SPX Flow Technology Lean

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JANUARY 15, 2014



COMPANY CONFIDENTIAL

Introduction-SPX Global



- Based in Charlotte, North Carolina, SPX is a global Fortune 500 multi-industry manufacturing leader with approximately $5 billion in annual revenue, operations in more than 35 countries and over 14,000 employees.
- SPX sells a variety of industry's leading brands that are designed for long-lasting reliability and low maintenance.
- Process technology expertise, custom engineering and continued research and development also help us deliver solutions that respond to the environmental, regulatory and other issues faced by our customers.

Introduction-SPX Delavan





- Along with four other facilities, SPX Delavan is part of the Food and Beverage Division with annual sales $975M.
- SPX Delavan's two plants total almost 300,000 square feet and employees about 400 full time employees.
- Annual sales for Delavan are $260M for engineered to order pumps, valves, separators, homogenizers, spare parts and fittings.

Delavan Products Overview

SPX Flow Technologies-Delavan Facility

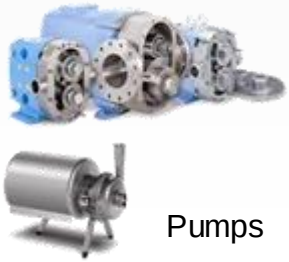
- Design, manufacture and service highly engineered food processing components, modular systems and full-line food processing plants
- Primary products:
  - Pumps
  - Valves
  - Heat exchangers
  - Homogenizers



Dairy
Process Food
Beverage
Brewery
Pharmaceutical
Household Care
Personal Care
Industrial Applications

Brands

- Anydro
- APV
- Bran + Luebbe
- Gerstenberg Schroder
- Johnson Pump
- Plenty
- Waukesha Cherry-Burrell



Pumps



Valves



Systems



Standard Products



Dispersion

Agenda

- To discuss SPX Flow Technology-Delavan's lean processes
- Inventory Obstacles
- SPX Current Kanban Process
- Lean Initiatives
- Takeaway Points

Inventory Success

Common Obstacles

- Too much inventory
- Low inventory turns
- No inventory when needed
- Long lead times for orders
- Suppliers not meeting schedule dates
- Manufacturing running large quantities to last for six months

KANBAN

The Right Amount of Inventory at the Right Time

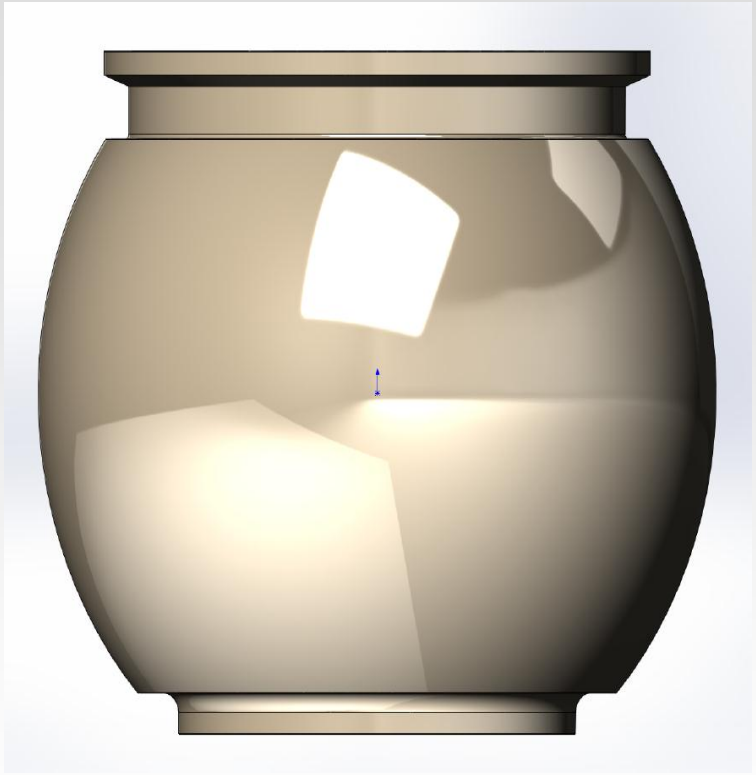
What Is Kanban?

