

Supermarket Design

Principles of Supermarket

Marek Piatkowski – May 2012



Introduction - Marek Piatkowski

- Professional Background
 - Toyota Motor Manufacturing Canada (TMMC) - Cambridge, Ontario from 1987-1994
 - TPS/Lean Transformation Consulting - since 1994
- Professional Affiliations
 - TWI Network – John Shook, Founder
 - Lean Enterprise Institute (LEI) – Jim Womack
 - Lean Enterprise Academy (LEA) – Daniel Jones
 - LEI Poland – Tomasz Koch, President
- Lean Transformation Solutions, Toronto, Canada

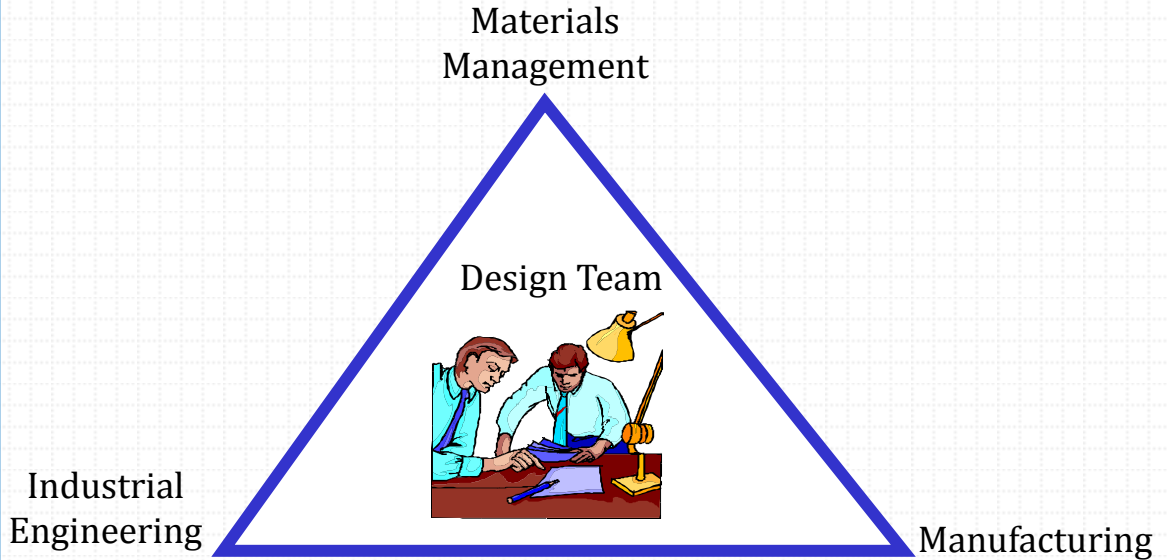
www.TWI-Network.com



Supermarkets – Future State Objectives

- One Purchased Parts Supermarket near Receiving
- Small WIP Mini-Markets at Point of Use
- One Finished Goods Supermarket near Shipping
- WIP Mini-Markets located along main delivery aisles to allow timely delivery of parts
- Visual management in place – address locations, min/max levels identified, parts shortage indicators, inventory controlled by Kanban cards
- All ergonomic and safety rules followed

Who designs Supermarkets?



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Design Considerations

There are several basic activities that need to be understood in order to develop a material movement/supermarket plan

Concepts

- ❖ Layout
- ❖ Categorization
- ❖ Storage / Racking
- ❖ Addressing
- ❖ Stock Rotation
- ❖ Couple/De-couple Tugging
- ❖ Rightsizing / Repacking
- ❖ Information Flow System
- ❖ Visual Controls

