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LSS Tool – The Spaghetti Diagram





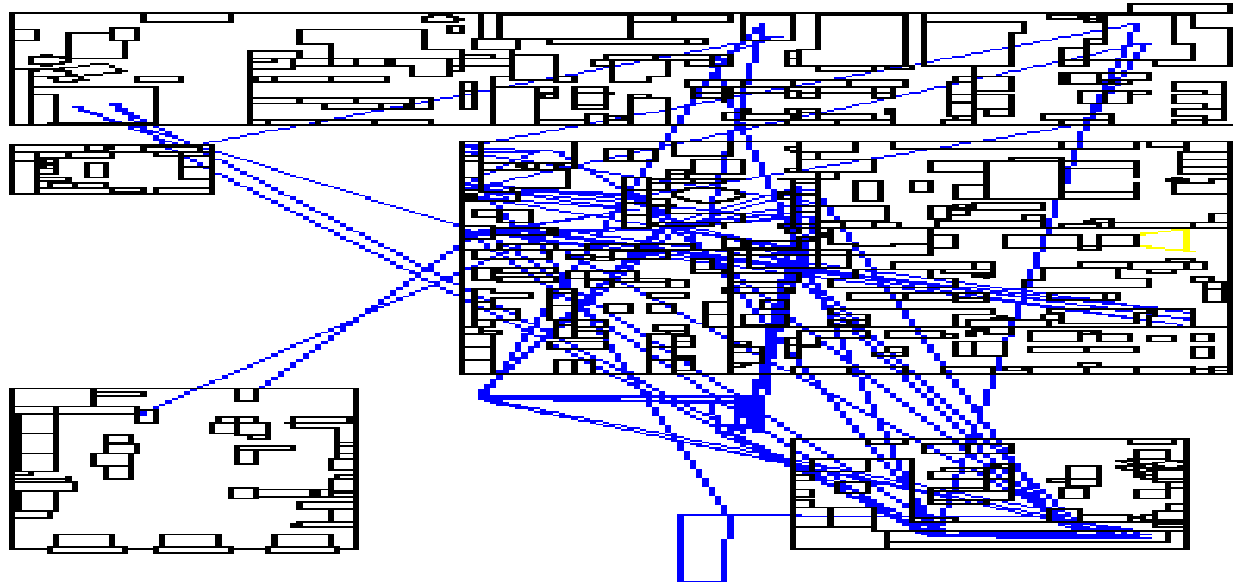
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Agenda

- What is a Spaghetti Diagram
- Uses of a Spaghetti Diagram
- Examples of a Spaghetti Diagram
- How to put together a Spaghetti Diagram
- Spaghetti Exercise
- Questions

What is a Spaghetti Chart?

- a.k.a “Physical Process Map”, “Point-to-Point Flow Chart”, or “Work-flow Diagram”
- Used to Graphically Depict The Movement of the Product or Documents (or people!) through a Process



An Illustration of a System's Inefficiency



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Spaghetti Chart to Identify Waste

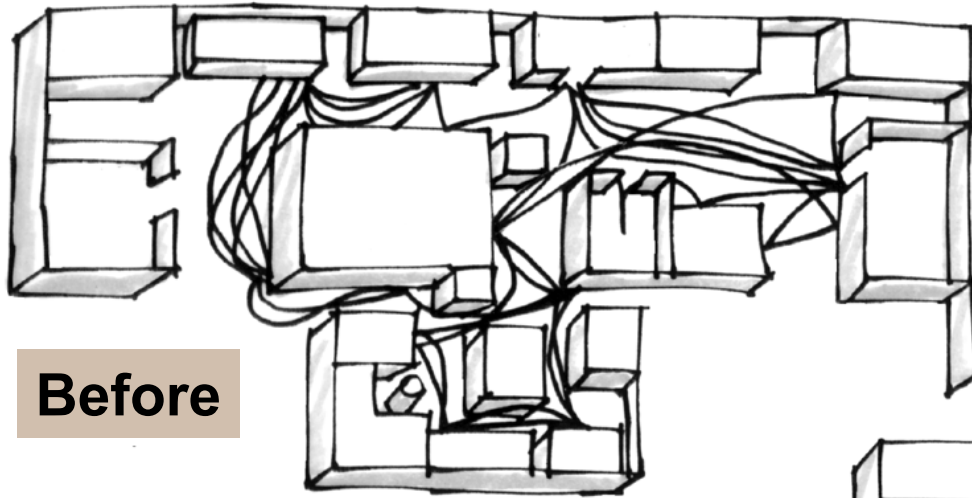
- Differ from Detailed Process Maps and other Value Stream Maps
 - Do not require sequential process steps
 - Seek to highlight wasted motion
 - Built around specific work area layouts
- Construction:
 - Sketch current work area arrangement in detail
 - Draw a line to describe every trip each person or unit makes from one point to another
 - As more trips are made, more lines are added
 - The more wasteful/redundant trips, the thicker the chart is with lines

Spaghetti Charts make poor layouts and wasted motion obvious in the Value Stream Analysis.



