Lean Inventory Management

(Kanban Inventory System)

OUR GOAL AND VISION

KANBAN INVENTORY SYSTEM

Standardized inventories using a Pull system,

Just-in-time inventories &

Kanbans that will improve quality

while reducing total cost

Definition of KANBAN

- A **KanBan** card:
  - **Kan** means color
  - **Ban** means card used for inventory

- Visual Aid to assist inventory management
  - High visibility for stock on hand
  - Indicator for Re-Ordering of stock

    (paper, gloves, surgical equipment, etc)

Benefits of Lean Production

- Reduce Inventory
- Reduce Storage Space
- Improve Quality
- Lower Total Cost
- Avoid Stock-Outs
- Avoid Obsolescence

Kanban Cards

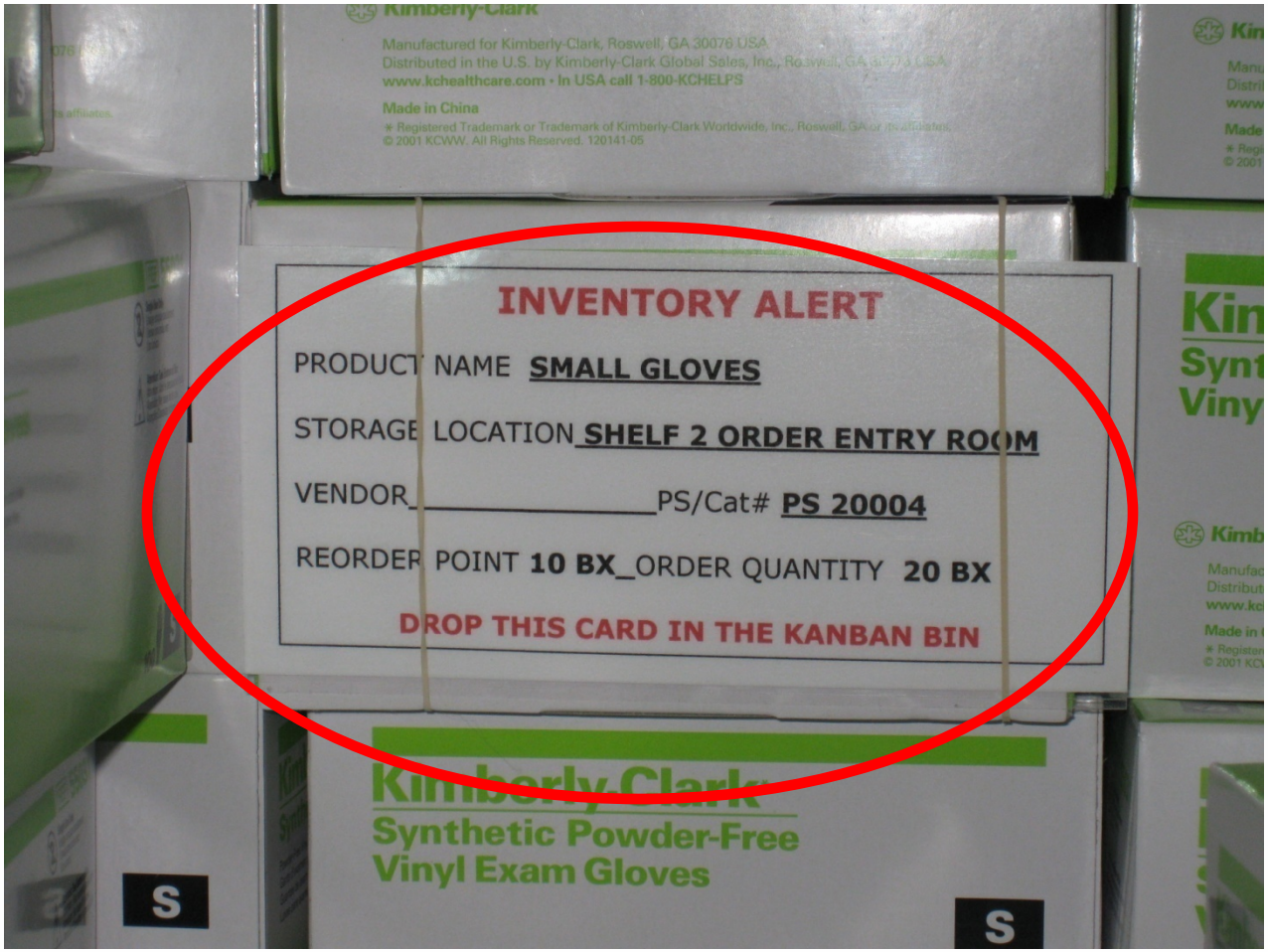
Kanban Card I

1st Generation

Kanban Card II

2nd Generation

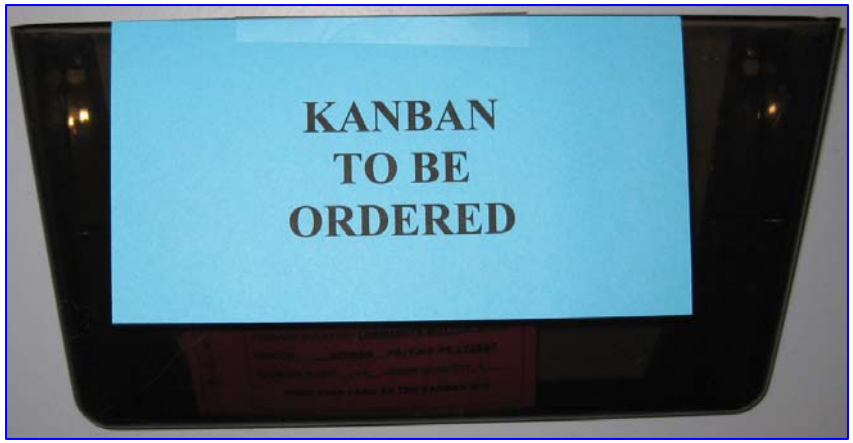
KANBAN FOR ANY STOCK



Example Order Station

- When an employee *PULLS* inventory with a **Kanban card,** the cards are placed at the order station
- Examples Include: Bins, Folders, Envelopes, Cubbies, Baskets, etc etc…
- Need to be in high visibility areas