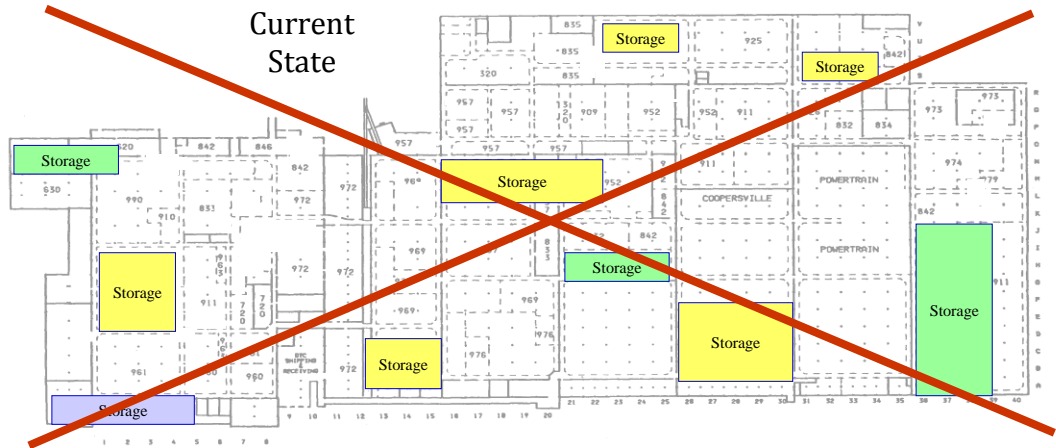
Enablers

- ❖ Materials Organization
- ❖ Location / Layout
- ❖ PFEP – Plan-for-Every-Part
- ❖ Standard Work
- ❖ WPO – Work Place Organization
- ❖ Receiving Window Compliance
- ❖ Escalation Plans

Supermarket Design Principle # 1

Design Principle # 1

All parts, materials and components must be delivered to and stored in single centralized warehouse locations – called Supermarkets



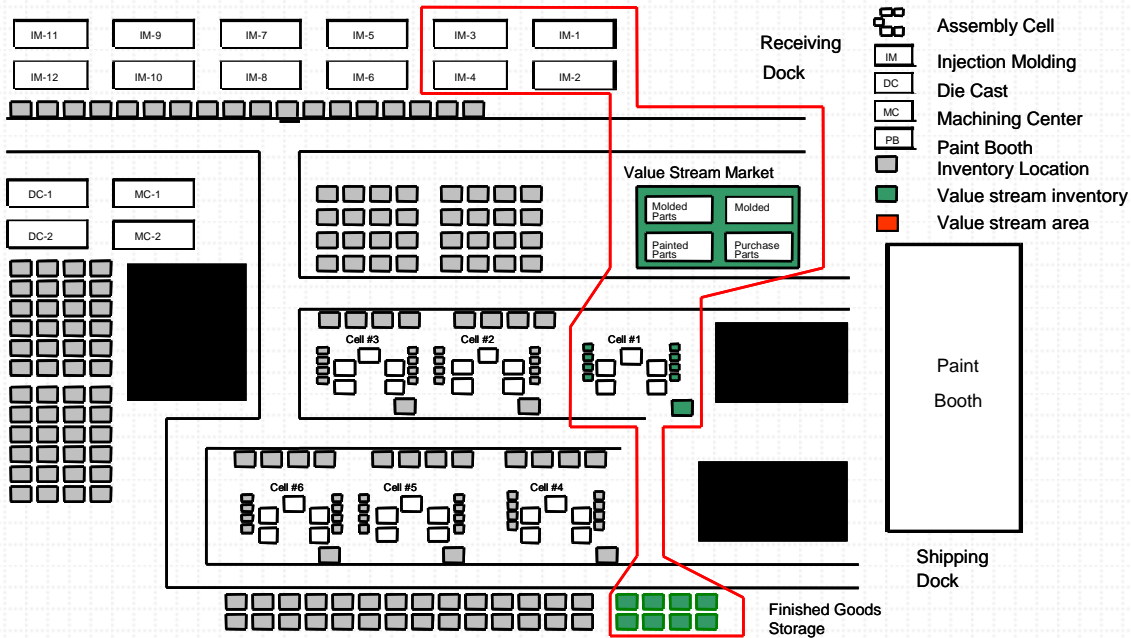
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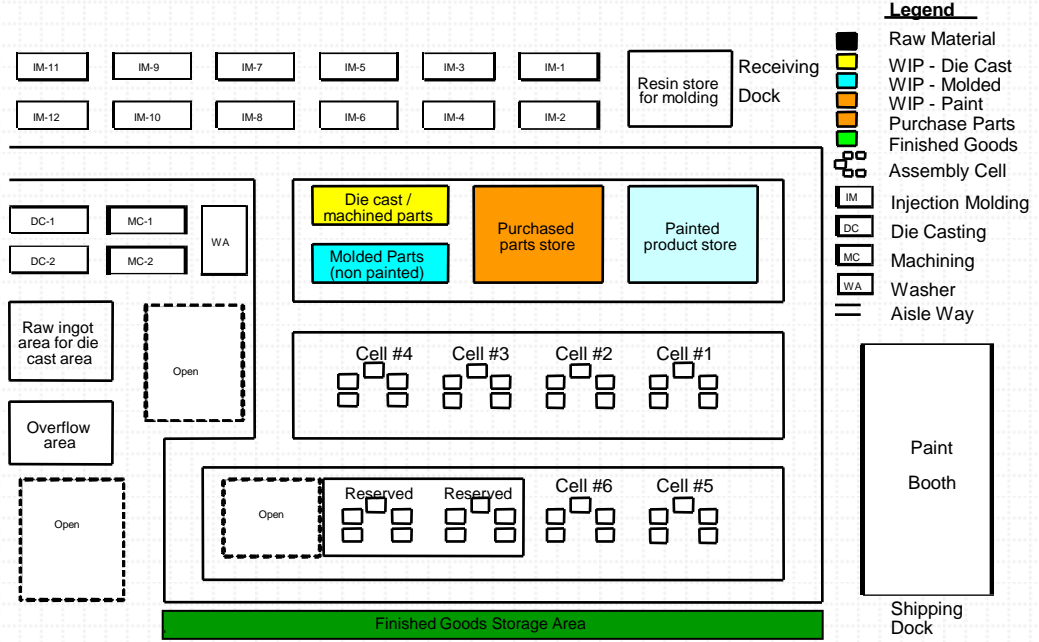
Supermarket Design Principle # 1