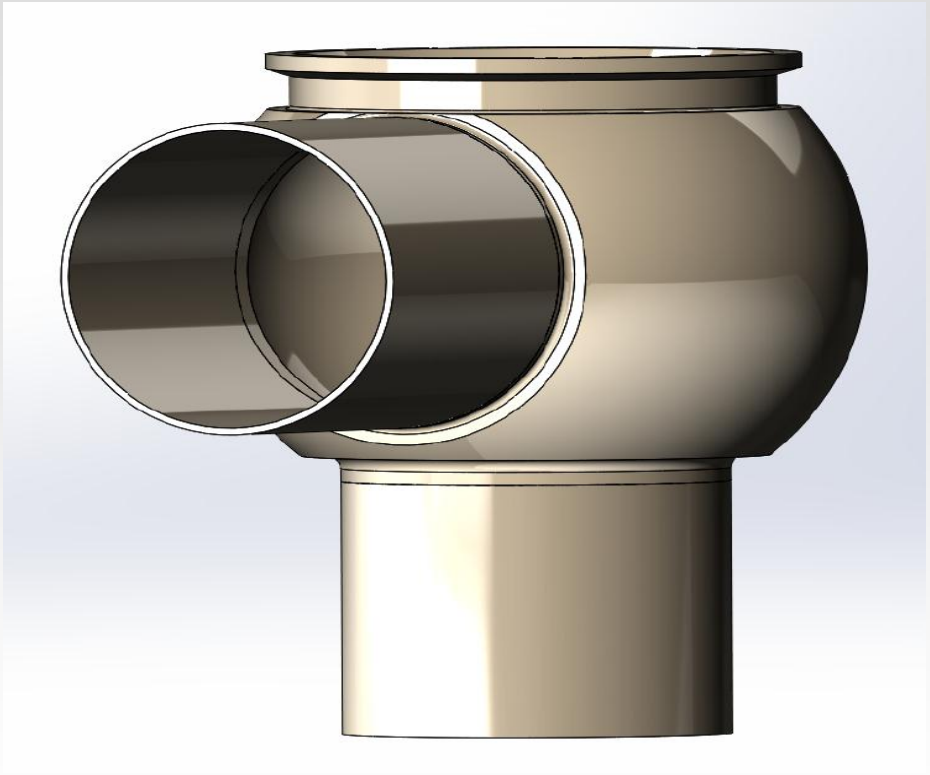
- Kanban is a pull system of inventory replenishment with main benefits to establish an upper limit of stocked inventory.
- Toyota introduced the Kanban process and roughly translated, it means “card you can see.” It is a “A visual communication device to signal the start of a process.”
- Kanban aligns inventory levels with actual consumption-Pull System
- Used to automate material requirement planning for items with **repetitive** use.

Recipe for Success

- Utilize Lean manufacturing practices
- Incorporate commonality for engineered-to-order parts
- Utilize best practices for inventory replenishment processes
- Proactive communication with suppliers
- Seek feedback from production leaders
- Following guidelines

Recipe for Success





Kanban Candidates

Is the part a candidate for the Kanban process?

- Is there a constant flow in the pipeline ?
- Are engineering changes rare?
- Is it free of quality inspection after receipt?
- Is the routing completed in-house?

Can you answer “yes” to one of the following questions?

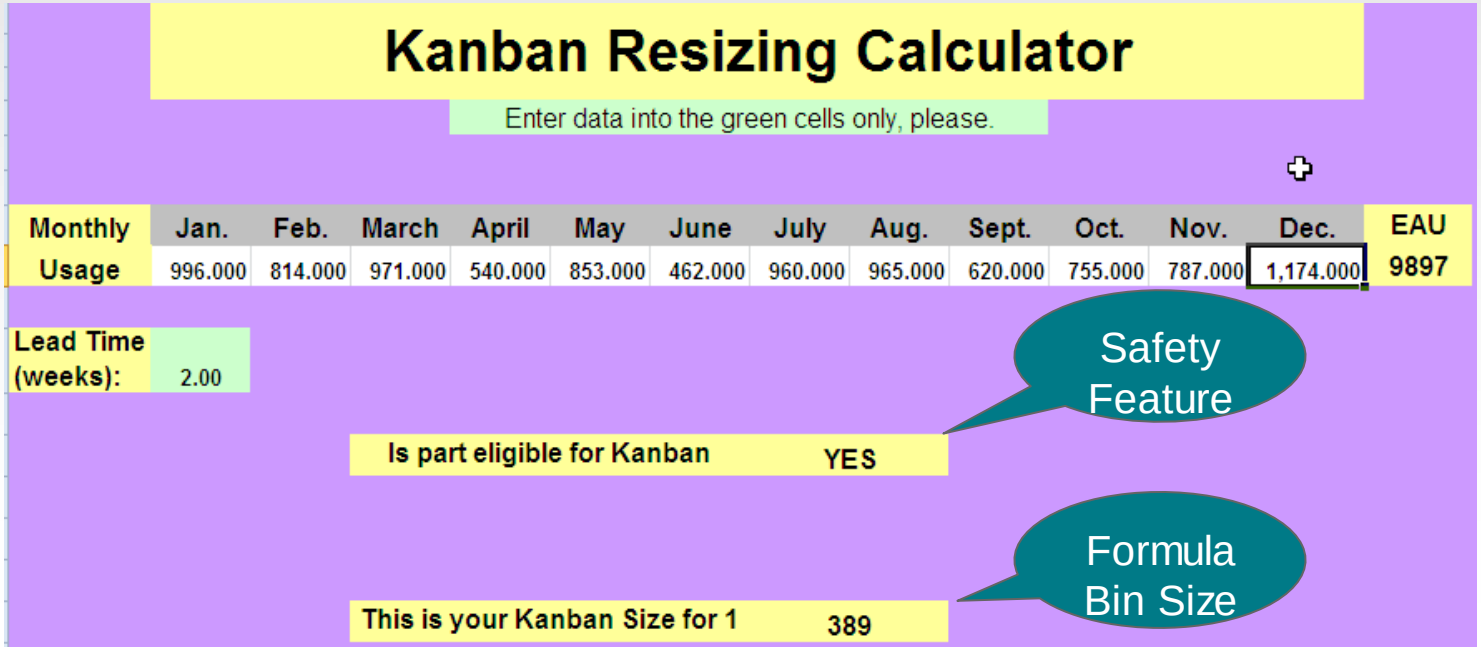
- Is estimated annual usage is >100 units?
- Is the lead time for the part/component longer than the market will wait?