Bins



Wall Holders


09/30/2008 19:26
CUVETTE CARTRIDGES

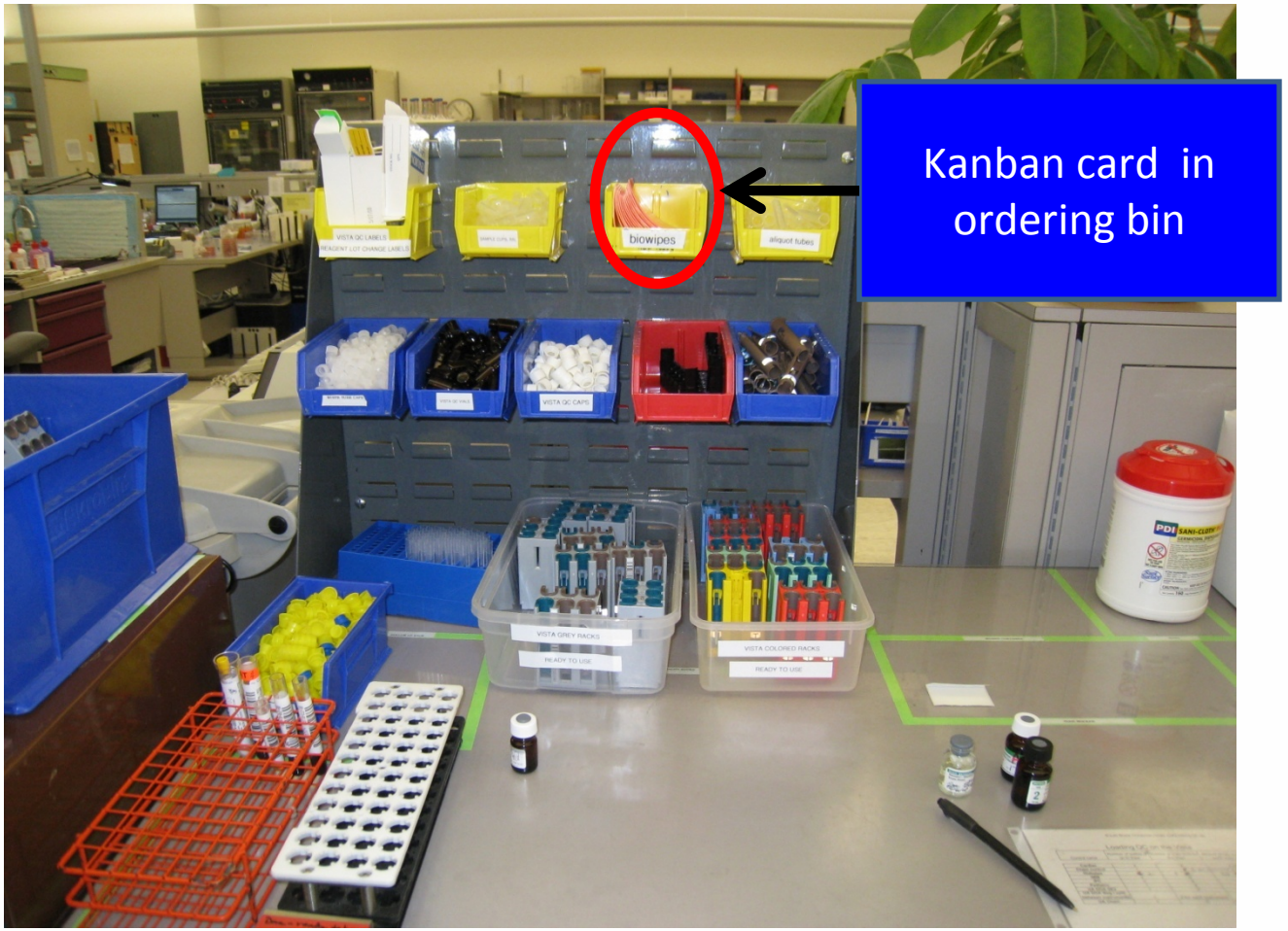
Example Re-Ordering Station

- Once item is ordered, the card is placed in the Ordered Kanban Station
- Card remain there until order arrives, unless backordered
- Once the stock arrives, stock is rotated and Kanban Cards are placed at the re-order point
- Re-order Station is at a different location than the Order Station

Kanban Example

Racks are alphabetical and shelves are numbered

Standardized Work Cell with Kanban Ordering Bins



Savings: Hospital Lab

One Coagulation Analyzer Reagents

- Inventory Factors:
  - Excess inventory
  - Obsolescence
  - Calibration
  - Quality Control
  - Accidental
  - Not so accidental loss
- Total Cost: $65,000+ on Excess Inventory

Savings: Hospital Lab

- Logistical Factors
  - Cost to order
  - Storage
  - Transportation

- Transportation Fees
  - $1000 spent on cabs monthly
  - Total Cost: $12,000/year

Savings: Hospital Lab

- Staff:
  - ✓ $25/hour + benefits ≈ $75,000/year
  - ✓ 1% Lost time to inventory handling

    $750/year
  - ✓ 3-4 Individuals handling inventory

    $3000/year
- Yearly loss to inventory handling:
  - ✓ 65000 + 12000 + 3000 = $80,000

Value Creation With Lean Multiple Aspects

- Improved Quality
- Increased Efficiency
- Savings – Reduced Total Cost
- Continuous flow – No stock-outs
- Avoid Obsolescence
- Reduced Storage Space and Equipment
- Reduced Motion – moving Inventory to work area

Value Creation – Savings

Two Types of Savings:

•One Time Savings

Frees up capital with reduced inventory

•Perpetual Savings

Saves the expenses to maintain inventory

Health care

Hospital CEOs find ways to save

Managing staff time, inventory can cut costs

By Del Jones
USA TODAY

Each of the nation's 5,700 hospitals must cut $2.6 million a year on average in costs in the next 10 years to meet the demands of President Obama's proposed health care reform, a daunting task when half of those hospitals lose money.

Criticism came from almost every corner leading up to Obama's speech before Congress on Wednesday night, yet many hospital CEOs aren't complaining, at least not publicly. They say that the hospitals they run are rife with inefficiency and that they are optimistic that the $155 billion in savings is do-able with the help of business disciplines, such as the Toyota Production System, lean manufacturing and Six Sigma.

