


## The Leanest Lean There's Ever Been

99% Fat Free Manufacturing


Are Lean and APS Mutually Exclusive?



## The Leanest Lean

### What do we mean by Lean Manufacturing?


- High Level
  - Eliminate waste (Muda)
    - Excess production/inventory
    - Unnecessary movement of people/materials
    - Excess queue time
    - *Over processing & scrap, not relevant to Preactor*
- The Aim
  - Deliver on time, with minimum inventory, shortest lead time and highest possible utilisation



## The Leanest Lean

### How Do We Implement Lean?


- Major characteristics of a lean project:
  - Value Stream Mapping
  - Lean Thinking
    - Takt time (Production rate)
    - Heijunka (Load levelling)
    - Process redesign
  - Typical Implementation
    - Visual Production Control (VPC)
      - Pull system
      - Kanbans



## The Leanest Lean

### How Do We Implement Lean?


- Is Visual Production Control (VPC) the best way to implement Lean?
  - Many consultants see Lean and VPC as synonymous
- Let's test this by asking The Ultimate Lean Question



## The Leanest Lean

### The Ultimate Lean Question

If you stopped accepting orders tomorrow and then waited until your factory stopped, how much inventory would you have left?



## The Leanest Lean

### The Ultimate Lean Question

- The Leanest Answer is None
- If you use VPC:-
  - There will be no finished goods, but...
  - All Kanbans will be full
  - Raw material stocks will be full
- Why?

**The Leanest Lean**

**The Ultimate Lean Question**

- Because with VPC only the final assembly and dispatch are Make to Order
- All upstream processes are Make to Stock
- Kanbans are simply inventory

Brian called me a heretic for saying this!

**The Leanest Lean**

**How Did We Get To This State?**

- Before MRP we had Economic Batch Quantities (EBQ)
- MRP gave us aggregated dependent demand, but it is still an EBQ and creates inventory
- VPC reduces inventory by process change so the EBQ is one Kanban full
- But even if the Kanban quantity is one, we are still making to stock

**The Leanest Lean**

**The Ultimate Lean Answer**

- Make (Build) To Order (MTO) is the real answer
- Ideally we should have no items in the factory which have not been ordered by a client
- VPC cannot achieve this state
- We need an IT based solution to take the final Lean step

**The Leanest Lean**

**The Ultimate Lean Answer**

- Where possible turn off Make to Stock (i.e. minimum batches) in your MRP
  - This will generate many smaller orders giving a changeover frequency problem
- Mostly Make To Order and use APS to perform dynamic aggregation
  - Order or operation based aggregation
- You can now trade off changeover frequency against delivery performance & utilisation

**The Leanest Lean**

**The Ultimate Lean Answer**

No. ≠ Due date

But at the expense of later completions for some orders

Forward by FIFO

Look Ahead 2 Days

Look Ahead 3 Days

Preferred sequence white-yellow-pink

Shorter Schedule Span

**The Leanest Lean**

**The Ultimate Lean Answer**

Late

Packing Line 1

1. Forward with Preferred Sequence
2. Highlight Late Orders
3. Find early order furthest from Due Date
4. Unallocate and Repair Schedule
5. Repeat until no Late Orders

Mon Tue

## The Leanest Lean

### Summary

- APS and Lean are not mutually exclusive
- Value Stream Mapping (or similar) is required to identify issues
- VPC reduces inventory...
- But to get the leanest lean you NEED APS
- Those who haven't gone through the VPC stage can leapfrog it by using APS
- However...

## The Leanest Lean

### Empowering The Planner

- VPC devolves scheduling decisions to the shop floor
- APS empowers the planner to make scheduling decisions
- Is this a good move?

## Empowering The Planner

### VPC Vs APS

- VPC
  - Scheduling decisions are based on empty Kanbans
  - Working in isolation
  - No visibility of company wide KPIs (delivery performance, cost, etc.)
  - Variations in demand cause problems
- APS
  - Scheduling decisions are based on company wide KPIs
  - The planner has the whole picture
  - Allows tradeoffs between KPIs
  - Variations in demand are handled easily
  - Production has one KPI – schedule adherence

## Empowering The Planner

### VPC Vs APS

We are getting back to optimising:

**Door to Door not Floor to Floor!**

But is this really happening?

## Empowering The Planner

### Preactor is Used in a Vast Range of Industries

Industry	Percentage
Metals & Metal Fabricated Products	14%
Rubber, Plastics & Leather Products	11%
Paper, Publishing & Printing	8%
Automotive & Aerospace	8%
Food, Beverages & Tobacco	8%
Precision Engineers	8%
Chemicals, Pharmaceuticals & Petroleum	7%
Glass, Ceramics & Miscellaneous Materials	6%
Furniture and Wood Products	4%
Textiles & Textile Products	4%
Transport, Storage & Services	3%
Medical & Precision Instruments	2%
Electrical, Optical Equipment & Machinery	9%
Machinery & Equipment	8%

## Empowering The Planner

### Preactor is Used in a Vast Range of Industries

- This puts PI in a unique position to compare the production control techniques across sectors
- Some of these sectors (e.g. fresh food) have always had very low inventory, because of shelf life issues
- They are in the forefront of planner empowerment
- Can other sectors learn from their experience?

## Empowering The Planner

### Some Food Users

- Geest
- Northern Foods
- Hazelwood Foods
- Hitchin Foods
- Nestle
- Nature's Way Foods
- Plus many others around the world

## Empowering The Planner

### Fresh Food Process Characteristics

- Short shelf life products
- Short shelf life materials (inc packaging)
- Delivery lead time < manufacturing lead time
- Very variable demand (promotions)
- Hygiene
- Alternative BoMs
- Tough clients (shorting is a huge issue)
- Flexible labour

## Empowering The Planner

### Fresh Food has Complex Scheduling Issues

- VPC almost unknown
- In some companies the status of the planner has been raised
- APS has become 'endemic' in the company culture
- Manufacturing truly have one KPI, schedule adherence

## Empowering The Planner

### Demand Variation with VPC

For Cell 2 should we make A or B first?

Cell 2

Increase in demand for B means Kanbans are too small

A001 is late - to meet due dates we need B then A in Cell 2 and C then D in Cell 1

Assy

Cell 1

Cell 2

Current Time

Due Date A001

Due Date A002

## Empowering The Planner

### Demand Variations with APS

For both Cells, what should we make first?  
Simply schedule by Due Date and the demand variation is automatically taken into account

Assy

Cell 1

Cell 2

Current Time

Due Date A001

Due Date A002