Bin Sizing Selection

- Bin quantity is based on historical consumption and not a forecast
- All Kanbans are two bins
- Parts does not have “spiky” demand
- Lead time consideration
  - Make parts are two weeks
  - Buy parts are one week

Kanban Bin Sizing

- Utilize “sizing” tool to calculate Kanban bin quantity.
  - Safety feature: If the demand varies too much, another inventory replenishment technique will be utilized.
  - Calculator considers annual consumption, lead time and a smoothing factor in the formula. Smoothing factor accounts for variation in demand.



ERP System Success

- Master data consistency
- Work procedures
- Easy identification of parts for end user
- Electronic (E)-Kanban
  - Automate PO releases
  - Barcode software and printers
  - Hand held scanners

Kanban Card

Key Information





Facility Functionality

- Dedicated storage location
- Dedicated bins
- Store bins close to point of use and processing area

Dedicated Kanban Storage



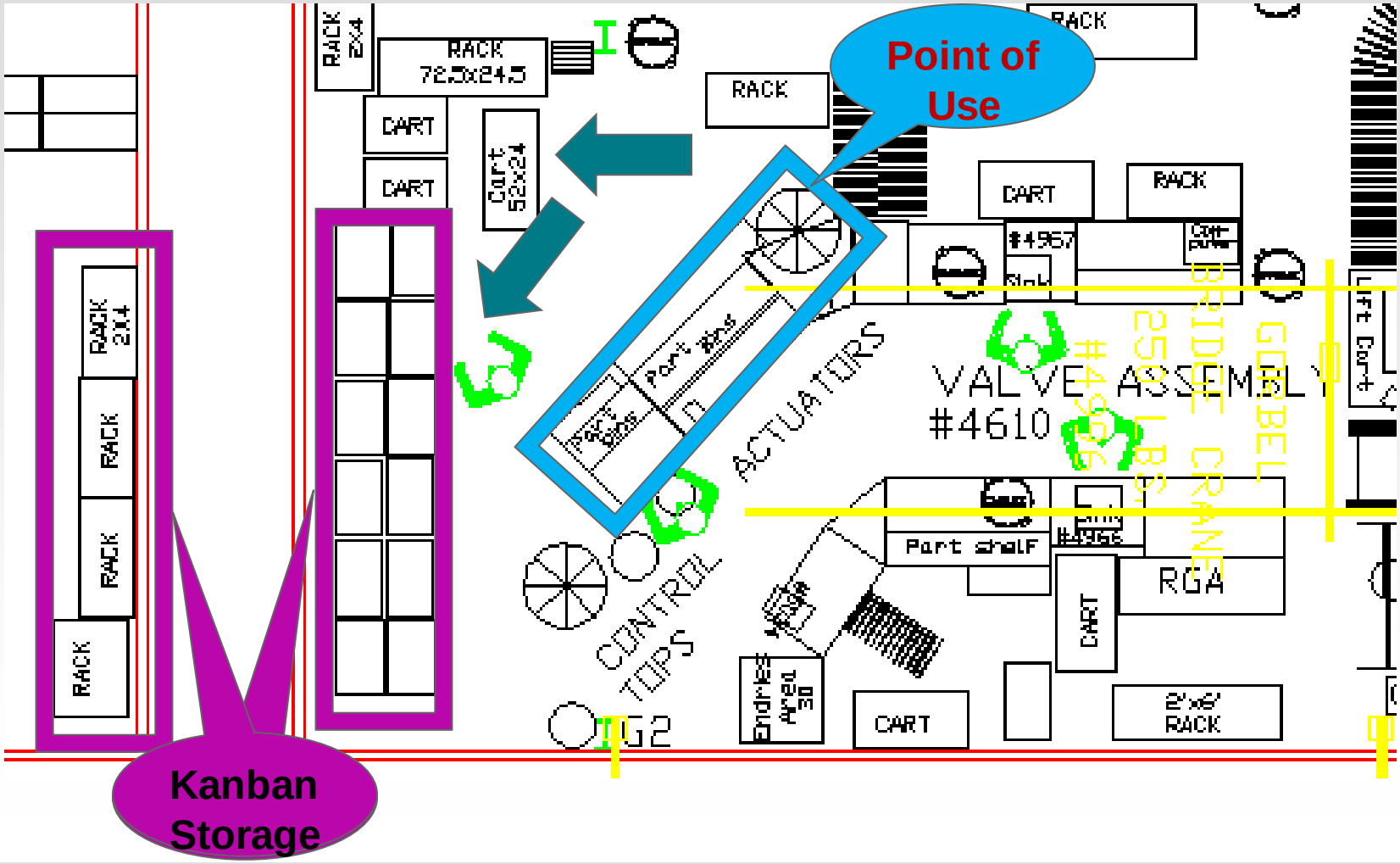
Dedicated Kanban Storage



Visual System



Kanban Layout



Source Participation

Purchased Parts

- Supplier agrees to terms of contract
- 7 calendar day lead time
- Stocking plan at supplier