"Efficiency has not been the hallmark of health care delivery operations," says Alan Aviles, CEO of New York City Health and Hospitals Corp. (HHC), one of the largest hospital and health care systems in the country, with $5.4 billion in revenue.

Those disciplines have been wringing costs from manufacturing for decades, and the cost-cutting has also delivered a counter-intuitive benefit. TVs and computers have gotten better as the cost of making them has declined. Similarly, hospital CEOs say, quality can improve as waste is eliminated.

The 11 hospitals under Aviles' command recently had storage rooms brimming with $10.2 mil-

Alan Aviles: The CEO of New York City Health and Hospitals Corp. visits the old supply warehouse at the Jacobi Medical Center in the Bronx. The 11 hospitals under Aviles' command have gone from having storage rooms brimming with $10.2 million in supplies to a just-in-time inventory system.
By Lisa Kyle for USA TODAY

▶ Obama discusses health care reform plan, 1A

USA Today
Sept. 10, 2009

When a CEO discovers Lean, watch out!

Inventory Management Calculations

1. How much to order? - Order Quantity
2. How much stock is required for variations? - Safety Stock
3. When to order? – Re-Order Point (ROP) or Kanban Position

Inventory Management Implementation Process

- Take stock of all inventory (Organize items by vendor, by department and by instruments)
- Calculate average daily material usage (Demand)
- Calculate average delivery times for all items (Supply)
- Perform inventory calculations (Spreadsheet Provided)
- Train at least two people in each location to perform ordering function

Inventory Model – Excel Spreadsheet On Your Request

Date: 06/15/09

HENRY FORD HEALTH SYSTEM – FOCUS ON QUALITY OF CARE

Location: Henry Ford Health System

Machine: Chemistry - RXL (example)

Lab Team: (Minimum two Champions)

OUTPUT IN GREEN CELLS

Item #	Product Number	Product Description	Average Daily Demand D (Qty)			Delivery (supply) Cycle in Days T (Days)		Order Unit Increments			KANBAN CARD LOCATION in terms of Purchase Units		Minimum Required Order Time (MROT) (weeks)	How Often you want to order (Should be >or=MROT (Weeks)	YOUR CUSTOMIZED SCHEDULE	
			Min	Max	Unit	Min	Max	Units per purchase unit (Box, Container)	Unit	Purchased Unit					Qty (Units)	Unit
1	111111	REAGENT DIMEN FLX RUN 480 TST	0.0	1.0	box	5	7	1	box	box	6.5	box	1	12	42	box
11	112222				box	5	7	1	box	box	0.0	box	1	12	0	box
21					box	5	7	1	box	box	0.0	box	1	12	0	box
26					box	5	7	1	box	box	0.0	box	1	12	0	box
33					box	5	7	1	box	box	0.0	box	1	2	0	box
34					Cartridge	5	7	1	Cartridge	Cartridge	0.0	Cartridge	1	2	0	Cartridge
37					bags	5	7	1	bags	bag	0.0	bag	1	2	0	bag
38					box	5	7	1	box	box	0.0	box	1	2	0	box
48					set	5	7	2	set	box	0.0	box	1	2	0	box
67					bags	5	7	3	bags	box	0.0	box	1	2	0	box

Inventory Calculations for Large Size Gloves

Data:

Average Demand (D)= 1 box / day

Best Case Delivery time = 6 days

Worse Case Delivery Time = 8 days

Average delivery time (T) **= (6+8)/2= 7 days**

Calculating Order Quantity:

Minimum Order Quantity = (D x T) **= (1 box per day) x (7 days) = 7 boxes**

Due to the manual ordering in the computer, HFHS decided to order every 2 weeks.