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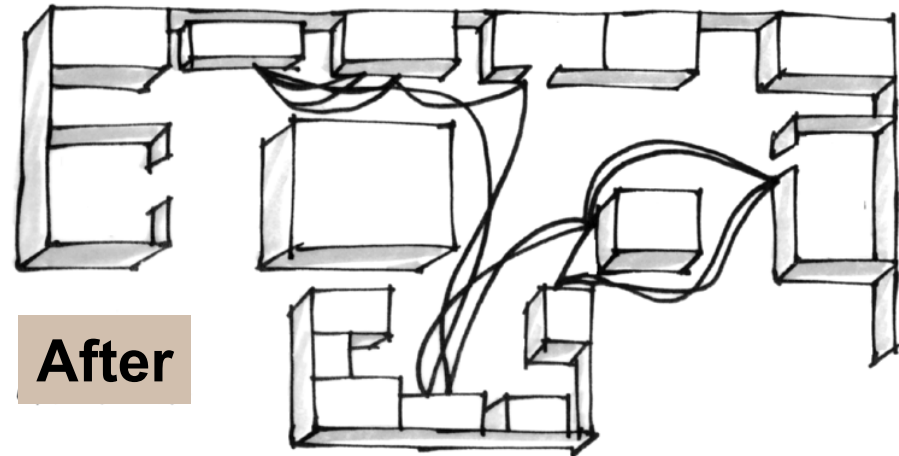
Example Spaghetti Chart



Before

Could be:

- Movement of people walking around
- Movement of documents through an office

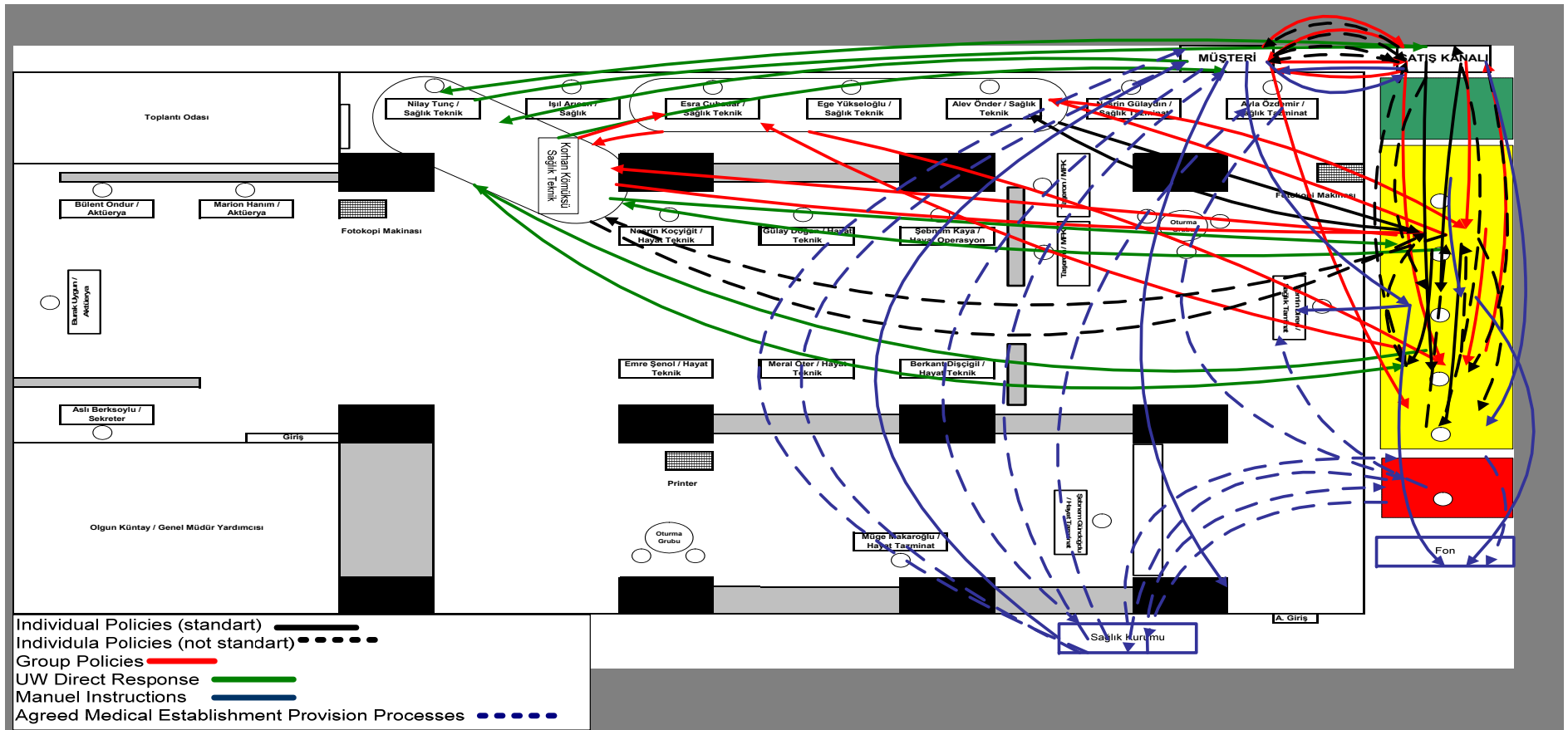


After

Spaghetti Charts make poor layouts and wasted motion obvious.



Example Spaghetti Chart

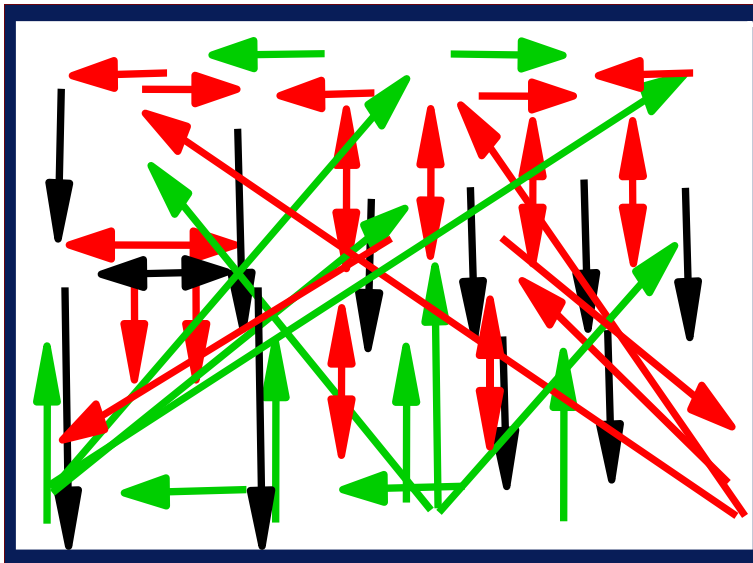


Spaghetti Charts make poor layouts and wasted motion obvious.

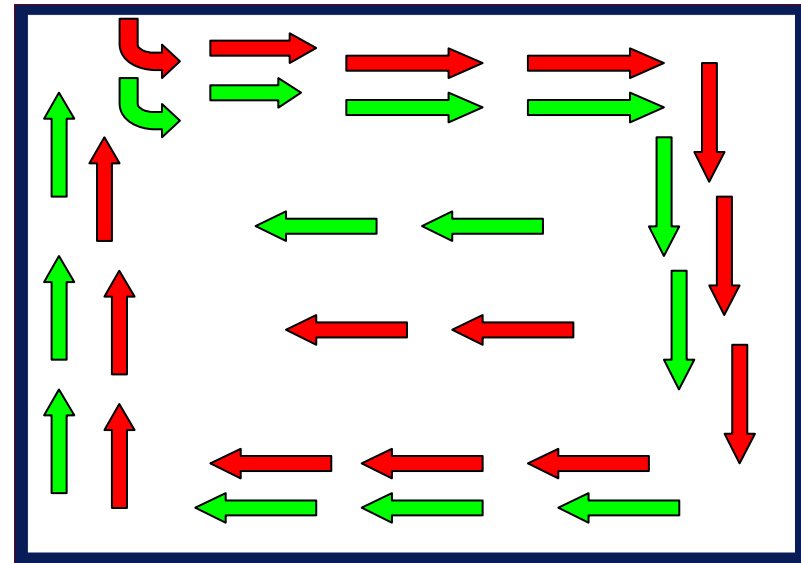
Spaghetti diagramming as part of Lean & 5S

- Construct a spaghetti diagram
 - draw arrows depicting workflow
 - optimize the movement of the product and employee
 - revise your layout to minimize unnecessary motion