Manufactured Parts

- Capacity/Prioritization
- 2 week lead time
- Lower level parts also on Kanban

- Maintain inventory levels to ensure an uninterrupted supply of inventory.
- Communicate issues
  - Quality, material, schedule or quantity

Kanban Side Effects

- Monitoring for spikes in demand via exception reporting
- Reviewing past due orders
- Human error
- Reviewing bin size for changes in consumption



Implementation Alarms

- Unusual size parts
- Fragile parts
- Multiple boxes per bin
- Long lead times

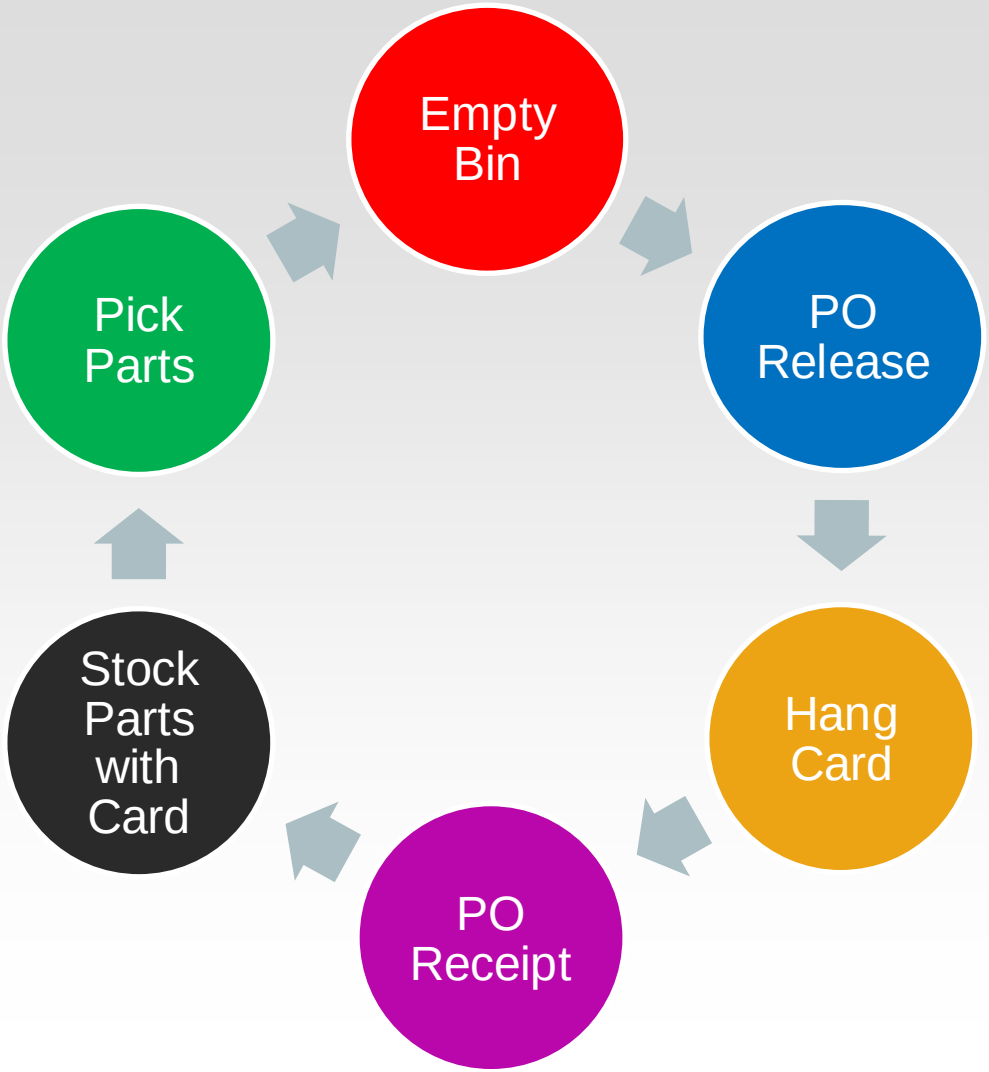
VISUAL SYSTEM

Dedicated Kanban Storage



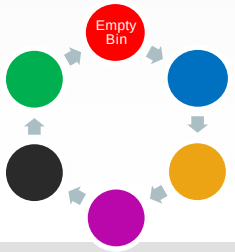
Current Processes at Delavan, WI Facility

Kanban Cycle



Kanban Storage



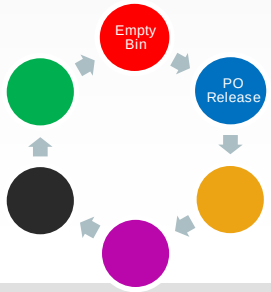


Empty bin; pick from left

Kanban Ordering E-Kanban

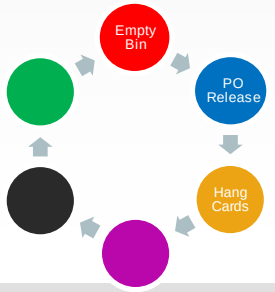
- Scanning Kanban card to create PO release





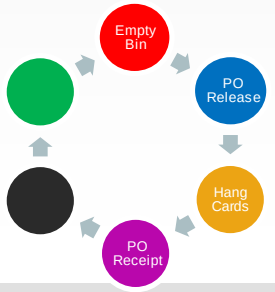
Kanban Traffic Board





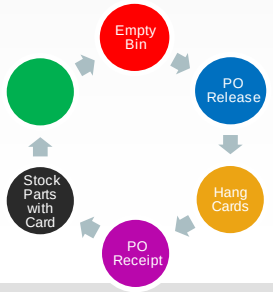
Kanban Recieving





Stocking Parts After Receiving





Happy Customers!