Actual order quantity = 1 box per day x 14 days = 14 boxes

Inventory Calculations for Large Size Gloves

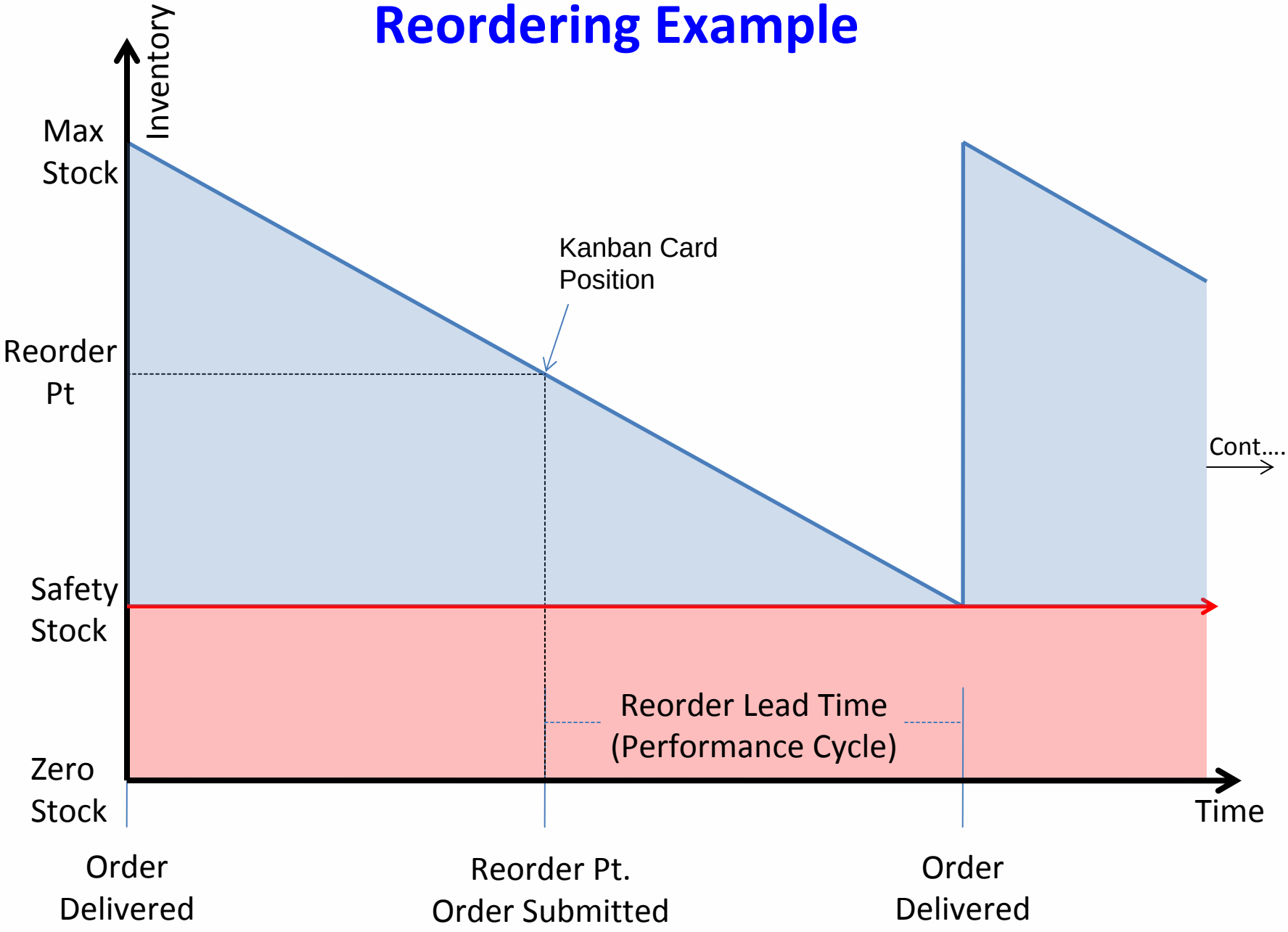
Calculating Safety Stock (SS):

Safety Stock (SS) = Material to protect for demand and supply fluctuations (7 days) **= 1 box per day x 7 days = 7 boxes**

Re-Order Point (ROP) and Kanban Card Position:

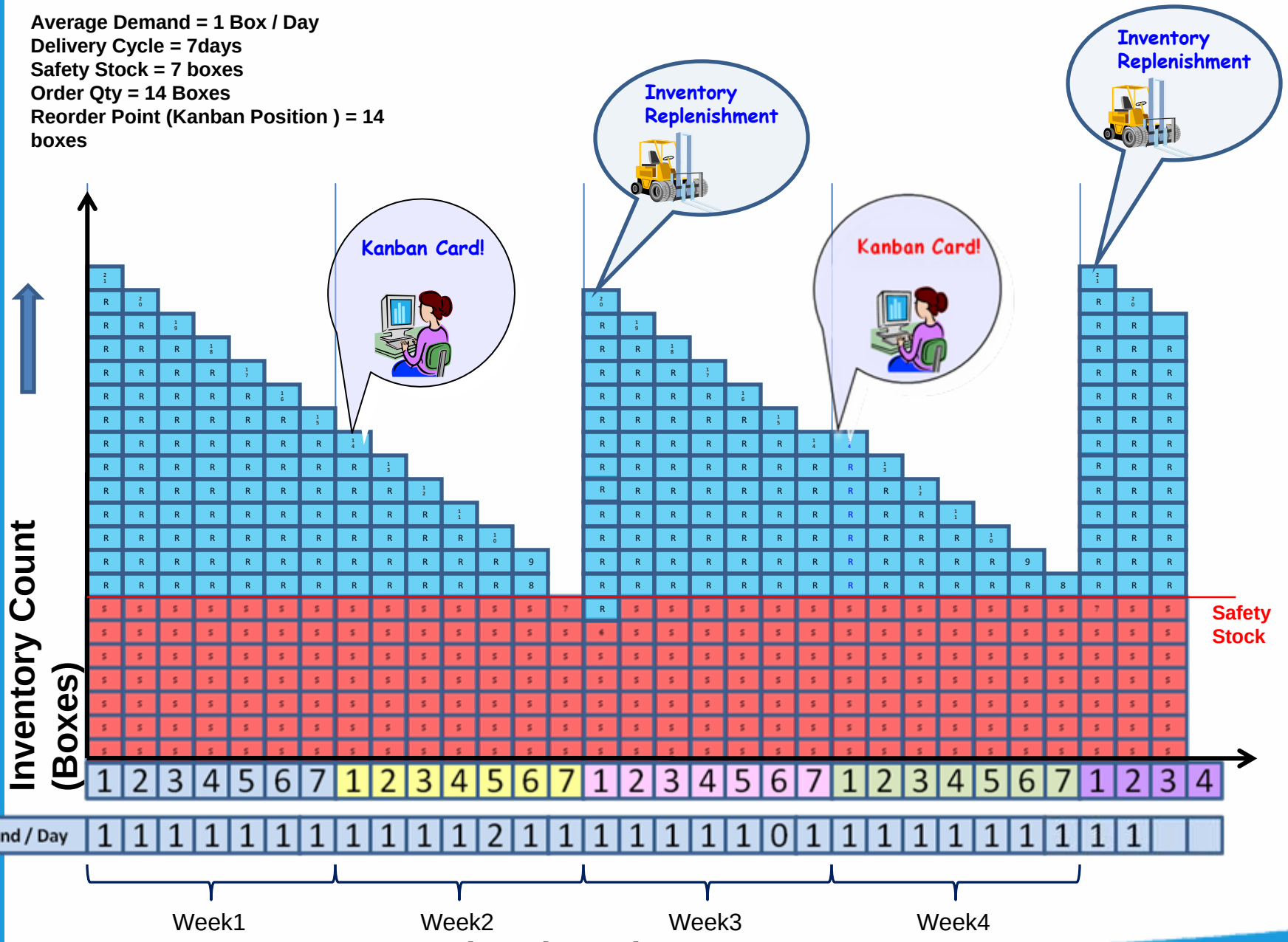
Kanban Card Position = Material for Average Delivery time + Safety Stock **= 7 boxes+7 boxes= 14 boxes**