Current State Layout



Supermarket Design Principle # 1

Future State Layout



Supermarket
Design
Principle

1

Supermarket Design at Donnelly



Start: 9:50
Stop: 21:00

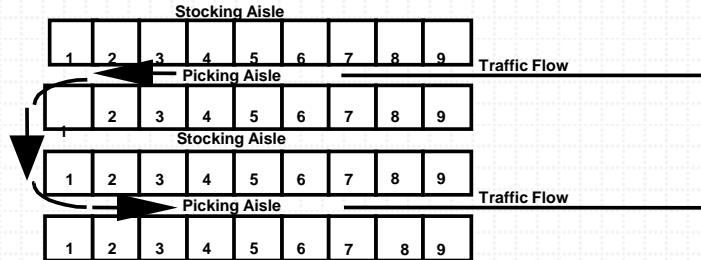


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Supermarket Design Principle # 1

Supermarket Layout

- Supermarket layout must optimize Man/Machine/Material flow
- **Material** - overflow, safety stock, normal, stock rotation, parts utilization, cardboard, empty containers
- **Man /Machine** - minimize walk patterns (shopping), minimize mixing of Tugger (Milk Run) and forklift traffic, create “one-way streets”, information flow management



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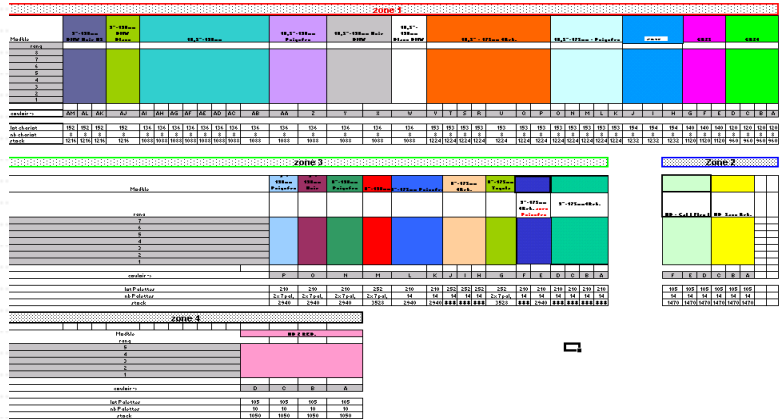
Supermarket Design Principle # 2

Design Principle # 2

All parts, materials and components must be grouped into some sort of logical fashion:

- ❖ Either by family type, frequency of use, destination or suppliers

Rangement Zone de Stockage Molding



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3

Design Principle # 3

Each part (container) must have a unique, designated, well identified storage location and address

Good



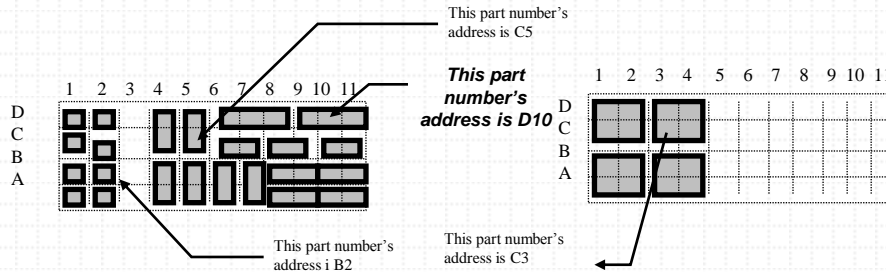
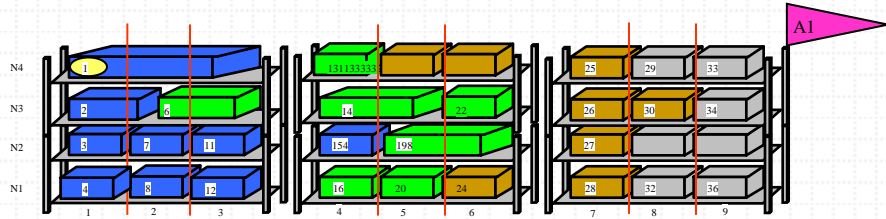
Bad