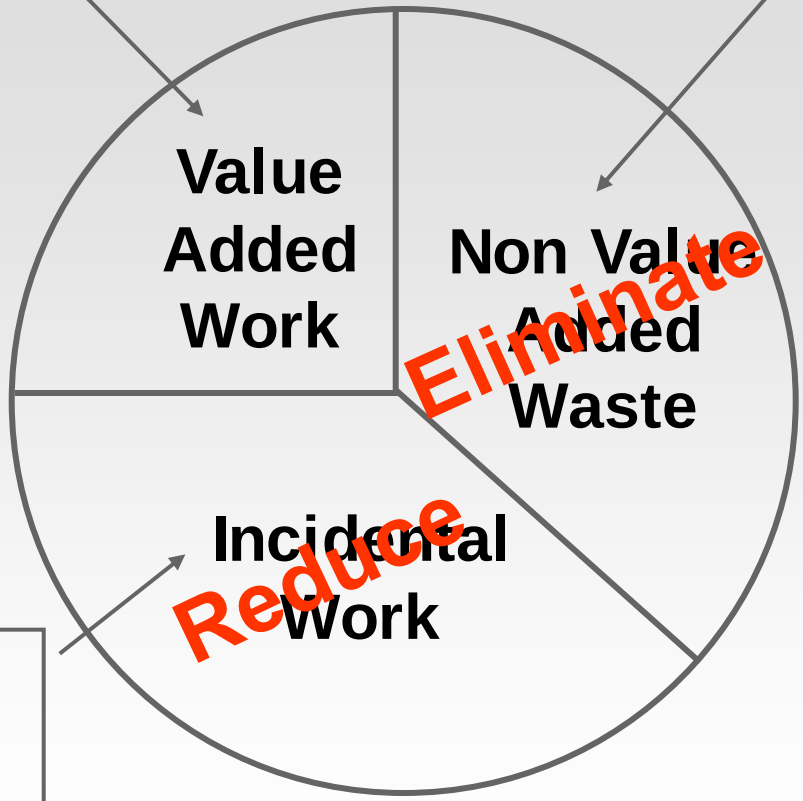
Lean Manufacturing at SPX Delavan

Lean Team

- People from all aspects of production
- Annual Projects
  - Layout Efficiencies
  - Automation of Processes
  - Updated Technology
  - Preventative Maintenance Plans
  - Building Energy Savings

Categories of Work

- Welding
- Bolting
- Tightening
- Position
- Clipping
- Painting



- Waiting
- Extra handling
- Excess bending
- Excess reaching
- Travel time
- Repositioning part
- Rearranging
- Repair & rework
- Reprocessing
- Working ahead
- Walking

- Get parts
- Apply fixture
- Discard dunnage
- Dispose of container
- Change cart
- Check manifest