Before



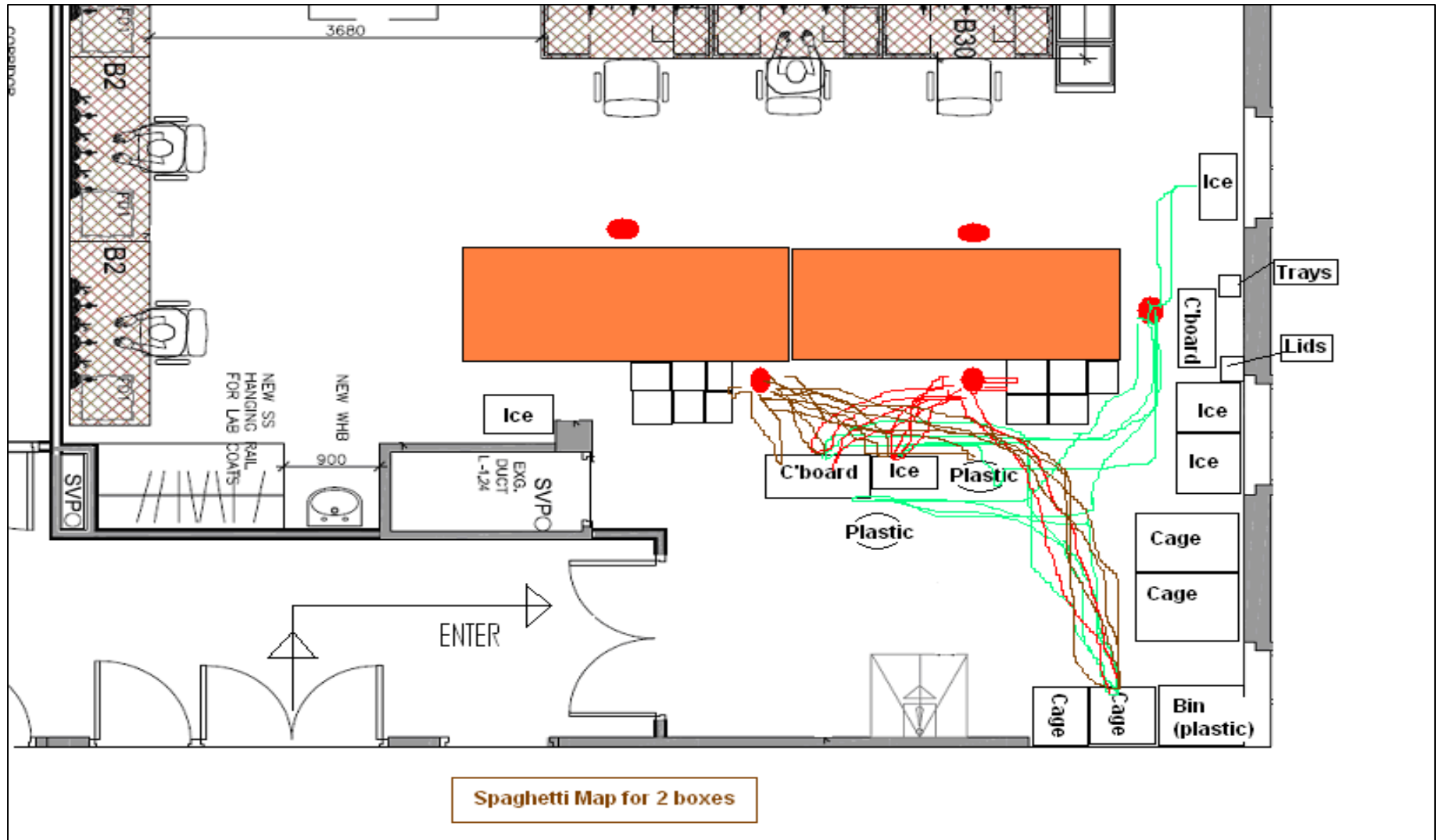
After



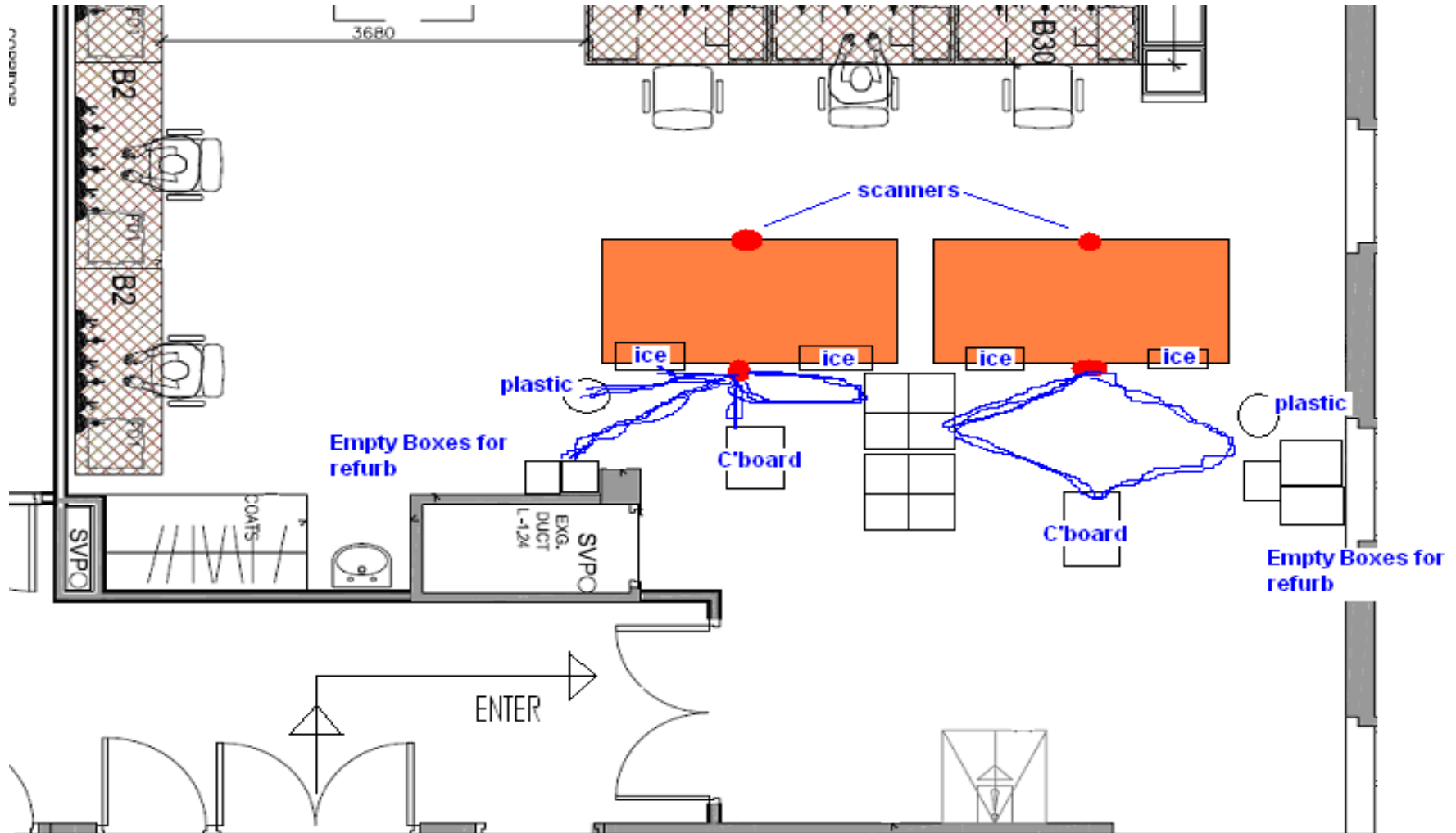


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Example :Central Processing Area -Before