Duplicate Storage Address

Supermarket Design Principle # 3

Supermarket Addressing System



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Storage Address System



Location Indicator

Level Indicator



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Storage Address Labels



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Rack Labeling System



Supermarket Design Principle # 4

Design Principle # 4

- All boxes and containers stored in the Supermarket must be “Line or Customer Ready”:
 - ❖ meaning right size and weight
 - ❖ 100% Quality acceptable
 - ❖ any re-packing, to make boxes Customer Ready must be done in a centralized location outside the Supermarket.

Good



Bad



Supermarket Design Principle

4

Repacking



Repacking - Not acceptable

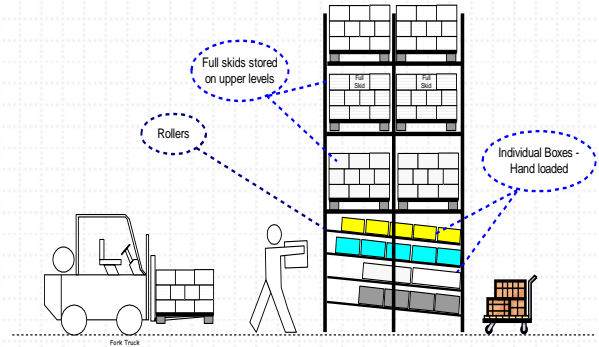
Supermarket
Design
Principle
4

Repacking



Single Box Flow Rack

- Advantages:
 - ❖ Maximum utilization of storage space
- Disadvantages:
 - ❖ Double handling of boxes
 - ❖ Safety / Ergonomics
- Best application:
 - ❖ Low volume consumption
 - ❖ Small / light boxes



Supermarket Design - Racks

Single Box Flow Rack

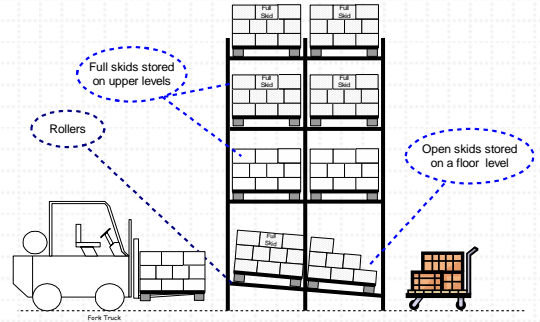


Single Box Flow Rack



Bulk Flow Racks

- Advantages:
 - ❖ Elimination of unnecessary double handling of boxes (loading and unloading the rack)
- Disadvantages:
 - ❖ Not the best utilization of floor space
- Best application:
 - ❖ High volume demand



Supermarket Design - Racks

Bulk Flow Racks



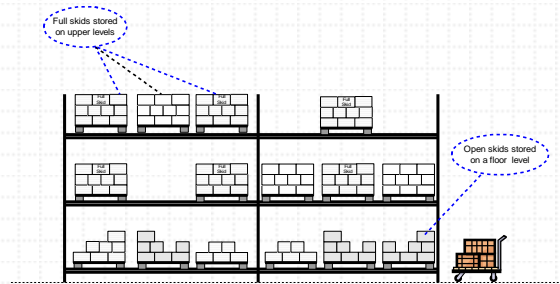
Supermarket Design - Racks

Bulk Flow Racks



Bulk Shelf Storage

- Advantages:
 - ❖ Elimination of double handling of boxes
- Disadvantages:
 - ❖ Material Handler (Tugger) and Forklift working in the same aisle
- Best application:
 - ❖ Low volume consumption (ex. Service Parts)
 - ❖ Heavy boxes