8 Deadly Wastes

Defects

Overproduction

Waiting

Non-Utilized Talent

Transportation

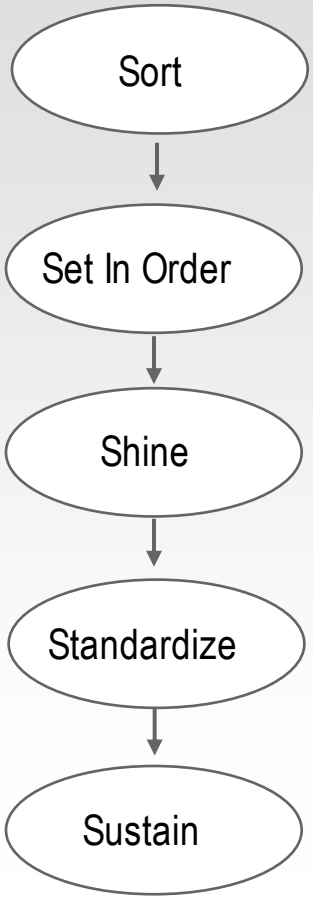
I nventory

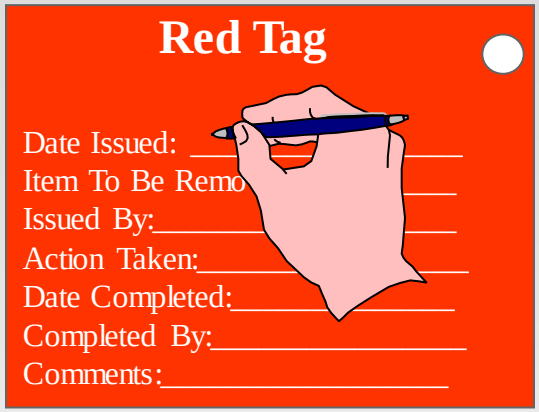
Motion

Extra Processing

Organizing with 5s

'5S' PROCESS FLOW



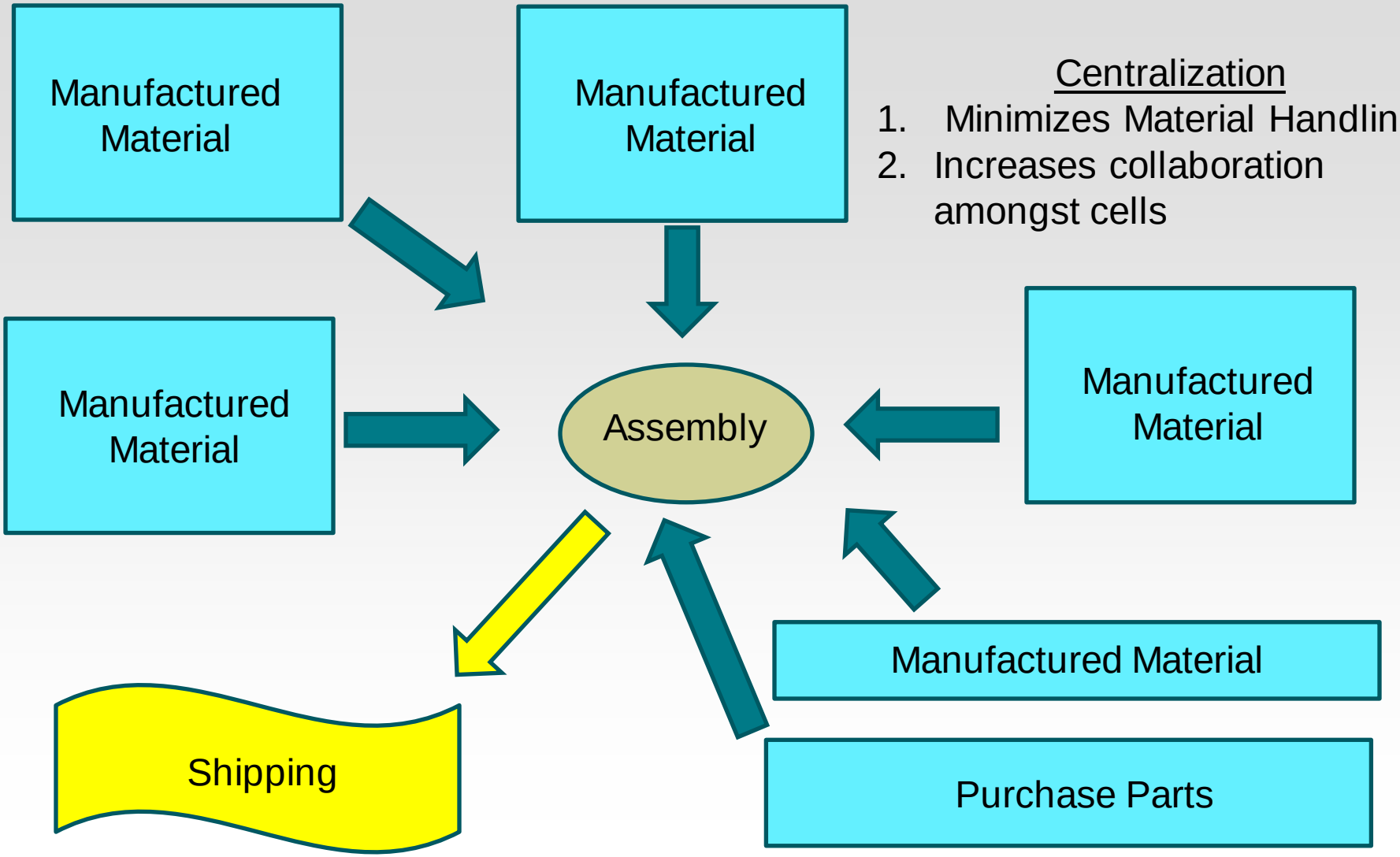






1. Develop "Red Tag" Standards
2. Implement Red Tag Process
3. Obtain Buy-In
4. Conduct Improvement Reviews
5. Standardize and Make Visual
6. Make Work List
7. Post Work Items On Kaizen Wall
8. Assign Responsibilities
9. Conduct Improvement Reviews
10. Assign Remaining Open Tasks
11. Conduct Wrap-up
12. Start Over