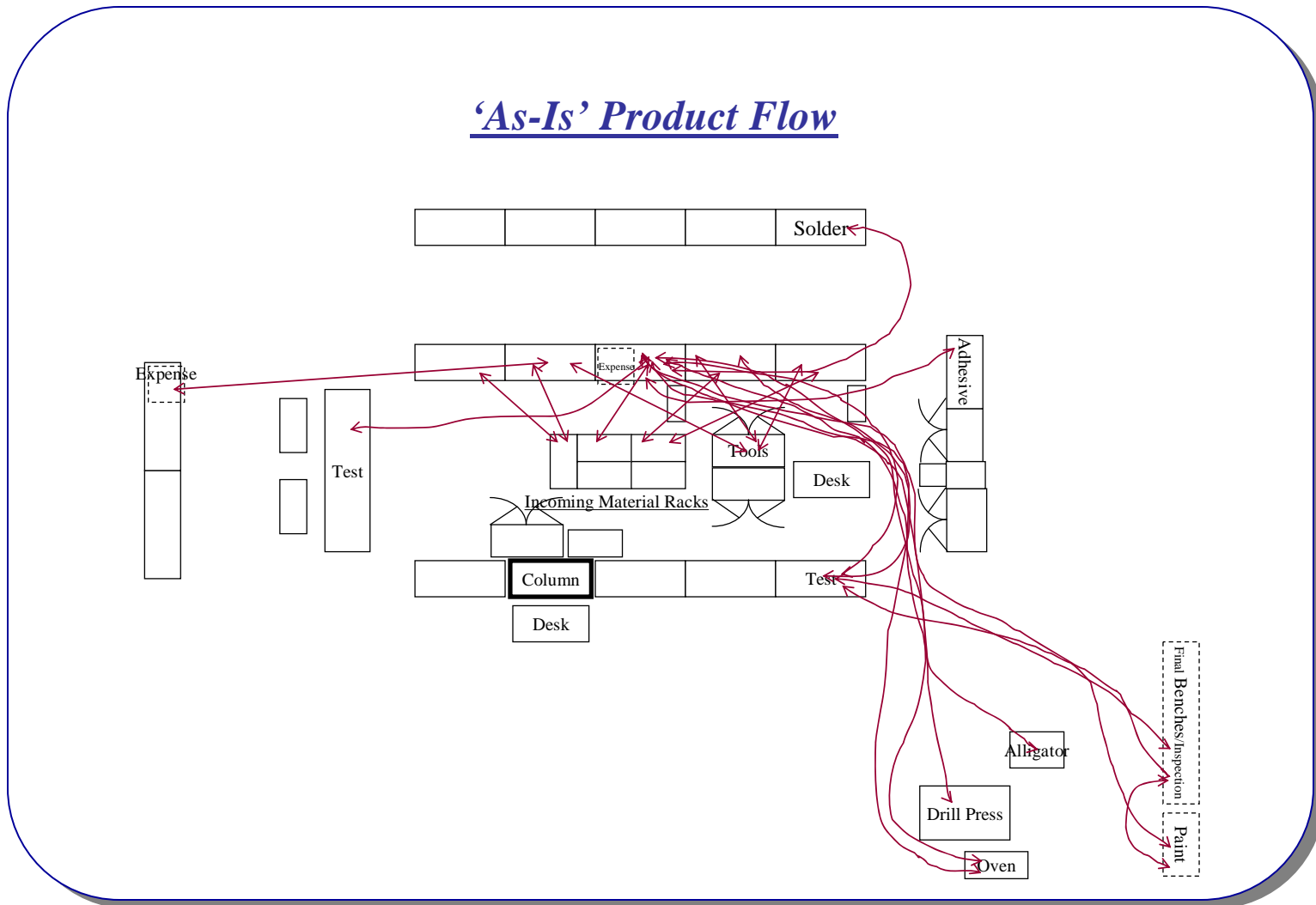
Example :Central Processing Area -After



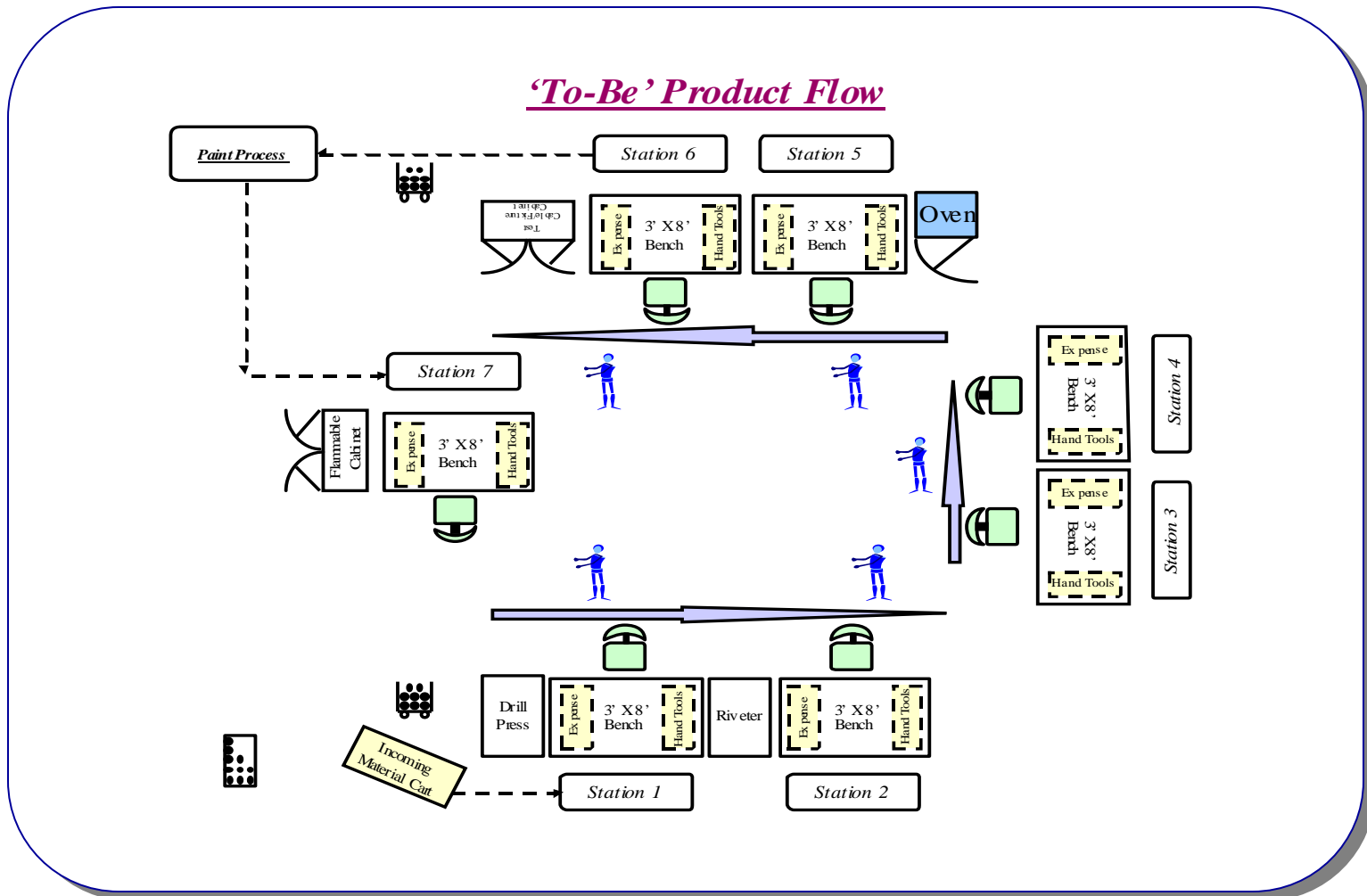


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Spaghetti Chart Example - "Before"



Spaghetti Chart Example - "After"





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Spaghetti Chart Advice

- Don't just draw one line for a route
 - draw a line for every trip
- Color code
 - to distinguish different people or products
- Look for differences
 - by time of day, person, job function, etc.
- Construct a Spaghetti Chart as you walk the process

Use whatever is useful to aid communication and understanding.



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Looking at Flow using Spaghetti Diagram

Does the product/process move from one value-adding step right to the next one?

A Spaghetti Diagram as a track of the physical flow of a product

- Track the route of the product
- Measure the distance traveled
- Look for potential problems:
 - Long route
 - Confusing routes
 - Back tracks/loop backs
 - Crossing tracks
- The result of these problems may be:
 - Long lead times
 - Lost product
 - Defects
 - What else?



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Benefits of Spaghetti Charting

- Identifies Inefficiencies in Area/Plant Layout
- Identifies Opportunities For Less Handling
- Identifies Opportunities For Better Workforce Communication
- Identifies Resource Allocation Opportunities
- Identifies Opportunities For Safety Improvements



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Construction of a Spaghetti Chart