Bulk Shelf Storage



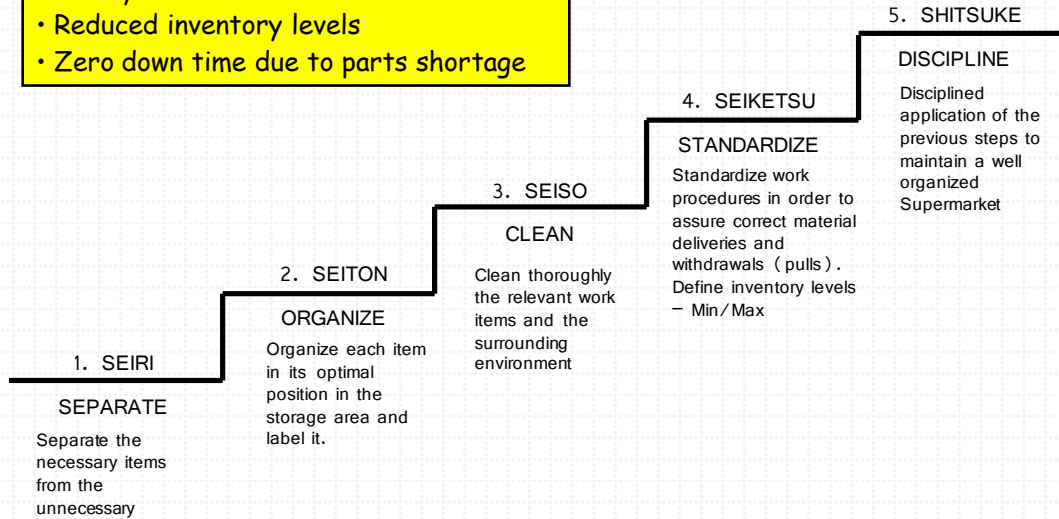
Supermarket Design - Racks

Bulk Shelf Storage



TPS - 5S Process

- Well organized material storage
- Timely material deliveries
- Reduced inventory levels
- Zero down time due to parts shortage



Supermarket - Design Principles

- All materials must be delivered to and stored in **centralized** warehouse locations – called **Supermarkets**.
- All parts must be stored in a **unique (designated)** storage locations.
- All boxes and containers stored in the Supermarket must be **“Customer Ready”** - meaning right size and weight and 100% Quality acceptable
 - ❖ Any re-packing, to make boxes Customer Ready must be done in a centralized location outside the Supermarket.



Supermarket - Design Principles

- Once parts are produced and identified with a Master Label (Pallet/Skid Label) they are immediately moved to the Supermarket
- The system must be designed so the oldest parts are moved first – FIFO.
- A very strong effort should be made to eliminate any unnecessary pedestrian traffic in the Supermarket.

OK
22194879
12/11/2001
50012919210001

Master Shipping Label

C-H-52

18-02/20

00 2
828
16



22043063


Cross bar beam end latches RH
Supplier part W00200AA

ITM

36	3042385	18
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Master Shipping Label – Production Week Number

Nó. De parte:	Descripción: Cross bar end
22043063	
Piezas por empaque: 36 pzas. (LPA-4-15-113-03-40)	

Storage Rack Label

Purpose of a Supermarket

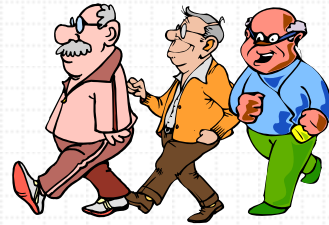
- The purpose of a Supermarket is to create a Buffer of inventory (Purchased Parts, WIP or Finished Goods) in order to safeguard against process or delivery variations
- Process variation can be caused by:
 - ❖ Batch (large lot) production process
 - ❖ Variation in working hours
 - ❖ Equipment breakdown or problems
 - ❖ Etc ...
- Delivery variation can be caused by:
 - ❖ Large lot and non-frequent deliveries
 - ❖ Transportation costs and distance
 - ❖ Delivery schedule changes
 - ❖ Weather
 - ❖ Etc ...



Supermarket and Lean Transformation

- Supermarket is NOT a final stage of Lean Transformation
- Supermarkets are constructed at the beginning of Lean Transformation in order to:
 - ❖ Stabilize the operation by eliminating parts shortages
 - ❖ “Protect the Customer” – short Lead Time and 100% on time Customer deliveries
 - ❖ Gain control of inventory problems – not enough of what we need and too much of what we do not need
- Ideal State is - No Supermarket !!!
 - ❖ Supply chain able to move at pace of manufacturing in component model, sequence, and mix.
 - ❖ Therefore, the little inventory that exists would be a ‘rolling inventory’ delivered frequently to point of use in the manufacturing facility





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