Plant Layout



Centralization

1. Minimizes Material Handling
2. Increases collaboration amongst cells

Hub and Spoke Approach

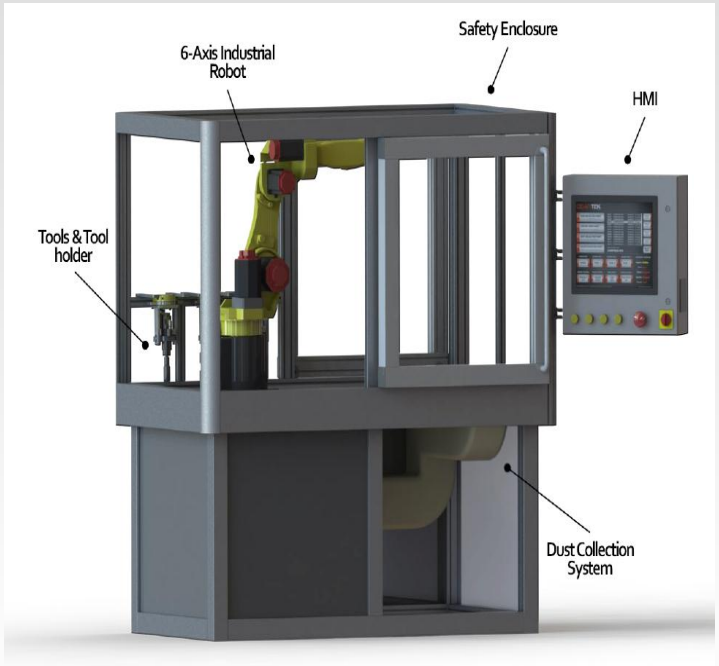
Automation Effect in a Cell

Automation Project

Old



New



Automation-Problems & Solutions

Cell Problems

- No room for the automatic robot
- Congested material flow areas
- Long distances to inventory
- Clutter from old processes
- Lost capacity

Solutions

- Eliminate wasted space between machines
- Designate staging areas for in process materials
- Centralize inventory storage
- Eliminate hidden areas for clutter
- Free up operators time

Automation-Impact

- Reducing Operator Fatigue
- Saved 2-5 Minutes Per Piece
  - Approximately $40,000 annually in Labor Savings
- More available labor = Increased Capacity
  - Machines no longer wait on operators
- Improved product consistency and quality
- Increase organization and cleanliness of cell

Automation-Time Utilization







What can you do With this extra time?



Increased capacity

More Machining

Time to Lean, Time to Clean

Maintain Work Area



Automation-Organizing with 5s

Old



New



Automation-Space Utilization

Moving Machines → Open Floor Space

Created180ft^2 for the robot
and
480 ft^2 of vertical storage along the aisle

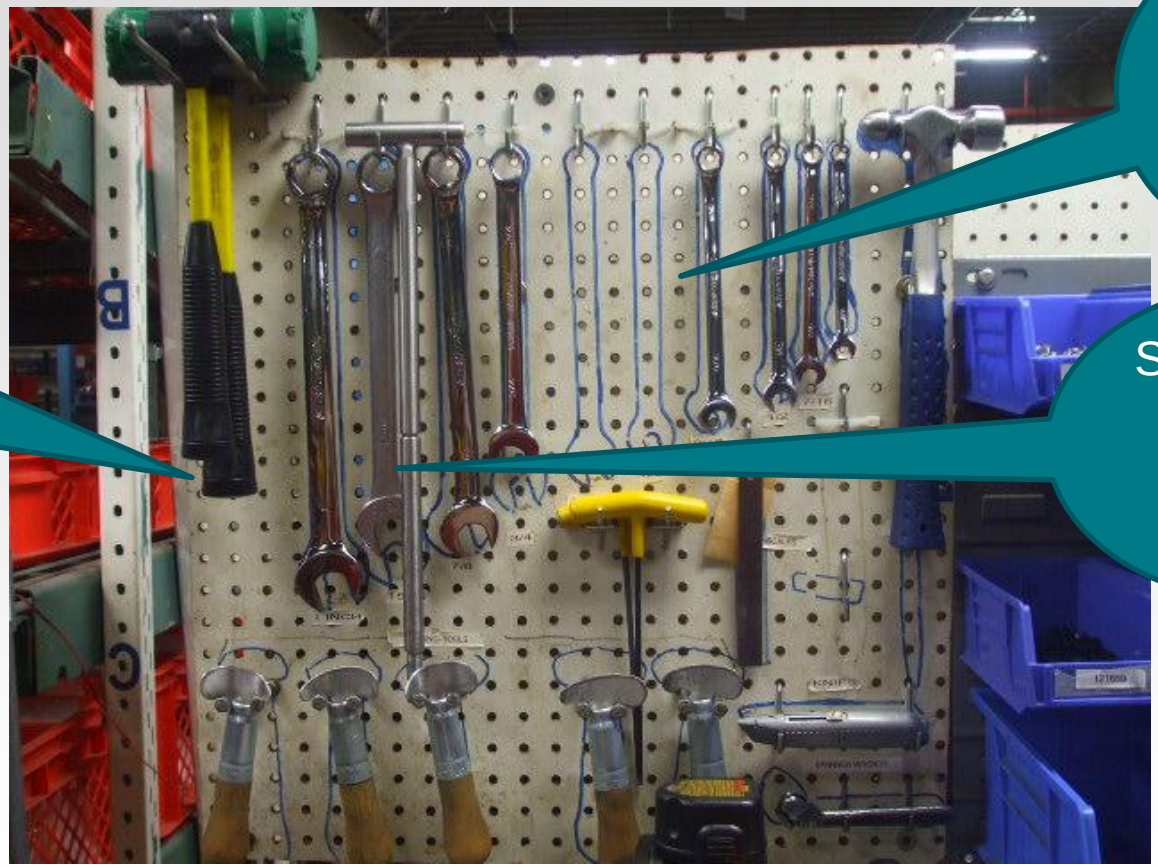
Reduced 200ft^2 of space along the wall
into
60 ft^2 of centralized inventory storage