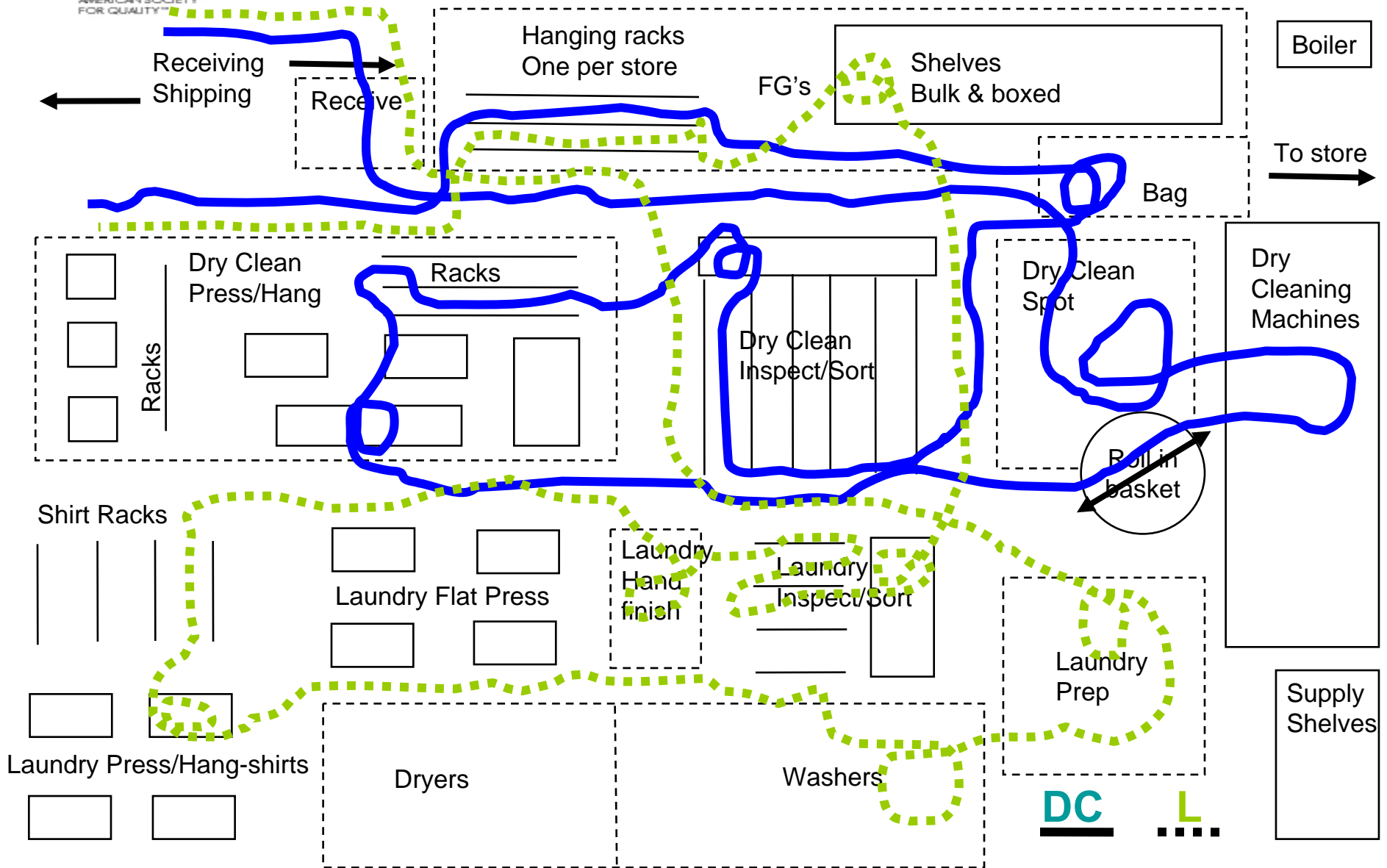
- Sketch or Obtain “Facility Layout, Map”
- ***“Become the Product”***
 - Walk the Process As if You Were the Product (a requisition, a specimen Tube, a file, etc.)
 - Mark the Process Locations and Steps on the Layout
- Connect the Dots in Accordance With the Actual ‘Travel or Walk Patterns’ -- use arrows to show workflow
- Calculate the Distance
- Revise layout to minimize unnecessary motion and conveyance time
- Get concurrence on a new layout and implement it

Where is There Excessive or Unnecessary Movement?



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Current State Flow Spaghetti Diagram





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What's Wrong with this Flow?

- There is no continuous flow
- Travel distance is long and time consuming
- The track is confusing
- There are a number of collision points
- It is difficult to determine what to work on next
- There are many opportunities for product to wait
- What else?



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Questions





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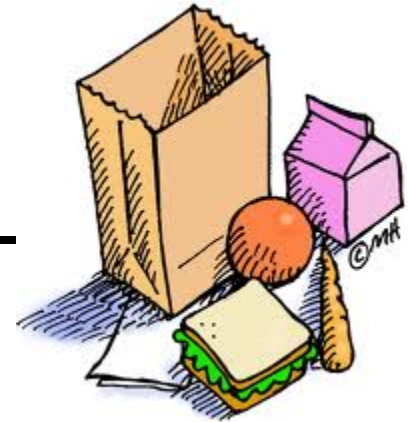
Exercise

Spaghetti Exercise (Handout)



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Spaghetti Chart Exercise- “Getting Lunch”



- Get lunch as directed by the provided SOP (handout)
- Use the Cafeteria Layout provided in the SOP
- Create a Spaghetti Diagram



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Next Steps

- Form teams of 2 – 4 people :
- Get With Your Team and Identify Improvement Opportunities:
 - How Can We Reduce Travel Distance?
 - How Can We Reduce Product Handling?
 - How Can We Layout the Process to Improve Workforce Communication?
 - Can We Positively Impact Employee Safety?
 - Develop Plans For Implementation
- Using a flipchart, re-layout the cafeteria to minimize travel through the cafeteria in addition to reducing the opportunity for an accident.
- Choose a spokesperson to explain your improvements to the class.