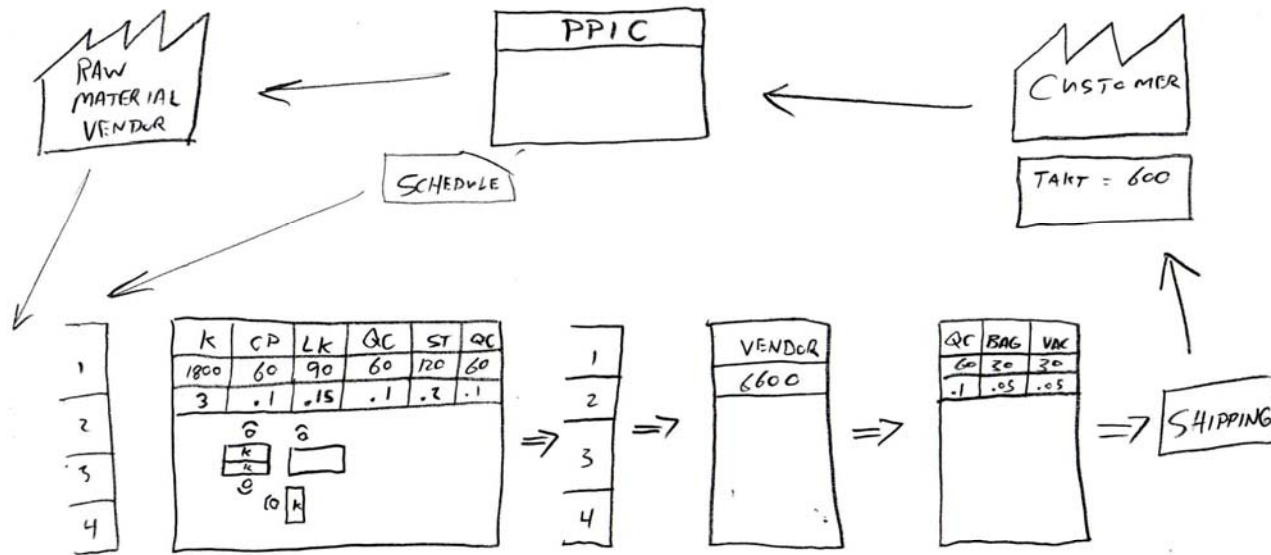
- Value Stream Mapping
- Go and See (Genchi Genbutsu)
- 5 S
- Visual Controls
- 5 Whys
- Continuous Flow (One Piece Flow)
- Smaller Batches (Every Part Every Day)
- Faster Changeovers (10%)
- Pull
- Level Production (HEIJUNKA)
- Continuous Improvement (KAIZEN)

VALUE STREAM MAPPING (Current State)



Compliments of PT Wooden Ships

VALUE STREAM MAPPING (Future State)



GO AND SEE

- Don't trust your computer
- Don't trust reports
- Don't trust staff updates

- Go and see it with your own eyes
- Map value streams by product family
- Dig deep
- Don't rush (1x 1hr vs 6 x 10min)

5S

- SORT (Seiri)
 - Go through everything in the work area, separating and eliminating what isn't needed.
 - Eliminate drawers
 - Ban boxes and bins
 - Analyze the garbage
- STRAIGHTEN (Seiton)
 - Arrange items that are needed in a neat and easy-to-use manner
 - 5 second test
- SHINE (Seiso)
 - Clean up the work area, equipment and tools
- STANDARDIZE (Seiketsu)
 - Conduct SORT, STRAIGHTEN, SHINE at frequent, indeed daily, intervals to maintain a workplace in perfect condition.
- SUSTAIN (Shitsuke)
 - Form the habit of always following the first four S's.

- 5S required to create a workplace suited for visual control and lean production

VISUAL CONTROLS

- Create an environment where the status of the system can be understood at a glance by everyone
- Hourly Production Tracking Boards
- Kanban Signals
- Standardized Work Charts

5 WHYS

- Ask why repeatedly whenever a problem is encountered in order to get beyond the obvious symptoms to discover the root cause

5 WHY Example

Excess plastic from the bag is being trimmed by hand after vacuum packing merchandise

Why 1 - Why are you trimming that plastic?because it is extra and not needed

Why 2 – Why is there extra plastic? ...because we prepared the wrong size bag

Why 3 – Why did you prepare the wrong size bag? ...because we don't have specific instructions on packaging and just wing it

Why 4 – Why don't you have instructions? ...because nobody has planned this step in advance

Why 5 – Why hasn't anyone planned this in advance? ...because the planning does not take packaging into consideration.

***The further down the chain you go with your counter-measure the greater the overall return on the investment in time, energy and money. Most companies stop at Why 1.

CONTINUOUS FLOW

- A simple, clear goal for everyone to understand
- Easy to see if it is being achieved
- Exceptionally difficult to achieve but by striving towards it you improve in leaps and bounds
- Forces you to solve problems immediately
- **STOP and FIX the PROBLEM**

SMALLER BATCHES

- Produce smaller production runs per sku
- Flow where you can flow, pull where you cannot.
- Set a goal to produce Every Part Every Day.

FASTER CHANGEOVERS

- Do faster and more frequent changeovers
- Dedicate 10% of the workday to changeovers
- Flexibility and speed is what allows you to react to demand produce made-to-order in real time and therefore minimize finished goods inventory

PULL

- Downstream activities signal their needs to upstream activities thereby eliminating over-production
- Kanban signals

LEVEL PRODUCTION

- Level the type and quantity of production over a fixed period of time to maximize efficiency.
- A small amount finished goods is often required in order to level

CONTINUOUS IMPROVEMENT

- Continuous incremental improvement of all activities
- Celebrate achievements but avoid complacency. The job is never finished.
- Perfection is the goal. Perfect processes with zero waste.

LEAN TOOLS

- Value Stream Mapping
- Go and See (Genchi Genbutsu)
- 5 S
- Visual Controls
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EMPOWERMENT

- Lean is a worker oriented system.
- You support the worker not the other way around.
- Lean will not work on going unless all workers understand, embrace and implement the concepts themselves

HARD WORK / HUGE REWARDS

- Improved Cash Flow
- Higher Margins
- Improved Quality
- Faster Deliveries
- Less Stress
- Job Satisfaction

A senior Toyota executive recently summarized the reason for the company's relentless progress over the years. "Brilliant process management is our strategy. We get brilliant results from average people managing brilliant processes. We observe that our competitors often get average (or worse) results from brilliant people managing broken processes."

HOW TO GET STARTED

- Read the literature (see Lean resources)
- Ask questions
- Join Bedo
- Join a Lean group
- Start small and expand as your knowledge grows
- Don't wait

MARK'S LEAN VISION

- Value Streams in Perfect Harmony
- Customers clearly articulate their needs.
- Stakeholders work together to deliver exactly what the customers want when they want it.
- Organizational boundaries blur as each contributor works effortlessly to create...
- Wow!

LEAN RESOURCES

- www.lean.org
- [*Lean Thinking*](#) (1996), Womack and Jones
- [*The Toyota Way*](#) (2004), Jeffrey Liker
- [*LEARNING TO SEE*](#) (1999), Rother & Shook
- BEDO - Bali Export Development Organization