Shadow Boards and Lean Layouts

Shadow Boards



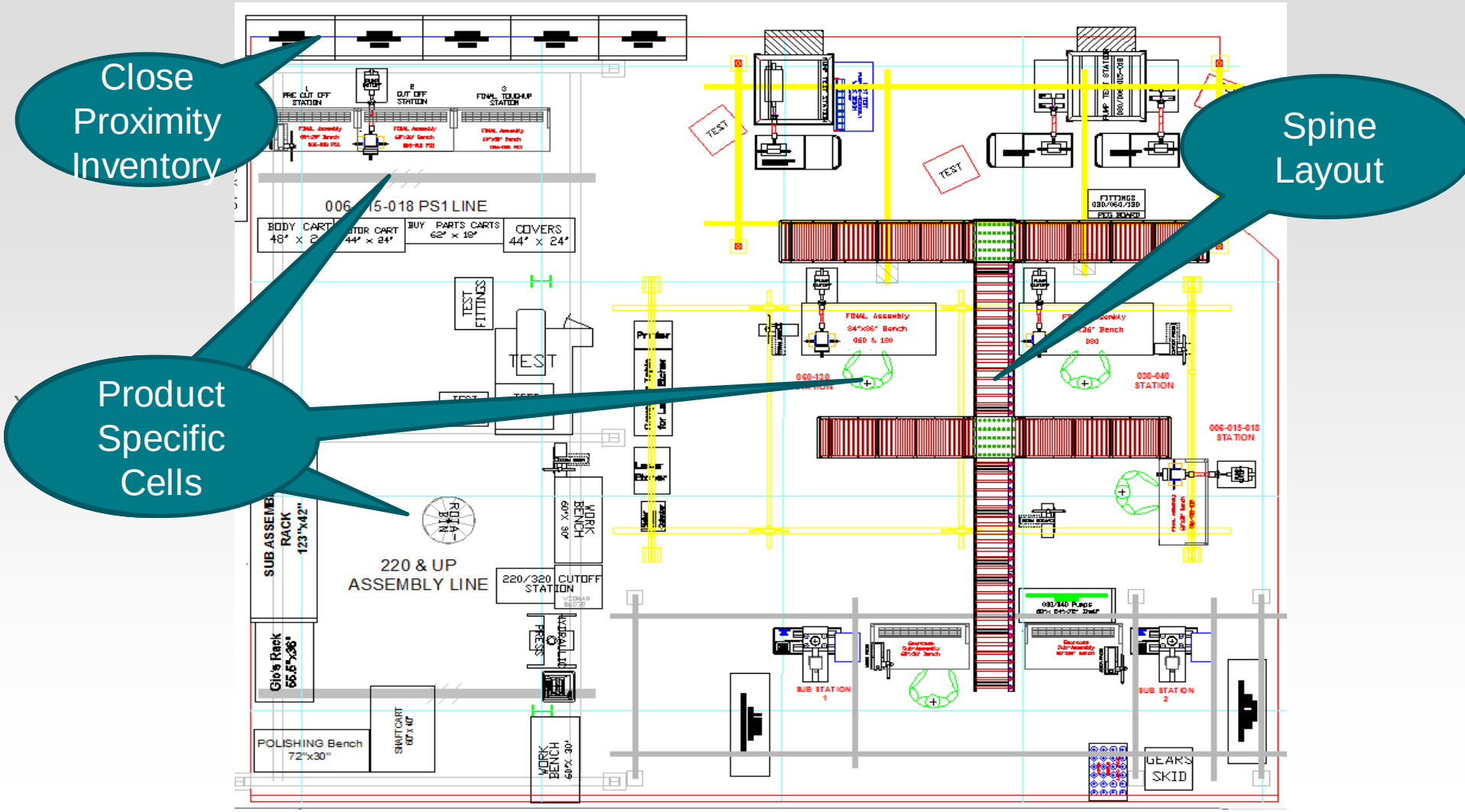
No room for clutter

Easy to see what is missing

Standardized Tooling For all operators

Tools needed for job = less waste

Lean Layout



Close Proximity Inventory
Spine Layout
Product Specific Cells
006-015-018 PS1 LINE
BODY CART
BUY PARTS CARTS
62" x 18"
COVERS
44" x 24"
TEST FITTINGS
TEST
220 & UP ASSEMBLY LINE
220/320 CUTOFF STATION
WORK BENCH
60"X 30"
SUB ASSEMBLY RACK
123"x42"
Gio's Rack
55.5"x36"
POLISHING Bench
72"x30"
SHAFTCART
60"x 40"
FINAL Assembly
84"x36" Bench
060 & 180
060-130 STATION
030-040 STATION
006-015-018 STATION
SUB STATION 1
SUB STATION 2
GEARS SKID

Close Proximity Inventory

Vendor Managed Inventory



Inventory Storage



Spine Layout



Takeaways

Q&A Session

Questions?