Reordering Example

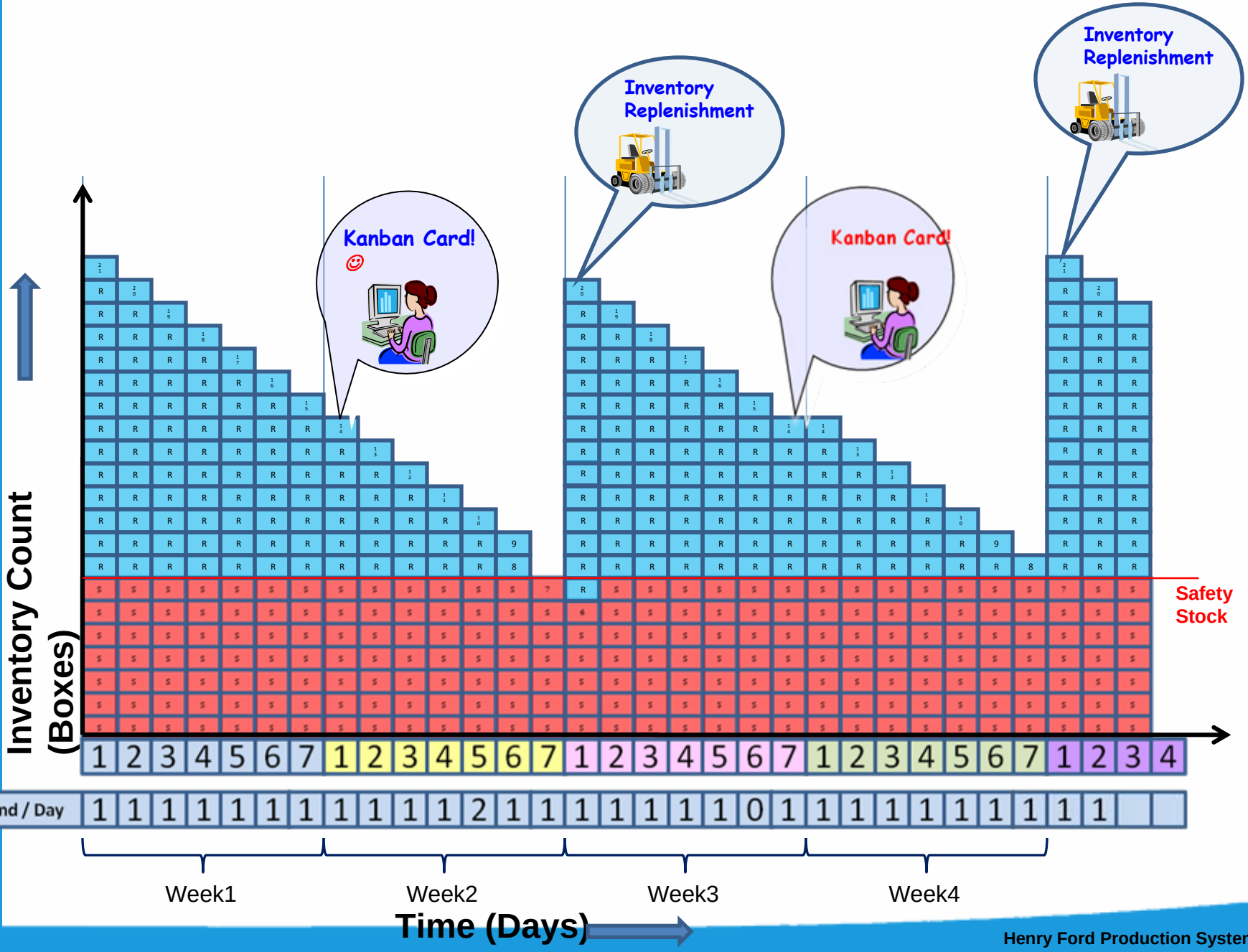


Inventory Simulation for Large Size Gloves

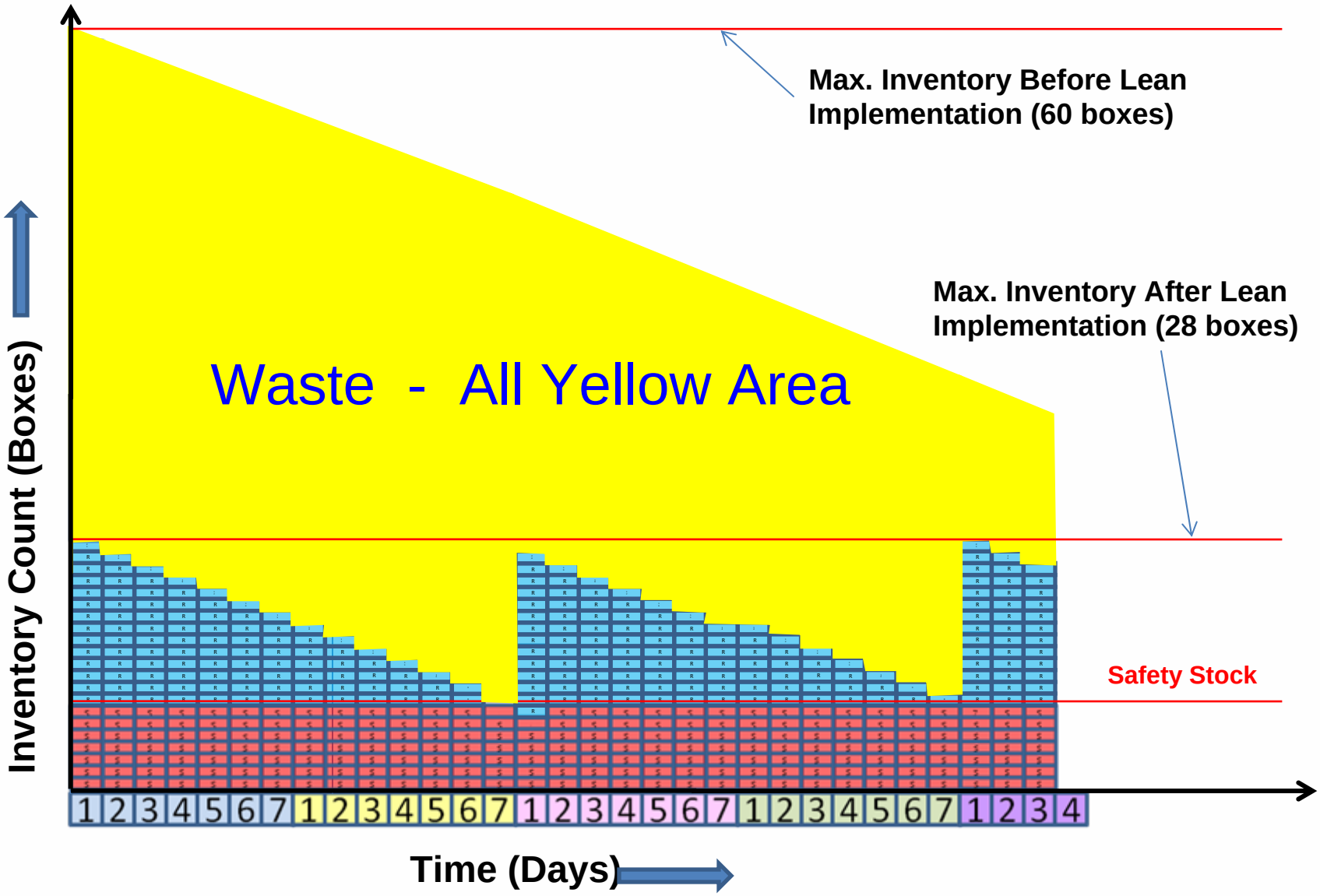
Average Demand = 1 Box / Day
Delivery Cycle = 7days
Safety Stock = 7 boxes
Order Qty = 14 Boxes
Reorder Point (Kanban Position) = 14 boxes



Inventory Simulation for Large Size Gloves



Inventory Reduction With Lean - Large Size Gloves



Tips for Inventory Management Planning

- Higher delivery variation => Increases safety stock
- Higher demand fluctuations => Increases safety stock
- Ordering more often => Increases “Ordering Cost”
- Ordering too much material=> Increase inventory maintenance cost
- Ordering Frequency => Depends upon the technology that is being used for ordering
- Order Quantity => May affect economies of scale (EOS)

Take Home Lessons

- Kanban involves all employees
- Kanban is a system that continuously supplies products
  - You have what you need, where you need it, when you need it
- Have sufficient material at points of use
- Teams and individuals are encouraged to CONTINUOUSLY IMPROVE
- Support each other

Questions or Comments ?

If you're interested in this inventory management approach
Visit the lab and E-mail us for the spreadsheet